CULTURAL ASPECTS OF INFANT UNDERNUTRITION AMONG THE LUJERE PEOPLE OF PAPUA NEW GUINEA

A NURSING PERSPECTIVE

A THESIS PRESENTED IN PARTIAL
FULFILMENT OF REQUIREMENTS FOR THE DEGREE
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ABSTRACT

A field study of five months has been undertaken to determine the causal or predisposing factors related to the prevalence of undernutrition in the Lujere infants and children of Papua New Guinea. Strategies used in the field study include:

- visiting eight venues and weighing infants from fifteen villages at regular intervals, variation in the weighing schedule occurred and are discussed
- participant observations which incorporated unstructured interviews and ethnographic recordings.
- the maintenance of a daily journal, in which all activities and cultural interactions related to the study were noted, has been used as a basis for the descriptive sections of the field study.

An anthropological and a nursing perspective has been combined into a "transcultural" nursing approach.

The results obtained through these field work strategies show: of 477 infants regularly weighed 27.25% of the infants were seen as well nourished and 72.75% suffered from undernutrition in varying degrees. 19.25% of the undernourished infants were deemed to suffer from severe undernutrition.

Causal factors for the high percentage of undernutrition were seen to be related to:

- insufficiencies in subsistence patterns mainly due to climatic factors which govern when hunting, gathering, fishing and gardening activities take place.

- the well developed cultural patterns which determined what portion of the available foods were given to infants and children, and when it was culturally acceptable for them to be given

- incongruity in relation to health care delivery between the care givers and receivers. The dominant features here were the two different philosophies of causality and treatment of disease. This incongruity generally tended to prolong the duration of undernutrition experienced by Lujere infants and children.

These factors need urgent attention and it is recommended that, together with health care givers, the Lujere people need to become aware of and encouraged to use community self care. This self care should amalgamate salient aspects of their own care ideas with prominent aspects of the western health care system.

PREFACE

This study stems from personal experiences the author has had as a missionary nurse in various provinces of Papua New Guinea from 1962 to 1972. One of the major concerns the author had during this period was with the nutrition of children under five years of age.

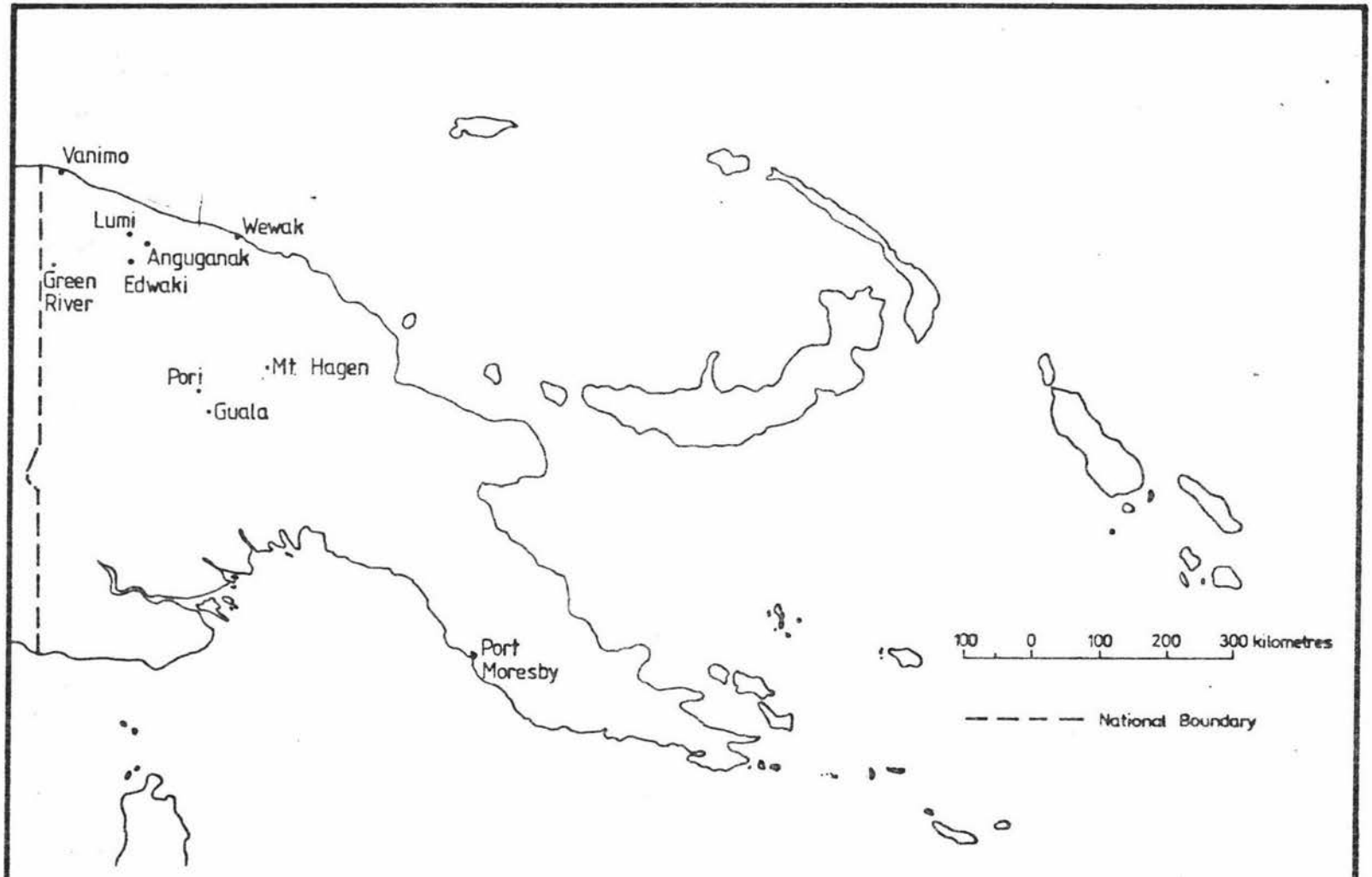
In Papua New Guinea, work was undertaken as a nurse with the Christian Missions in Many Lands, a missionary organization which is an outreach movement of the Open Brethren Assemblies. As a missionary nurse, monthly patrols were made to villages in remote areas of the Western Sepik and Southern Highlands provinces, giving Christian instruction and conducting infant welfare clinics. The latter activity was carried out under the guidance of the Department of Health, Papua New Guinea. During these ten years work was based at Anguganak, Green River, Yellow River (Edwaki) and Lumi in the West Sepik Province and Guala and Pori in the Southern Highlands Province. Map 1[1] gives the locations of these settlements.

Whilst based at Anguganak 1963-1964, the author assisted Dr Sturt with research related to infant mortality. In 1968 Dr Sturt, along with co-author Dr Stanhope, published a paper "Mortality and Population Patterns of Anguganak", in The Papua New Guinea Medical Journal.

At Lumi 1977-1978 similar assistance was given to Dr Wark who wrote, with co-author Dr Malcolm, "Growth and development of the Lumi child in the Sepik district of New Guinea". This was published in 1969 in the Australian Medical Journal.

A transfer was made in 1973 to work for the Department of Health as a nurse tutor, at first at Mt Hagen Community Hospital and then at Mt Ambra Aid-post Training School.

1- Map 1 is adapted from a Map included in Sturt 1982



Map I : Papua New Guinea

The purpose behind this change was to train others who could, in turn, help alleviate undernutrition and other health problems.

In 1973 the author published a paper in the Tropical Doctor, entitled "Beliefs of the Wapei people about conception, child birth and early childhood".

In 1974, after twelve years of monitoring the health of infants under five years the author returned to New Zealand. The author took with her a marked feeling of dissonance between:

- the nursing/health activities which were carried out to encourage families to improve the nutritional status of their infants
  and
- the unknown variables associated with the incidence of undernutrition.

This deep feeling of dissonance promoted the desire to develop skills which could help the investigation of the nutritional aspects of infant rearing, and, as well, develop effective and appropriate nursing interventions. A desire to increase knowledge and understanding and, in adition develop research skills led to the commencement of studies at Massey University in 1975.

It was during university studies that the author came to understand the principles of the transcultural nursing which she unwittingly had been practising for many years. As nursing and anthropology were integrated while giving nursing care. Study at university made it possible to read much on the subject and to relate this knowledge to previous experiences.

A definition that has proved to have relevance in the author's understanding of transcultural nursing practice

is that of Brinks (1976):

> Transcultural nursing is the fusion of nursing and anthropology in both theory and practice. Nursing is an active profession, it does things to, for and with people. It is the clinical component that makes transcultural nursing NURSING and the cultural component of clinical practice which makes it transcultural, both components must be present. (p. 182)

Following completion of undergraduate studies in nursing, plans were made for a programme of graduate research, specially focused on the problem of undernutrition in Lujere infants.

Locating the Research Area

During the year 1980 preparation began for a return to the West Sepik province of Papua New Guinea. By this time, the sense of dissonance experienced had turned to a compulsion to enquire into the hidden variables (now believed to be socio-cultural factors) that were affecting the nutritional status of Lujere infants under five years of age.

The Christian Missions in Many Lands, previous Papua New Guinea employers, were contacted regarding a study. In response they recommended that there was a need to do such research with the 3,000 Lujere people who lived in fifteen villages near the Edwaki Health Sub-centre. Map I shows Edwaki in relation to the Christian Missions in Many Lands head office at Anguganak, and its proximity to Wewak the nearest urban town of some size.

Arrangements were then made for the author and Ms Martin, an M. Phil. student from Massey University to spend five months, January to May 1982, surveying health and, in particular, the nutritional apsects of rearing infants

under five years of age. On December 19, 1981 the team flew into the Yellow River Mission airstrip, and commenced village visiting on January 4. There were fiteen villages in the study and by May 28 thirteen had had five visits and two had had four visits. Subsequently, a return was made to New Zealand via Australia. It is pertinent to note that this brief diversion to Australia provided the opportunity to discuss certain of the research findings with others who had experience in this field.

They endorsed the need to put these findings on paper in the form of a research report.

ACKNOWLEDGEMENTS

I would like to record my thanks to all the people who made this thesis possible.

True and lasting appreciation goes to my thesis supervisors Dr N. Kinross and Miss M. Idour for their loving expressions of belief, counselling and encouragement.

For their administrative support, help and unending practical support which made the sojourn in Papua New Guinea possible, my thanks are expressed to the

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Personnel directly concerned are: Ossie and Jenny Fountain, Colin and Daphne Sweeney, Miss L. Hyde, Mrs W. Muir, Mr G. Smith, Miss S. Stephens and Miss B. Sundgren.

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GLOSSARY

Ecology: The scientific study of the inter-relations of living organisms and their environment. (Miller & Kean 1962 p. 229)

Ecosystem: The interaction of all living organisms, such as humans, flora, fauna, micro-organisms with each other and with the physical environment, and terrain. The important factor which governs the survival of all living organisms is the movement of food through the system.

Ethnographic recordings: An ethnography is a factural description of the way of life of a specific group of people. (Leininger 1970 p. 12).

Health beliefs: Health is situational that is, it is related to what a people believe to be fullness of life for them. It is an expression of qualities to which they give value. Health is evaluated by many criteria drawn from every corner of a people's life. (Wilson 1975 p. 55)

Health-illness: Health is a word related to the quality of human life in ecological terms, that is, it is not just an individual quality, but is related to life lived together in harmony with the environment. (Wilson 1975 p. 60)

Illness therefore, is related to a break-down in the quality of human life due to a measure of disharmony with the environment.

Horticulture: The science of gardening for the production of fruit vegetables and flowers. The Lujere use the rotation of soil method and is referred to as bush fallow, or shifting cultivation or slash and burn. The Lujere gardening technique involves - felling of trees, leaving the area to dry out, burning of the dried grass and timber, planting, caring by spirits, then reaping.

Human relations dimension: This dimension of care involves the nurse or any other health care practitioner being aware of the clients psychosoical needs and the cultural variables which determine illness behaviours.

Hunting and gathering: Hunting is the pursuit of wild game (animals and birds) by tracking, chasing or watching and waiting. The Lujere hunting tools are the bow-and-arrow with an occasional use of the gun.

Gathering is foraging for wild foods. The Lujere use three types of activities, picking and digging fruit and vegetables and catching or digging for insects and lizards.

Kwashiorkor: The primary cause is a diet low in protein but which does contain some calories. The four constant features of kwashiorkor are - oedema, growth failure, muscle wasting with some retention of subcutaneous fat and psychomotor changes. (adapted from Jelliffe 1968, p. 122).

Marasmus: The primary cause is a diet low in protein and calories, often resulting from too early cessation of breast feeding. The two constant features of marasmus are growth retardation and severe wasting of muscles and of subcutaneous fat. (adapted Jelliffe 1968 p. 135).

Medicine man: 'Nakwaru' (Namie) 'Sanguma man' (pidgin) In Lujere culture and Namie language, sharmanism and witchcraft are combined in the person of the 'Nakwaru' whose dual status as a sharman-witch is expressed in his role of curing and killing. (Mitchell 1977 p. 7)

Nutrition: The sum total of all the operations when a living organism takes from the environment what is needed for fuel growth and repair of tissues (May 1974 p. 32). This implies a consider-ation of several phases:

- food science - the value of available food...
- nutritional physiology - nutritional requirements...
  and
- clinic nutrition - abnormalities resulting from improper food supply..
- public health nutrition - nutritional surveys, nutritional education and supplementary feeding (Wadsworth et al 1972 p. 1).

Participant observations:	These are performed by being in social settings where the researcher participates and observes for the purpose of gathering data relating to the interactions which take place.
Patrolling:	The organizational strategy used in Papua New Guinea for administering health and other services to urban communities. To patrol is to visit villages for routine inspections or infant welfare clinics as in this thesis.
Silvaculture:	A set of interrelated activities directed towards the establishment and maintenance of a permanent association of tree bearing edible materials in areas previously dominated by association of other plants (Rappaport 1967 p. 55). In other words it means the deliberate planting of trees for food.
Subsistence:	An interaction with the environment primarily for providing for the living needs of oneself and one's family rather than for the purpose of marketing.
Traditional values:	This is any concept referring to a desirable or undesirable state of affairs (Spradley and McCurdy 1975 p. 47). The world has values including health and caring values. (Leininger 1978 p. 9)
Transcultural nursing:	This is the fusion of nursing and anthropology.

Nursing is the clinical component and is an interpersonal process with nurturing interactions by the nurse to the client. These interactions are ones of mutual acceptance and trust.

Anthropology is the cultural component. It is having an understanding of a community's beliefs, values, and attitudes which govern customs, and moves expressed by behavioural patterns.

World View: This is a way a culture tends to look out on their world and the universe.... It can provide the nurse and other health personnel with a general overview of how people view life, health and illness and those who give and receive care. (Leininger 1978 p. 94)

Undernutrition: This is the pathological state resulting from the consumption of an inadequate quantity of food over an extended period of time. (Wadsworth et al 1972 p. 49)

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CHAPTER ONE

BACKGROUND TO THE STUDY

As stated in the preface (p. iv-viii) this thesis is based on a field study undertaken in the South Wapei census division of the West Sepik Province of Papua New Guinea. Such a study needs to be placed within a global context in which the geographical and cultural variables are discussed. The content of this chapter:

- places the location of the study within its national and provincial boundaries and discusses the placement of Papua New Guinea in the West Pacific
- provides a brief description of the people of the West Sepik Province
- sets out the aims of the study, the overall and specific objectives, the approach to the study, the nature of the research and methodology, and outlines the organization of the thesis.

LOCATION OF THE STUDY

This field study is centred in the South Wapei census divisison of the West Sepik Province of Papua New Guinea. Each province of Papua New Guinea has several census divisions formed for administration purposes and is administered from a district headquarters.

Papua New Guinea

Map II[1] depicts the placement of the islands of New Guinea in the Western Pacific region. The largest island looks like a prehistoric monster whose head touches the Equator

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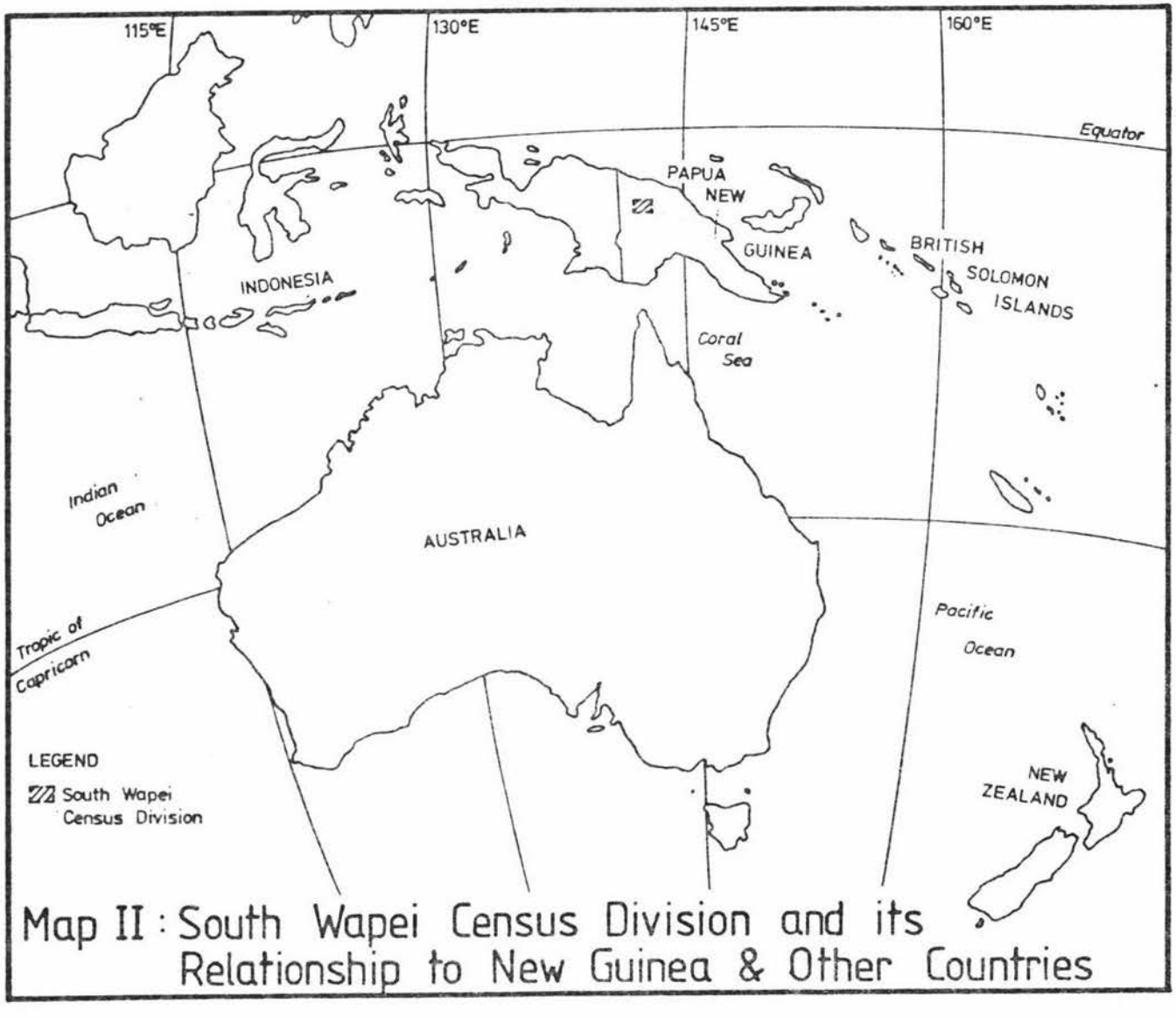
[1] Map II adapted from a map included in Sturt 1982



Map II : South Wapei Census Division and its Relationship to New Guinea & Other Countries

and whose tail lies in the Coral Sea, whilst its claws rest just above the tip of Australia. The islands of New Guinea are situated between longitude of 113° to 151° and latitude from the 0° to 10°. To the south is Australia and the Tropic of Capricorn. To the north is the equator with Indonesia to the west. The largest island of the New Guinea group with its offshore islands, is divided into two countries. Irian Jaya is the country to the west and it is part of Indonesia. The eastern country, known as Papua New Guinea, with a population of approximately three million, gained its independence from Australia in 1975.

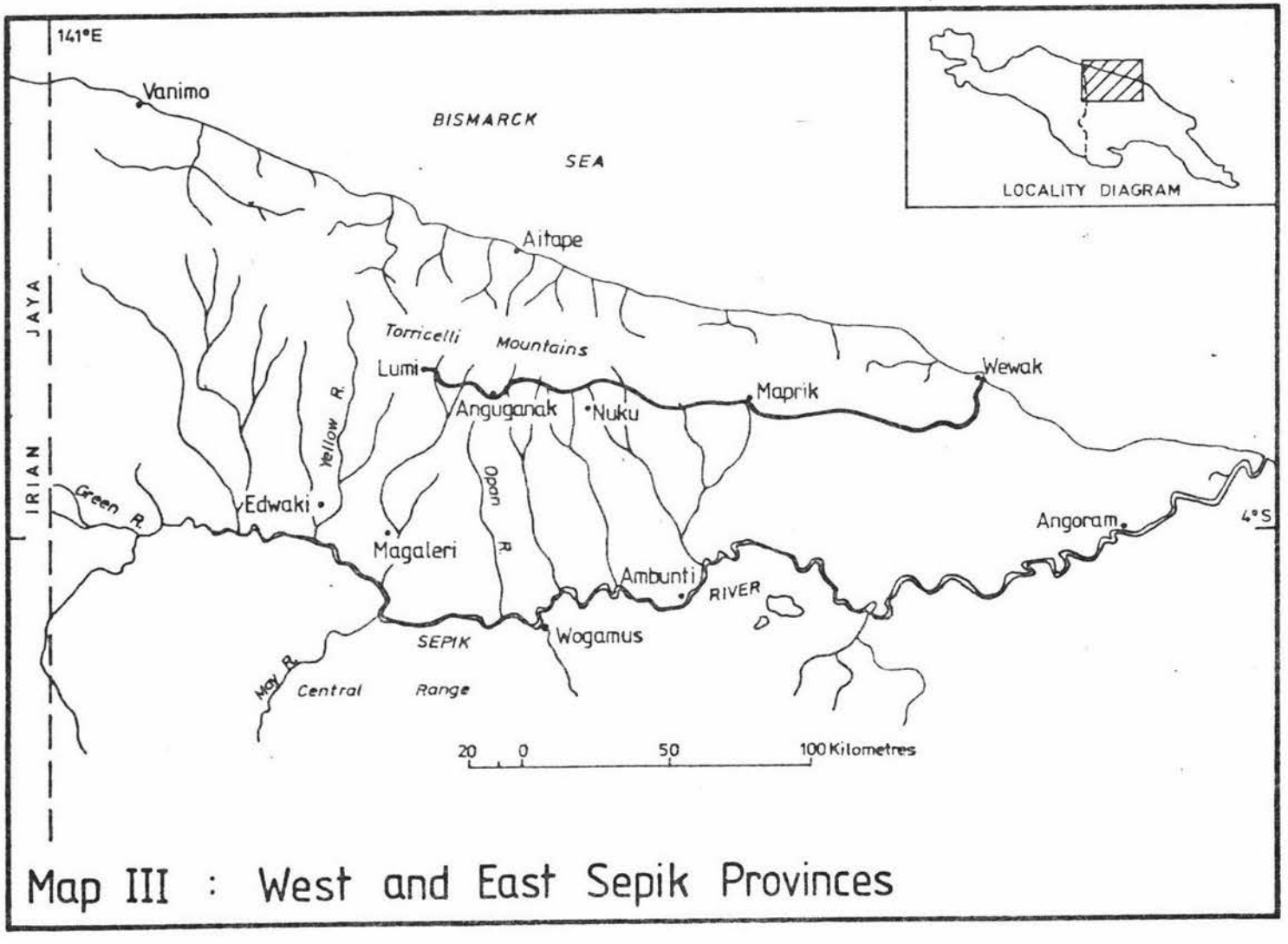
West Sepik Province

The West Sepik Province is situated to the north west of the mainland of Papua New Guinea and covers approximately 40,000 square kilometres. Map III shows this province to have to its western boundary Irian Jaya, to the north is the Bismarck Sea, to the south is high mountain ranges, and to the east is the East Sepik Province.

South Wapei Census Division

Map III[I] shows that the South Wapei area is situated in a reasonably central position in the West Sepik Province. To the north are the foothills of the Torricelli mountains which become progressively smaller and flattened out and stretch south to the Sepik plains and thence to the Sepik River which is the southern border. Geographically the South Wapei area has alluvial soil and is extremely swampy, but near the Sepik River are four low lying hills. Draining the swamp is a network of streams which flow into either the Sand or Yellow River or other rivers to the east of Edwaki. Plate 1.1 illustrates the terrain of the South Wapei area with forest, grasslands and low lying hills.

Map is adapted from Sturt 1982



Map III : West and East Sepik Provinces

PLATE 1.1: Plains of the South Wapei Census Division

PLATE 1.2: The meandering Yellow River

Plate 1.2 shows how the rivers meander through the swamp. The whole area is covered with dense rain forest and some grasslands. The Lujere people live between or on either side of the Sand and Yellow Rivers. The basic facts of this description of the area have come from Sturt's (1975) unpublished thesis and the personal observations of this author.

PEOPLE OF THE STUDY

The people of New Guinea come from a number of ethnic groups but are predominantly Melanesian in origin. The other ethnic groups in the population are Micronesian, Polynesian, Chinese and Caucasian background. Between them they speak over 700 distinct languages with Melanesian Pidgin and Hiri Motu being used as trade languages. Melanesian Pidgin is the most widely spoken of the two. English is known as the language for official records and education. Life in most areas is arranged in village societies. Social organization is usually based on the clan structure and status is usually acquired rather than inherited. Food is obtained mainly by subsistence hunting, fishing, gathering and horticulture with staple foods such as sweet potato, yams, taro, bananas and sago. (The Papua New Guinea National Health Plan 1974-1978).

The Lujere People

The Lujere people are Melanesian in origin. Plates 1.3 and 1.4 depict people who are small in stature, brown skinned, brown eyed with black, closely cropped hair. The red hair of some of the infants seen in Plate 1.4, is one of the indications that they have undernutrition. The Lujere people live in the South Wapei area which has a population of approximately 5,000 people, 3,000 of whom are Lujere. The Lujere people form a discrete ethnic group

PLATE 1.3: Lujere people

PLATE 1.4: Lujere Mothers

speak the Namei language. Three other ethnic groups, with distinctly different languages, make up the rest of the South Wapei population. The South Wapei census division is part of the Lumi district (refer to Map IV[I]).

The Lujere live in village communities based on clan relationships. They are hunters and for this purpose live in hunting camps and hunt in extended family bands. Mitchell 1975 explains:

> The Lujere settlement pattern is semi-sedentary. Although each family belongs to a specific hamlet, much of the year is spent dispersed in various hunting camps and the hamlet is not visited for months at a time. (p. 417)

The Lujere people literally subsist by interaction within their forest. They live primarily by hunting animals, by fishing for fish, by gathering wild plants, by using silva-culture to obtain sago, green leaves and fruits and also by horticulture for vegetables. The staple foods collected by the above methods are sago, green leaves and meat. The latter is sometimes difficult to obtain.

The Lujere's traditional belief system of animism also stems from the forest. They believe that objects such as the swamp, water holes, trees, plants and their ancestors, have super-natural spiritual powers, and human-like charact-eristics. They also believe that these spiritual powers are able to manipulate them in a capricious unaccountable fashion, through threats of illness and death. Along with the medicine man's magical and counter magical powers these supernatural powers are greatly feared. This fear causes the Lujere to try and live in a righteous fashion so as to please the spiritual and human being. Therefore, it could be said that the supernatural powers of the forest and

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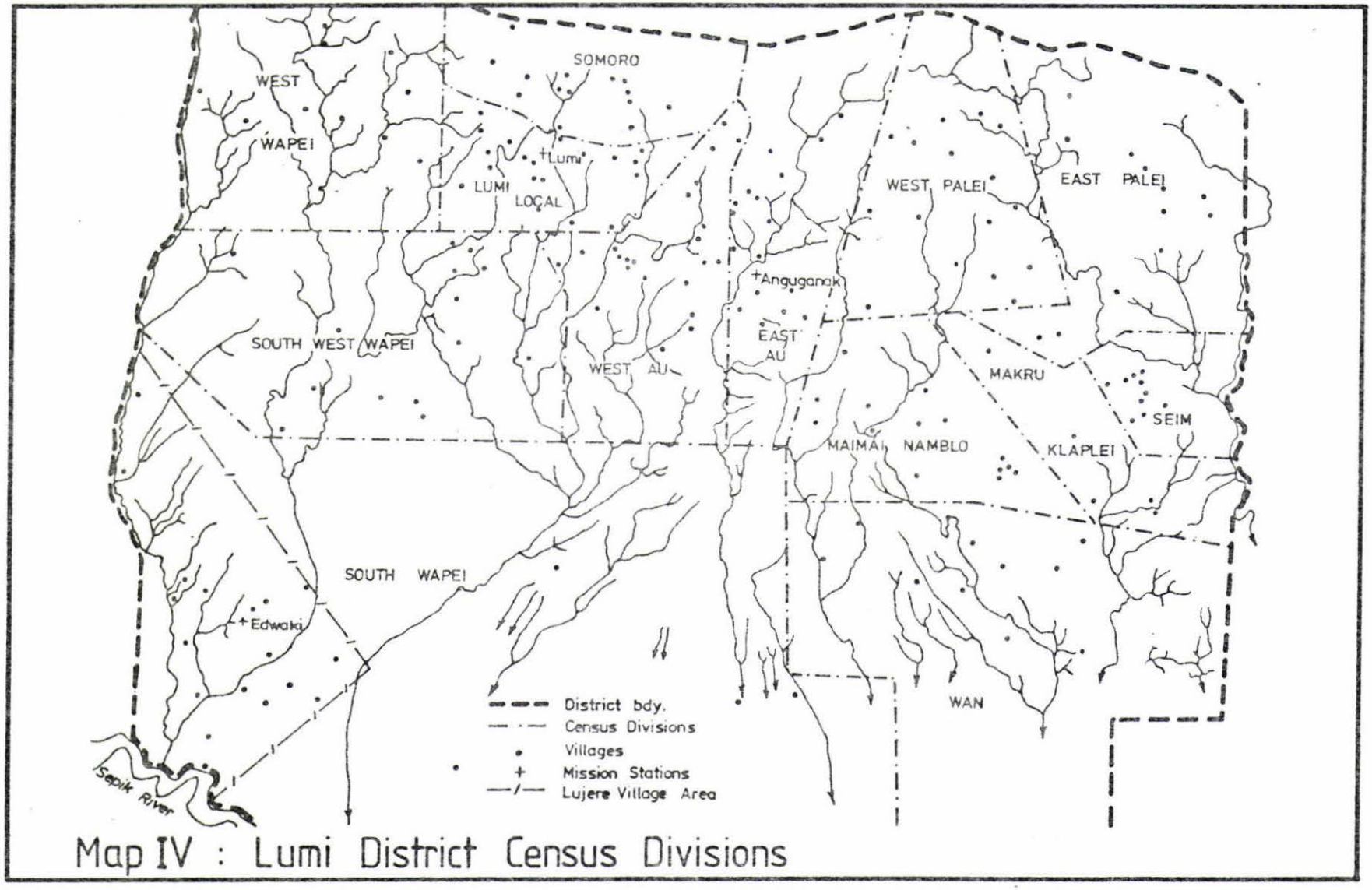
I Map IV is adapted from a map enclosed in Fountain's (1966) thesis.



Map IV : Lumi District Census Divisions

the medicine man hold the key to health and illness. Other nearby indigenous populations refer to them as swamp people. For administrative purposes they are usually referred to as the Yellow River people. Mitchell (1975) terms them as Lujere which comes from the Namei word for people, 'lu' means man, 'jere' woman.

Mitchell (1975) writes:

> They are referred to as swamp or Yellow River people, I shall call them 'Lujere' a word in their own language meaning people. (p. 413)

Some people wonder how the Lujere people came to live in the swamp and why they stay. At night around the camp fire the author has often heard the legend which states that their own territory was claimed for them by ancestors known as Wilaki and Krenmau.

THE COMING OF THE LUJERE TO THE SOUTH WAPEI AREA

The legend has it that Wilaki and Krenmau as fully grown men suddenly came to life by coming out of the ground on the top of Edwaki hill near the Sepik River. These two brothers built a shelter there. Wilaki was the adventurous brother who took to wandering around the other hills and swamp land. On the hill called Mauwi which is in close proximity to Edwaki, Wilaki observed some beautiful pigeons. There was one special female pigeon he became attracted to. To befriend it he built a pigeon house on the top of an iron wood tree and tried to lure her inside, which he did after waiting a long time.

Krenmau being a good brother built a house for them at Edwaki. There Wilaki and his pigeon wife lived and brought up two children. Wilaki continued to wander through the area and claimed it as territory for his descendants. His descendants still wander this territory and continually tell their children this legend of their origin.

Personal communication with Mitchell (1983) reveals that this legend was told to him. But the version he heard had a man and his dog who came up the Sepik River to the Iwani or (Mauwi) hill and took a bird wife.

AIM OF THE STUDY

The aim of this field study is:

. To determine the nature of the variables which may contribute to undernutrition in Lujere children under five years of age.

OVERALL OBJECTIVES OF THE THESIS

Objectives of the thesis are:

. to define and discuss the nature of the problem of infant undernutrition

. to identify the factors in the Lujere ecosystem which lead to undernutrition

. to examine changes in the incidence of undernutrition over time

. to draw implications from the findings for transcultural nursing and to make recommendations for future development.

THEORETICAL APPROACH TO THE STUDY

The approach to this study has both a nursing and an anthropologic component.

The nursing approach

The nursing approach is basically one of human relationships with mutual acceptance by both the nurse and client. The nurse-client relationship is a helpful, meaningful, purposeful interaction where clients' needs are met for preventive nurturant and curative reasons.

The author subscribes to the philosophical approach taken by the College of Applied Health Sciences (PNG) (1982).

- *Nursing* is human interaction between the patient and the nurse. This interaction must have mutual understanding, respect and trust for each other

- *Nursing* is giving high quality nursing care using nursing process steps, as a guide to deliver the care that is required by an individual, sick or well.

- *Nursing* is the acceptance of the "total" human being; caring through commitment; assisting man to adapt to his/her environment and being accountable for the decision made and the responsibilities taken.

If high quality care is to be given with acceptance of the "total" human being,there is a need to use the anthropologic component alongside the nursing component. This combined approach gives a deeper understanding of the "total" human being who is the client.

The anthropological approach

The anthropological approach brings to nursing the cultural component. Firstly, it involves the community served and allows their beliefs on health to be understood and used. Secondly it requires recognition of the culture of the nurse or caregiver.

Brinks (1976) asks the question -

> What is the cultural variable?

She answers -

> The list of cultural variables is an extensive one. All aspects of living have a cultural component. The easiest definition to remember about culture, is that whatever a person believes to be true or right about any aspect of his life, stems from his culture. (p. 3)

The anthropological approach, therefore, brings a balanced view to nursing across cultures. It brings together the cultural components of the care giver and the receiver of care and enables comparisons to be made in respect to health and illness, for both the nurse and client have beliefs about health that they feel are true and right.

Transcultural nursing

Nursing and anthropology fuse together to make transcultural nursing. The nursing component is one of action - by caring for and considering peoples' needs it does things for and with people. The anthropological component considers people in their cultural environment and extends nursing to transcultural nursing.

It is for this reason that the theoretical approach taken in this thesis is a transcultural nursing approach formed from a fusion of anthropology and nursing insights. The author agrees with Powles (1973) that human progress and the underlying factors that support behavioural choices:

> ... can be traced in anthropological terms from hunter-gatherers to modern urban dwellers. The development of disease can be traced in parallel, i.e. the development of man and disease can be defined as the result of the interaction of man and his environment and therefore of the type of society that man has evolved for himself. (p. 2)

As this descriptive study will demonstrate, the development of undernutrition in Lujere infants and children under five years of age appears to be one outcome of the interaction of the Lujere people within their environment. 'Environment' is used here to refer to the ecosystem or total environment, that is, the physical and social systems of people who live largely as hunters and gatherers.

In her book Nursing and Anthropology: Two Worlds' Blend. (1970) Leininger emphasises the significance of using an anthropological and cultural concept in nursing. Leininger (1970) comments:

> ... this book has been designed to stimulate nurses so that they will blend together nursing knowledge and anthropology concepts to ensure that people will receive good nursing care. (p. x)

In keeping with another of Leininger's aims it is hoped that this study will produce new insights into people's behaviour and health needs. The particular people under study here are the Lujere people of Papua New Guinea. It is *how* the Lujere people interact with their ecosystem that determines the nutritional status of their under five year olds.

The main variables that are involved in this study are drawn from nursing and anthropology.

Leininger (1978) defines transcultural nursing as:

> ... the area of nursing which focuses upon comparative study and analysis of different cultures and subcultures with respect to nursing and health, illness, caring, practices, beliefs and values with the goal of generating scientific and humanistic knowledge to provide cultural specific and cultural universal nursing care. (p. 335)

This study of the Lujere people comes within this definition. In this case the focus is on 'undernutrition' in infants and children under five, who are aptly described in Melanesian Pidgin as 'skin bun nating', skin, bone and nothing. It is the successful fusion of nursing and anthropology using knowledge and experience which will produce some new ideas for future scientific and humanistic pursuit in the nursing field.

In the concluding chapters of this study implications will be drawn as nursing and anthropologic insights develop and generate new ideas for the nutritional well-being of the Lujere under five year olds. Nursing within a medical framework is occupied with care for a body which in some way does not function well. But caring for Melanesian infants with undernutrition requires a nursing perspective more broadly based in natural and social sciences. This is essential if effective health and nursing practices are to emerge, which meet the socio-cultural and physical health needs of the Lujere people and their under five year olds. It is not enough to understand and treat the underlying biology. Nurses who work in transcultural settings require a thorough understanding of the relationships between the people of the area and their ecosystem. They must also have a real appreciation of the distortion in interaction which may occur when a predominantly western health care delivery is used.

NATURE OF THE RESEARCH

This requires that the problem be defined and then that certain practical steps be planned to research the problem.

Defining the problem

The essential problem is that of understanding undernutrition and its causality in infants under five years of age. More specifically, it is that of undernutrition in a population of Lujere infants who have come under the author's care and surveillance over a period of some years.

The condition of undernutrition in Lujere infants and children is the subject of full examination in chapter six. Some general comments on undernutrition, however, are appropriate at this point. Undernutrition is not exclusive to Papua New Guinea but occurs in a world wide perspective.

Over the years undernutrition has been known by many different names. Some of these are, 'protein-energy malnutrition' as De Maeyer (1976) writes, 'malnutrition' and 'undernutrition' as King (1966) states, and 'protein-calorie malnutrition' as Burgess (1962) emphasises In this study all of these terms are equated with 'undernutrition'.

De-Maeyer (1976) writes:

> Protein-energy malnutrition is the most wide spread form of malnutrition in the world. (p. 27)

King (1966) states:

> Malnutrition in early childhood is one of the dominant problems in early childhood in most developing countries. Though easily recognized in its gross forms (marasmus and kwashiorkor), it is often missed in mild cases and the prevalence of undernutrition in a community is apt to be grossly underestimated. (p. 14.1)

Burgess (1962) emphasises:

> Protein-calorie malnutrition is found where diets are habitually poor in protein but provide calories in quantities that vary from gross inadequacy to excess. It is known under different names in many parts of the world. (p.4)

Undernutrition is often missed in its mild form and is the result of inadequate food intake. It is always associated with a deficiency of protein and energy nutrients.

In the writings of Wadsworth et al (1972), Jelliffe (1963), Burton (1976) and King et al (1978) the basic facts of undernutrition are described and are generally applied to the under five year olds. In the mild form Jelliffe (1963) terms undernutrition as 'traditional growth failure' and Burton (1976) as 'primary malnutrition'. They both agree that the infant suffers from slow or inert growth with thin limbs and small buttocks. Burton (1976) comments that if infants suffering from 'primary malnutrition' do not receive adequate treatment they can progress into the conditions of marasmus and kwashiorkor. No instance of kwashiorkor was recognized in the course of this study, but marasmus has occasionally been seen and treated.

Wadsworth et al (1972) and King et al (1978) both agree that marasmus can be recognized by:

retarded growth
gross loss of subcutaneous fat
wasted muscle
apathy and hunger
change in hair colouring

Undernutrition is a world wide deficiency disease due to the lack of food containing the elements protein and carbohydrates (the element which provides energy) or just protein. The onset is gradual and the infant first shows signs of weight loss, then as the condition worsens muscle waste occurs and subcutaneous fat disappears. The Melanesian Pidgin definition 'skin bun nating' translated "skin and bone" is an apt description of undernutrition.

The specific objectives of the field study

Subsequent to defining the problem specific objectives of the study can be formulated:

- To identify clinical evidence of undernutrition in Lujere infants and children under five years of age.
- To examine change in their undernutrition over time.
- To compare the differences in undernutrition between infants and children of different villages.
- To observe subsistence patterns and understand their relationship to the ecology.
- To observe and identify cultural patterns in regard to Lujere infant nutrition.
- To consider the measure of harmony and disharmony between the indigenous and introduced health care systems.
- To examine implications for transcultural nursing.
- To examine the findings in the light of the relevant literature.

Method of approach to the study

This study records sequences of events and interaction with the Lujere people, which involved in varying degrees, all four members of a team led by the author to the South Wapei district of the West Sepik province of Papua New Guinea.

The team moved from village to village practising, or assisting the practice of, transcultural nursing in addition to the collection of data. As the team moved through the Lujere villages they:

- observed clinical evidence of undernutrition
- examined Lujere ecology and subsistence patterns
- witnessed cultural attitudes and practices regarding Lujere infants
- interacted with clients and introduced alternative health care which is applied alongside the already established indigenous health care system
- recognized the implications for transcultural nursing.

Data was collected on all these subject areas and was recorded in a journal (refer chapter two) and in other records which together form the basis of this field study report. This thesis reports on the above, using the method described in chapter two. With an elaboration of the "patrol", the main strategy used in the study being the subject of discussion in chapter three. Chapter four describes the Lujere ecology and subsistence patterns. There are explanations on how the climate can effect subsistence patterns and on the different subsistence patterns. Chapter five brings together the two health care systems, namely the Lujere system and the western introduced system. There are descriptions on salient points of each and how they could interact. Chapter six describes how cultural attitudes related to infant nutritional practices can contribute to an inadequate diet. An example of this is withholding solids until the infant's teeth erupt. Chapter seven describes undernutrition and reports on a study dealing with growth using Harvard weight for age mean. This chapter also includes a case study which illustrates marasmus, and how infection and poor maternal lactation can affect the inadequate diet. In chapter eight an analysis of the variations in weight distribution of Lujere infants and children over the period of the five months of the study is discussed. Finally, chapter nine presents conclusions about the study and its findings, implications are drawn, and recommendations are made for future handling of undernutrition among the Lujere.

CHAPTER TWO

STRATEGIES FOR FIELD WORK

The specific objectives formulated for the field study serve, as noted in chapter one to direct the nature of the research required for generating data (p. 15). This involved living and interacting with the Lujere people in their own environment over a period of five months. It is therefore important in this chapter to discuss the following:

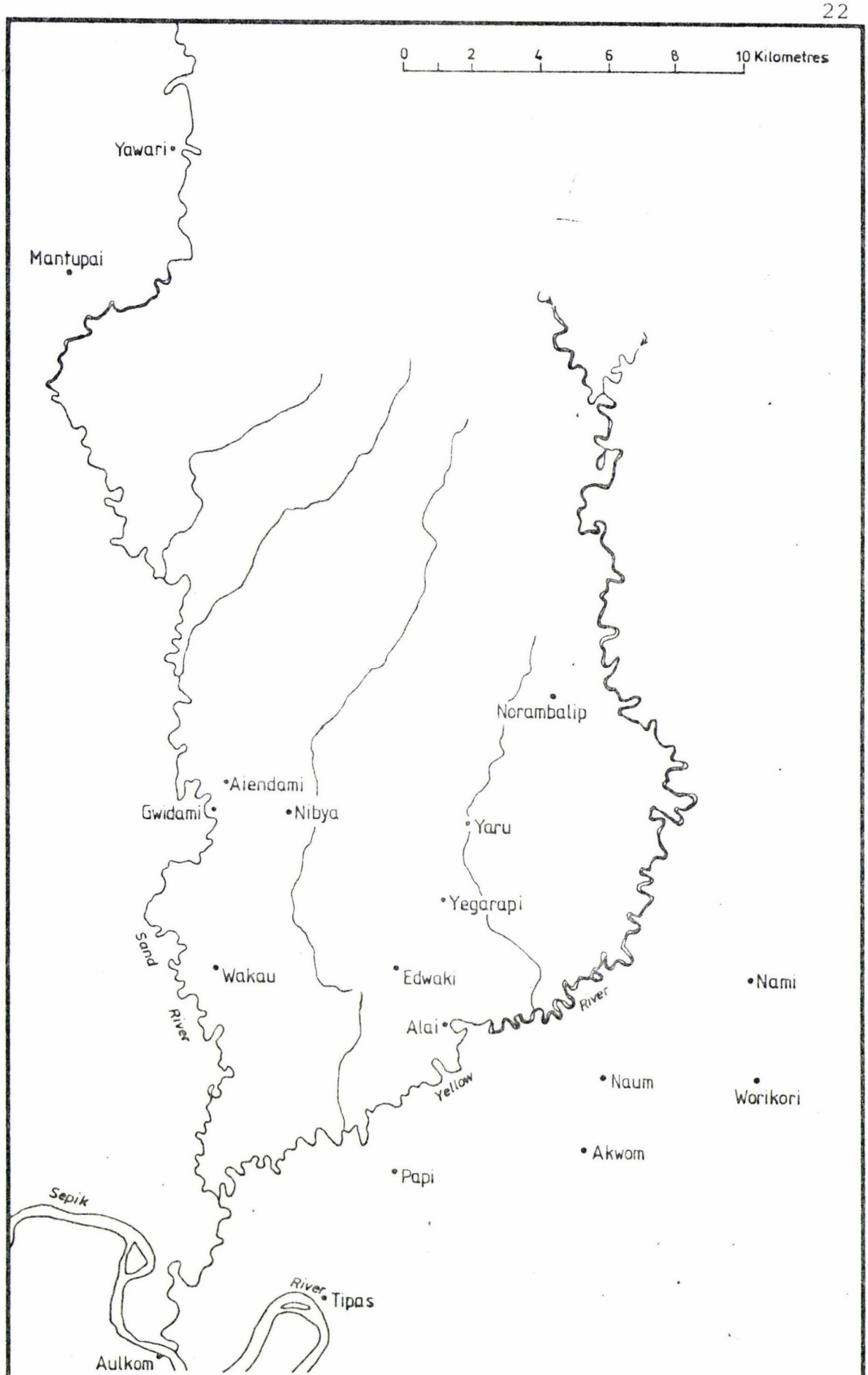
- the field setting
- field work language
- the methods of generation of data.

THE FIELD SETTING

The Lujere people have been chosen as subjects for the field study because they are the largest ethnic group in the West Sepik area and live within a reasonable walking distance of the Yellow River Mission at Edwaki. Map V[I] shows that the 3,000 Lujere people live in fifteen villages near and around the Sepik, Sand and Yellow Rivers. Certain practicalities involving the field setting included:

- suitable accommodation
- selection of supplies with attention paid to what could be obtained locally
- decisions as to the need for and selection of a field work team.

[I] Map V is copied from sheet 7290 (Edition One) Series T683 topographic survey (P.N.G. National Mapping Bureau)



Map V: Lujere Villages

Tables 2.1 and 2.2 shows the population spread, walking distances and venues for clinics. This also emphasises that walking is time consuming especially when the mud is ankle deep and rivers and streams are flooded. On one occasion the floods were so great that the team was unable to reach Mantupai. Table 2.2 also reveals that there were seven venues for clinics and at most of these the team slept at least one night a month. These overnight stops were opportune for collecting data related to the cultural component of transcultural nursing.

The Lujere people alternatively reside between villages and bush camps spending several months at either. These villages and bush camps are spread out through the bush and grasslands. There are no roads but walking tracks are plentiful which are muddy most of the time. These tracks criss cross streams and the two rivers, the Sand (Kago) and the Yellow. Usually to cross the Yellow a canoe is needed. Map V shows that Edwaki, where the team was based, is reasonably central to the other villages and is situated in the western area of the South Wapei districts.

To reach villages where infant welfare clinics are held the team needed to walk from one and a half hours to nine and a half hours in one day. Venues for these clinics are:

Worikori
Norambalip
Akwom
Papi
Tipas
Nibaija and
Mantupai

No field study can proceed without decisions about practical matters such as choosing a team and considering the ethical principles related to collecting data, and the source of finance for the team.

TABLE 2.1: NATIONAL CENSUS (1980) AND CLINIC POPULATION FIGURES (1982)

Village	Total Population	Zero to Five Population	Clinic Population
Yegarapi	245	47	41
Yaru	160	32	31
Alai	143	29	30
Norambalip	230	45	43
Akwom	257	36	38
Naum	165	31	26
Worikori	175	36	31
Nami	230	31	36
Papi	223	33	35
Tipas	136	27	43
Iwani (Aulkwom)	140	14	20
Iwani (Wakau)	186	33	22
Gwidami	282	55	54
Aiendami	206	33	18
Mantupai	162	26	23
Yawari	219	37	35

TABLE 2.2: MONTHLY SCHEDULE OF CLINIC

Weeks	Venue	Village	Total Clinic Population	One Way Walking Time
One	Edwaki (Health Sub-centre)	Yegarapi, Yaru	72	
		Al	30	
	Norambalip	Norambalip	43	2 hours
Two	Akwom (Aid post)	Akwom, Naum	64	$2\frac{1}{2}$ hours
	Worikori (Rest house)	Worikori, Nami	67	$1\frac{1}{2}$ hours passed Akwom
	Papi (Rest house)	Papi	35	2 hours
Three	Tipas (Rest house)	Tipas, Iwani (Augom)	73	$1\frac{1}{2}$ hours passed Babei
Four	Nibaija (School house)	Iwani (Wakau), Gwidami, Aiendami	94	2 hours
	Mantupai (Rest house)	Mantupai, Yuwari	58	$7\frac{1}{2}$ hours passed Nibaija

The field work team

A team of people assisted with the organization of the project and with the collection of data in the field. An expatriate nurse (Ms M. Martin) helped with recording clinical data and photography. Two Edwaki residents, Wilaki and his wife Yorei fulfilled the roles of companions, carriers, guides and interpreters. Wulinaki also fulfilled the role of pastor and Yorei did the work of an auxiliary. Wulinaki is well known to the author as he acted as a guide and carrier on trips through the bush in 1966. As Lujeres, they were a tremendous help for data collection as they introduced us to their friends and relatives. They proved to have the skill of encouraging others to talk to and demonstrate to the expatriate members of the team their way of doing things. This team, based at Edwaki, went out to villages on a weekly basis spending one to three nights camping out. This regular sequence of visits to villages and bush camps is called a 'patrol' both in Pidgin and in English. A typical 'patrol' is described in chapter three.

Ethical principles

The choice of a team and the use of their help to collect data involved ethical principles. Through the interpreters consent was asked from informants who gave information and demonstrated skills. As well, the author explained through interpreters, the purpose of the research; who would benefit from it; and the source of the finance. These principles were adhered to whenever there was a first contact with Lujere persons willing to share information or demonstrate a skill.

Financial Support

The finance for this research came from a variety of sources. The Open Brethren Assemblies subsidised travelling expenses from New Zealand to Papua New Guinea. The Christian Mission in Many Lands employed the author and Ms Martin as nurses and obtained money for wages from the West Sepik Health Department.

FIELD WORK LANGUAGES

Often the babbling of three languages at one time could be heard. These languages were English, the language of the nurses and of some of the Health-sub-centre staff; Melanesian Pidgin (the trade language of Papua New Guinea) which was spoken amongst the team; and then there was Namie, spoken solely by the Lujere people. The author speaks fluent English and Melanesian Pidgin but was dependent upon interpreters to translate the Namie language into Melanesian Pidgin.

English - was the language used for the recording of data even though information was usually given in Melanesian Pidgin and Namei. Initially points might be recorded in these two languages.

Melanesian Pidgin - a language in its own right which was developed in Papua New Guinea. Its orthography was published in approximately 1955 by Milhalic, a priest. This was the language used to collect data. The Lujere members of the team and others who understood both Pidgin and Namei interpreted for those not familiar with Namei or English.

Namie - an oral language, for which no orthography has been published. It was named thus, by a government official who when writing patrol reports some time after World War II referred to all the Lumi district languages by their word for 'No'. Namei is spoken by 3,000 Lujere people, the other 2,000 who live in the South Wapei area speak other distinct languages.

GENERATING DATA

The use of interpreters

Williams (1967) writes:

> The decision to use an interpreter to assist in the course of observation and inquiry is a crucial matter that can affect the course and nature of research... (p. 31)

The author is conscious of the fact that when using interpreters, the data was actually passed through three languages and that each medium put their own interpretation on what was being said. This was an unavoidable bias as the author does not speak Namei and the informants did not understand English or Pidgin. But the reliability of the interpreters (Wulinaki and Yorei) is such that the bias could be said to be minimal.

Informants

These are those Lujere people who were willing to give information. There were always plenty of volunteers, as the young men especially enjoyed sharing their knowledge

They enjoyed relating stories and legends to an audience. Most of the woman were shy about talking to the team. The interpreter-cum-nursing auxiliary, Yorei was extremely

efficient and encouraging and thus, able to get the women to share information. In Plates 2.1 and 2.2 one can see informants who have gathered and are sharing knowledge with the author.

Subjects

These were any people who were willing to demonstrate skills and practices. The team observed subjects interacting while processing sago, fishing, hunting, gardening, cooking food, caring for infants under five years of age, sick and well. The Lujere people seemed to enjoy the team's presence in their villages and bush camps. They were considerate and their help was appreciated and valued by the team. Some were extremely patient and took care to be precise when demonstrating skills and explaining interactions.

To generate data, interaction took place in a variety of settings. Those chosen as informants and subjects were people who would converse freely and allow the team to share activities. Situations used include:

. the Yellow River mission station

. the Edwaki health sub-centre

. the rest houses where the team camped

. the six assembly points and

. the alluvial swamp land where patrollings took place.

PLATE 2.1: Talking with informants in the resthouse

PLATE 2.2: Talking with informants while patrolling

Ethnographic Recordings

The method of ethnographic recording was used because the data deals with the culture of a specific ethnic group.

Ragucci (1972) emphasises:

> Ethnographics, empirically descriptive of the world, provide the chief analytic instrument by which valid cross cultural (transcultural) comparisons are made. (p. 314)

Ethnographic recordings are important in this study because they enable the author to record accurate descriptive data and highlight important points of actual happenings. These points require emphasis for they assist explanation of how cultural variables do, in part lend to an inadequate diet. Ethnographic records, will, when writing up the study, enable accurate comparisons to be made between the Lujere and the Western Cultures.

Leininger 1970 writes:

> An ethnography is a factual description of the way of life of a specific group of people. (p. 12)

Ethnographic recordings in this thesis are the result of recording observations of the Lujere people and of interactions with the Lujere people whilst they were interacting with their ecosystem. The result of such recordings in an ethnography explains how members of a certain society survive by using beliefs, values, attitudes, mores, customs and relating these to behaviours. In this thesis the behaviours observed are those related to subsistence patterns, nutritional practices, and health practices.

Participant observation (as defined by Morris et al and cited by Johnston, 1975)

> Is a process in which the observer's presence in a social situation is maintained for the purpose of scientific investigations. The observer is in a face-to-face relationship with the observed and by participating with them in their natural life setting he gathers data. Thus the observed is part of the context being observed, and he is both modified and is influenced by the context. (p. 84)

The author found that being present at social situations and having face-to-face relationships was advantageous. The author actually witnessed life as lived by the Lujere people in their own environment.

Activities witnessed and in which the author always took part were:

- hunting, gathering, gardening, processing sago and fishing

As well when the opportunity arose:

- food preparations, cooking, infant feeding, care of sick and well infants and skills of the local medicine man were observed and reported on.

Being a participant observer allowed the author to learn living skills from the Lujere people. Also knowing about these helped with explaining about nutrition. The author also realizes that some skills which looked reasonably simple are in fact quite difficult e.g. processing sago.

The question matrix 2:3 was constructed so as to be helpful to the author on patrol. At a glance it can be seen to help with switching from reasoning in one language to reasoning in another. Mostly questions were phrased as open ended questions, but on occasions simple questions

TABLE 2.3: QUESTION MATRIX

Subject Areas	QUESTIONS			
	HOW? Hamus? Olsem Wanem?	WHAT? WHO? WHICH? Wanem? Husat?	WHERE? We?	WHEN? Wantain? Wanemtaim?
Under-nutrition	How long has your child been thin?	What causes this child to get marasmus?	Where do the spirits live which cause undernutrition?	When did your child last eat?
	Hamas taim pikinini i stap olsem?	Wanem as bilong skin bun nating?	Tewel bilong kirapim skin bun nating stap we?	Long wanem taim bin kaikai?
Ecology and Subsistence Patterns	How do you know grubs are in that wood?	Which arrow did you use to shoot that bird?	Where do your hunting spirits live?	When did you process this sago?
	Olsem wanem yu save binitang i stap long diwai?	Yu wok long wanem supsup long taim kisim balus?	Tewel bilong helpim yu long painim pik stap we?	Long wanem taim yu bin skrapim saksak?
Infant Practices and Cultural Attitudes	How much food has your child had today?	Who gives food to your infant when you are in the bush?	Where do you leave your infant when you are fishing?	When did you last give your child sago?
	Hamas kaikai yu bin givim, pikinini long san?	Husat i givim kaikai long pikinini long taim you stap long bus?	Yu putim pikinini we long taim yu go kisim pis?	Long wanem taim yu bin givim kaikai long pikini bilong yu?
Health Care of Lujere People	How did the spirit get into the child?	Who cures your baby when he is sick?	Where did you become sick?	How do you prevent sickness spreading in the village?
	Olsem wanem tewel i go insait long pikinini	Husat i kirapim pikinini long taim i kisim sik?	Yu kisim sik we?	Long taim planti manmeri i gat sik long ples yu wokim wanem bilong pasim rot?

as set out in this matrix were asked. This question matrix was developed from Spradley's (1980, p. 82-83) descriptive question matrix. It was the guide for participant observations and for unstructured interviews. Various questions from the descriptive question matrix are used below as examples in discussion of observer and participant roles.

Byerley (1976, p. 145) when writing of participant observations as a method of collecting behavioural data in nursing research quotes Pearsall's (1965) continuum of roles:

- complete observer
- observer as a participant
- participant as observer
- complete participant.

Complete observer - This role expresses itself in the question 'What is going on here?'. The author became a bystander watching and recording the interaction. For example she might watch Lujere people in a village foraging food and then record the way the people went about it. Observation involved scanning the tracks as the team and companions walked from place (a) to place (b). The role of the bystander was limited in this study but it still had its uses.

Observer as a participant - Here the author participated by choice or by necessity. Thus, the author moved from being the bystander, to having brief encounters and some short discussion such as:

'Show me where you found those mushrooms?'
or 'Do you give your baby mushrooms to eat?'

or meeting others in the bush and exchanging greetings such as 'Where are you going'.

Participant as observer - This role was used most often. It proved much in the way of interpersonal relationships particularly when participating in social activities.

A good example of this occurred in the rest house at night when the team became part of an active discussion group exchanging comments about the day's activities. There was opportunity to ask open ended questions such as:

'Tell me about the food you gathered today?'
or 'Tell me about the hunt you took part in last night?'

Such participation changed the bystander role to one of a participant. On these occasions information flowed freely.

Complete participant - This role was a difficult one. When it was actually utilized it did not prove to be very effective. This was probably because the author was invariably ascribed a dominant role and therefore put in the position of leading the activity - no doubt an outcome of cultural mores and a courtesy extended to the visitor. An example of this occurred when the author was learning to cook food using Lujere methods. The instructor became a bystander and left the author to cook alone. This reduced the value of the interaction and was not always an experience the author appreciated.

The author experienced what Pearsall (1965), cited by Byerley (1976) wrote:

> Both observer and observed tend to vacillate between observer-as-participant and participant-as-observer role. (p. 146)

This interchanging relationship enabled the author to utilize increasing and decreasing involvement to an advantage, and so to obtain pertinent and useful data.

Unstructured interviews

These occurred when acting as a participant observer. Such interviews were informal and usually began with an open ended question about an interaction being observed, for example:

> 'Would you like to tell me about how you catch fish with this trap?'

For unstructured interviews the question matrix table 2.3 discussed earlier, proved to be invaluable.

Verhonic and Seaman (1978) gives a definition that is aligned with the author's opinion about most of the interviews that were conducted during the field study.

That is:

> An interview is a conversation with a purpose. It is a device for collecting data concerning knowledge, opinions, expressed feelings, and reactions. (p. 59)

The advantages of the unstructured interview were most evident when in an evening a crowd of Lujere people and the team sat around a hurricane lamp or fire and the group exchanged stories of happenings of recent and not too recent events.

Developing trust

Trust is a vital component of participant observation. It involves developing relationships in order to reach good rapport. This mutual understanding is best achieved in a relaxed situation.

Johnstone (1975) explains:

> The universal consensus on this point stems from two obvious facts. What the observer will be allowed to see in the setting and the truthfulness of the statement made by members will depend on:
>
> (1) how they define him as a person
> (2) how the observer's role is defined by others in the social setting.
>
> (p. 85-86)

In the South Wapei, activities involved in developing trust seemed to be continuous as the team was always meeting and talking to new people. This building up of trust with informants and subjects began on arrival at Edwaki and is not yet finished.

Data collection

In the philosophy of nursing quoted from a publication of the College of Allied Health Sciences Papua New Guinea it is explained:

> Nursing is the ability to think critically and analytically through the studies of humanities, the social and natural sciences, all of which seek to understand the world in which man lives. (p. 1)

When eliciting information and writing up data, this principle has been adhered to as knowledge and methods came from other disciplines. For example: mapping from

geography, the idea of nutrition tables from nutrition, participant observations from anthropology and sociology, and ethnographic recordings from anthropology. These borrowed techniques certainly helped to organize and analyse the data.

For recording data the author kept a journal which contains ethnographic recording of all interviews, discussions and observations. At the end of each month these were edited and themes extracted. Also analysis of subject matter allowed the author to assess whether more information was required on the matters discussed with Lujere people in villages and along bush tracks.

Photography is another way of collecting data and recording data. In this thesis photographs are presented as part of the data to be presented or to illustrate further verbal data.

The remaining chapters of this thesis set out the data recorded by the method outlined in this chapter. Since "patrolling"[I] was the main structure within which interaction for practice and research purposes occurred an account will be given in chapter three of a typical patrol.

I "Patrolling" is best understood as the main structure of organizational strategy used in Papua New Guinea for administrating health and other services. It was used by the author both for conducting health and nursing care and for the collection of data. It is a familiar and effective medium for administrating health and other services and the word 'patrol' itself has been made a Melanesian Pidgin word.

CHAPTER THREE

"PATROLLING": ITINERANT VILLAGE VISITING

The author found participant observations, non-structured interviews, and ethnographic recordings to be ideal methods for compiling scientific humanistic knowledge. This chapter outlines how these are applied when a deliberate search for data is made. The purpose of this deliberate search is to collect scientific knowledge which will benefit transcultural nursing in the West Sepik.

Kaplan (1964) cited Ragucci (1978) suggests:

> Scientific observation is deliberate search, carried out with care and forethought, as contrasted with casual and largely passive perceptions of everyday life. It is this deliberateness and control of the observation process which is distinctive of science. (p. 317)

The continual 'patrolling' to different villages allows interaction with people in their total environment, and this is advantageous. It allowed for deliberate observations of everyday life in a variety of settings which prove to be valuable for transcultural nursing. The witnessing of activities of people cutting down the forest, then burning off; planting seeds, cuttings and seedlings, then reaping a harvest with the use of three instruments. An axe, a bush knife and digging stick are important in understanding the interaction of the Lujere people with the ecosystem, and therefore, to understand their attitudes towards health and illness.

The commencement of "patrols" on village visits for this study was a relatively simple matter because welfare clinics had been held in most villages for many years.

The clinic routine used in this project was slightly different to the usual routines of weighing, the examination of infants and the administration of immunizations and the giving of nursing care for illness. In this instance participant observations, unstructured interviews and ethnographic recordings have been added. In every village the team explained their actions and asked permission to record observations . Table 3.1 lists visiting routines.

When obtaining permission to collect data, the author, with the pastor's help, contacted men of standing in each village. These are government appointed headmen called in Pidgin 'Luluai' or 'Tultul', the local medicine man called the 'Sanguma Man', church pastors and others who hold positions of authority in the village structure. It was fortunate initially that the author's arrival at Edwaki coincided with a visit by these men with the patrol officer. They all showed great interest in the author's return to Edwaki. Some men of authority from the villages more over sought out the author before she had a chance to contact them.

While the village headmen were available a programme of visits to villages was drawn up, so that they could notify those concerned of the team's impending arrival. It was planned to visit exactly every four weeks on the same day. When concluding a clinic the team informed the village of the date of the next month's visit. When the team met people from the different villages they told them of impending visits. All this was necessary because of the Lujere people's life style which is semi-nomadic with families spending some time at the village and some time at hunting camps, situated in the dense forest. It became clear that messages needed to be taken to hunting camps as well as villages so that people could return to the villages for the monthly clinics. Large numbers

TABLE 3.1: ROUTINE VISITING SCHEDULE

Evening before:

- pack rucksack
- table 3.2 describes the content

On the morning walk the team:

- breakfasts
- cooks lunch - tubers and green leaves or rice and packet soup.
- leave when Wulinaki & Yorei arrive (if raining the team waits till it stops)

On forest walks the team:

- crosses the Yellow River by canoe (twice a month)
- balances on log bridges over deep swamp or streams
- walks through mud and surface water
- walks through hot grasslands
- wades the Sand River (once a month)
- stops to boil the billy and eat lunch
- forages for food
- meets people
- observes horticulture and silvaculture activities

On arrival at the village the team:

- is greeted by the villagers
- seeks out the rest house
- has a drink of coconut milk
- has a wash in a stream
- makes camp
- buys food with salt
- prepares and cooks tea
- exchanges food
- talks around the camp fire (data collecting)
- beds down for the night

On the next day the team:

- beats the drum or gong
- makes breakfast and eats it
- holds a church service
- sets up the clinic by -

  hanging up the scale
  preparing syringes
  collecting baby books

- interacts at the clinic by -

  weighing infants
  physical examinations
  giving immunizations
  counselling
  writing up records and data collection
  packing equipment

Then leaves the village for another village or Edwaki.

did return as the team always saw about 75% of the infant population at any one clinic visit.

On a 'patrol' the team interacted with people in a variety of settings. They met people in the forest as they sat or stood and exchanged talk by streams. They met them when they were fishing, or in the bush when they were hunting, foraging or gardening, or in their home at the village. Later people visited the team when it was camped in the rest house or its equivalent. One of the main settings for participant observations was the clinic where the team chatted to people before and after the weighing and examination of infants, and the giving of immunizations. Listening and counselling were two important activities in the clinic setting. A schedule of activities was followed for interaction while visiting villages (refer to table 3.1).

> The method of participant observations is synonymous with the ethnographic approach ... The major instrument for the collection of data is the investigator himself. Thus, the successful employment of the method of participant observations is predicted upon one's ability to establish rapport and relationships of mutual trust and respect with his informants.
>
> Ragucci, (1978, p. 317)

Being on the move all the time meant that the team was continually changing social groups, making more friends and establishing rapport. The team became known through hearsay. This was an advantage as most of the reports were good and this led to good first encounters with new clients.

THE SOCIAL SETTING

For the villagers and the team, 'patrol' visits were great social occasions. The same people in each village often acted as hosts and hostesses. There was always much merriment as both the team and the villagers enjoyed each other's company and shared information. Most Lujere people are good story tellers and love telling stories and listening to others tell them.

Walking in the forest is always a learning experience, and on each trip the author gleaned a wealth of information. Rarely were there just the four team members. People enjoyed travelling with the group. Plates 3.1 and 3.2 show the team arriving at a bush camp in the forest and a group of people walking ahead of the team on the graded track which leads to the Yellow and Sepik Rivers.

The Lujere people love sharing their cultural activities and teaching bush lore. They pointed out to the author which tree leaves and ferns were edible, where mushrooms grew in soggy patches on rotten logs or in the pith remaining from processing sago. They gave demonstrations on how to dig out insect larvae from rotting tree logs or deliberately cut sago trees so as to obtain the larvae. The author joined in on hunts for lizards, turtles and scrub turkey eggs. Actually on two occasions young girls caught turtles, and one man dug up a scrub turkey's egg from a mound of rotten vegetation. On each trip green leaves, ferns and mushrooms were collected. On most trips lizards were caught and insect larvae dug up. The Lujere people never waste a moment while in the forest. Some people have the good fortune of always stumbling upon food, others do not seem to have this luck. Foraging for food is certainly a skill that Lujere people have developed well.

PLATE 3.1: Arriving at a hunting camp

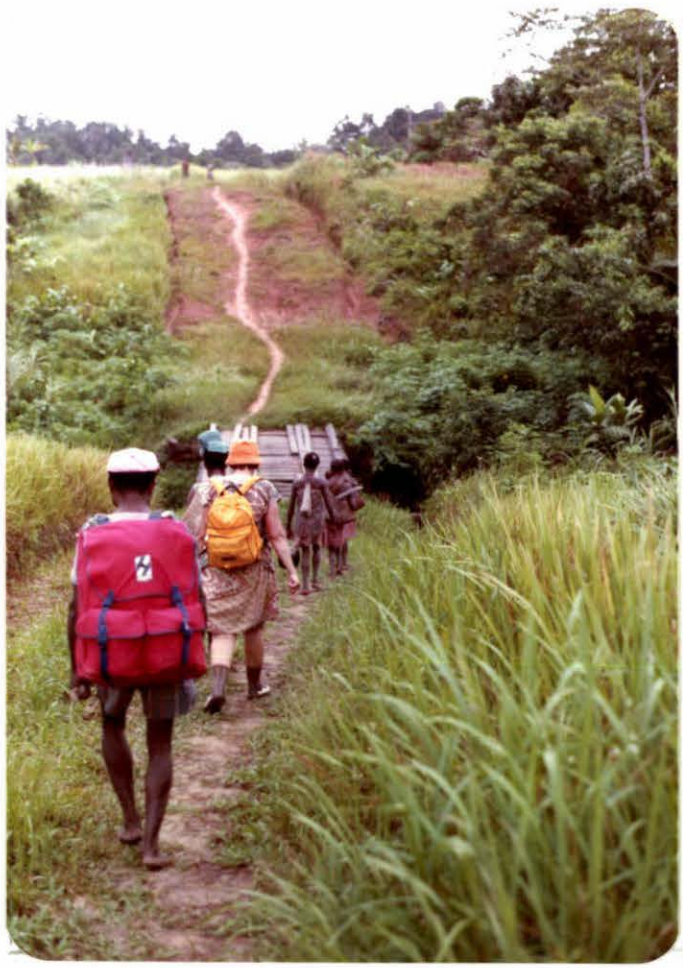


PLATE 3.2: Other people travelling with the team

On one occasion (plate 3.3) a man with a gun accompanied the team. The Lujere are usually greatly skilled in hearing bird movements and calls as well as good markmanship. The team would be quietly moving through the bush and then the gun man would suddenly drop his bag and begin stalking a bird. In minutes a shot would be heard and he would reappear with a bird for tea. The men who carried bows and arrows (plate 3.4) were not so fortunate. They too have keen ears but only rarely produced a bird after stalking, though on one occasion however, the team met a group of men carrying a pig they had shot with a bow and arrow and the help of a dog.

Surviving in the South Wapei is more than foraging for food, searching for supplies to erect shelters, and admiring the beauty of the forest. There are the hazards of walking along logs either submerged in the mud, or lying over soft ground or bridging streams, and sometimes bridges need to be made. Plate 3.5 shows a sturdy log bridging sago swamp and the pastor stooping to wash his face in the water below the log. Plate 3.6 shows companions making a bridge over a stream. The bare foot companions were certainly good teachers and protectors. They readily demonstrated to expatriate team members how to survive in the New Guinea forest. They knew the best ways to approach log walking, river wading and canoeing. The two expatriate nurses soon learned, because learning meant getting to places that were important for the study.

On one occasion when the canoe was on the opposite bank a youth who was in his garden came to help the team. He floated down the river to the canoe using a banana palm as a buoy. Since as usual the canoe did not have a paddle he used his bush knife to make one out of a sapling growing on the bank. The bush knife is a very versatile tool and Lujere men and women often use it to improvise as they go on their way through the forest. Bush knives for instance are used to cut tracks when

PLATE 3.4: The man with a gun

PLATE 3.4: A man with a bow and arrows

PLATE 3.5:

A log spanning a sago swamp

PLATE 3.6:

Making a bridge

trees have fallen down, and to cut tops off coconuts. They are also used to chop down the leaves of wild coconuts when umbrellas are needed to protect ones self from the weather. The Lujere people always have at least one bush knife within a group.

The forest was full of interest for the author. Companions showed the author how to recognize pig tracks and fresh pig roots, and the claw marks of different ground birds. They imitated the different birds songs to teach the expatriates how to distinguish one from another.

It was while walking in the bush that the author learned about gardening. On many occasions the author heard that in the dry season the bush is cut and left to dry, then burned to destroy ants and other vermin, followed by planting when the rains began. From observations while walking in the bush this was not always found to be so. During the time of the study four of the months were very wet and one was dry. During this time, gardens were in a variety of stages. Some that had had the bush cut before arrival had not improved at all. Others were cut, burned and planted during that time. Most gardens gave the look of not having received much care. They were completely covered with long grass. The author learned to know when a garden was nearby because of a stick in the ground with some ginger and shredded leaf of a sago tree attached. This is called a 'tanket' and means "humans keep out" and "gardening spirits keep in" to care and protect the garden.

On many occasions the team came upon a group of women processing sago. Usually these were near the village. On one occasion when nearing Tipas, the team met four teenage girls washing and squeezing sago. They had completed grubbing. They took the pains to explain the whole process and show the author where they grubbed the pith out. While talking they completed their washing

and packed up and returned with the team. At Tipas they gave the team some of the sago and as well some freshly caught fish. A young girl from Pani who accompanied the team made sago with hot water and the nurse auxiliary roasted some and steamed the fish in the fire. This was eaten with some green leaves exchanged for salt and rice carried in by the team.

Entering the village

When the team arrived at a village people appeared from houses to greet them. Often it was only children, sometimes women and infants or sometimes only men or a mixture of age groups and sexes. They came to enquire whether the team had salt to exchange for vegetables. These were usually bananas and green leaves and occasionally pit pit, breadfruit, pumpkins, tubers and coconuts .
At Akwom where there is a community school the team was always given an over abundance of all the above vegetables from the school gardens. The team would carry some on to Worikori the next day as Worikori villagers are always short on vegetables.

In each village the team made camp in a house, usually a special house for visitors known in Pidgin as a 'haus kiap' or rest house. These were usually in disrepair and had no furniture. Some of the camping equipment carried by the team was limited to bedding with mosquito nets, a lamp and kerosene, matches, two billies, plates, spoons, cups and a bush knife and smaller knife, as well as salt, rice and tinned fish. The carrying of this equipment was shared among the four team members along with the clinic equipment (refer table 3.2).

The first activity was setting up camp, then having a wash in the stream, collecting fire wood, exchanging salt for food, then preparing and cooking food. When the food

TABLE 3.2: EQUIPMENT FOR PATROLS OR ITINERANT VISITS

Two rucksacks containing:

- food - rice, tinned fish, packet soups, muesli, and salt, coffee, dry milk and sugar
- eating utensils - cups, plates, cutlery
- bedding - lilos, mosquito nets, sheets, blankets
- other equipment - fly spray, matches, kerosene, torches
- some personal belongings

One rucksack containing:

- cameras and film
- study diaries, pens and pencils
- some personal belongings

String bag containing:

- clinic scale and sling
- village registers
- spare baby books
- first aid kit
- immunization equipment
- immunizations
- some personal belongings

Carried by hand:

- bush knife, lamp, two billies

was cooked and eaten, guests arrived bringing sago mixed with hot water and smoked meat or fish. The Lujere team members exchanged rice and tinned fish they had saved from the meal for the food brought by their guests.

Evening interaction

In the evenngs after the exchange of food, people would come again and sit and talk. Views were exchanged in Namei, Pidgin and English, and amongst the noise this engendered, a great deal of data was recorded. Legends were told, questions answered and demonstrations given. The best entertainment on such occasions was the telling of legends. One person would start and then many others would interrupt and correct. Then a friendly argument would arise and continue until some agreement was arrived at. This also occurred when the expatriate nurse asked questions.

The team heard many legends. One notable legend was one relating to the discovery of fire and the way in which cooked food was introduced to the Lujere diet.

Encouraging people to tell legends stimulated talking and enabled relationships of trust and rapport to develop. From legends talking extended to thoughts about health, activities of the 'Sanguma man' [I] hunting and food gathering stories. The team always looked forward to the evenings of talking. They were great learning moments.

[I] 'Sanguma man' the Pidgin for medicine man. He is a man trained locally in the art of sorcery, killing and healing by manipulating the object causing the illness out of the body. He gains tremendous power from being known to kill secretly.

THE LEGEND OF THE ORIGIN OF FIRE

Many generations ago, according to the legend, fire was found at the foot of the Edwaki hill, not far from the health sub-centre. A young married lady stumbled upon it when returning home from foraging for food. She saw a cloud coming out of nearby bushes. She investigated as she saw pieces of wood glowing. She picked up a burning stick, wrapped it in leaves and carried it to her house. She found that this burning stick gave off heat like the sun did. She then investigated its baking powers. She unwrapped some fresh meat and put it in the fire with some dry sticks. The meat sizzled and smelt delicious. Its baking powers were certainly quicker than the sun. Before her husband and family arrived home she put out some of the fire and hid the rest. For the evening meal the family received a surprise, meat baked in a fire. It looked rather strange, but as the husband said, it was delicious to eat.

The family wanted to know about the new method of preparation, but the wife would not tell them. She said it was her secret. The next day she took the fire back to where she found it and brought some home in the evening, then baked meat. This went on for many months, until one day she was coming away from the place where she found the fire and a neighbouring lady saw her. Quickly she hid the fire under her skirt and tried to get the lady to go away, but she would talk on. Then the fire caught light to her skirt and burned her badly and she died.

The family grieved for the wife and mother and tried to destroy the fire, but other ladies came and stole it and made fire places in their homes and learned the art of cooking by fire. After that discovery no one used the sun to bake meat any more. They all used the fire and developed many different methods of cooking.

Actually the author visited the place where the fire was found. For there the earth is red. The red earth was said by an informant to be the result of the fire.

CLINIC INTERACTION

Clinics were held first thing in the mornings usually after Wulinaki, the pastor, had held a church service. Before the team had breakfast, a log drum or gong was rung to alert people that the clinic was to be held. When the team had eaten and packed away their equipment, people arrived for church and continued to arrive throughout the service and directly after it. When a goodly number had arrived, preparations for the clinic would begin. Syringes were boiled, if necessary the scale was hung up and the baby books collected. Plate 3.7 shows the scale ready and the clinic register lying open. The scale was a spring balance and weighed up to 40 kg. For equipment used refer to table 3.2 (p.50). The nursing auxiliary and the author did the weighing and Ms Martin wrote up the baby books and register. The author did physical examinations and gave immunizations whilst the nurse auxiliary counselled. It was found that when the author spoke through the interpreter to a mother, this was embarassing to her and the rest of the mothers labelled her a poor mother. Plate 3.8 shows an infant handing the baby book to the author. Also note that this child is small for its age and has red hair which is one of the signs of undernourishment.

The clinic gave the expatriate nurses the opportunity to observe infant care. This included breast feeding, disciplining of infants, how the mothers played with infants and what solids were given to infants as infants and older children often bring snacks with them. The common food is roasted sago, which often has beans, or pit pit added for the smaller children with a few teeth. The old ones often have grated coconut or tadpoles and sometimes insect larvae cooked with sago. There are plenty of opportunities to have nonstructured interviews about child care and watch children at play.

PLATE 3.7:
Setting up a clinic

PLATE 3.8: Handing over the baby book

After the clinic is over the equipment is put in the nurse auxiliary's string bag, the team checks that they have packed everything, and then they leave. The team talked with family groups as they walked out of the village. Often people going to their hunting houses or gardens would accompany the team until they came to the track they needed to follow. Others would accompany us to the next village or even to Edwaki. On the way home the author continued to learn about Lujere mores and folk lore.

Sometimes the author would see groups of children going into the forest to forage for food. Usually the boys went off in one direction with small bows and arrows and a bush knife between them. The girls would go in another direction with a bush knife and string bags. These groups of children, the author collectively named the multi-aged society of children. The ages ranged for these groups from approximately two and a half years to ten to twelve years of age. Not always did these children go off together. Sometimes they went to the forest with their parents.

Patrolling is hard work and physically tiring but extremely worthwhile. It is a time of sharing and caring for both the villagers and the patrol team. Both groups learn a tremendous amount about each other's way of life, especially those behaviours and personal idiosyncrasies which are prominent. As well, lasting friendships are made and these are helpful as the team found friends make good willing informants. It proved to be an ideal setting for trans-cultural nursing, a fusion of anthropology and nursing knowledge and insight.

'Patrol' is the general term used in Papua New Guinea for itinerant village visiting. When the author first arrived in Papua New Guinea the Pidgin term was 'wok bus' walk bush. Now 'patrol' is the term used in Pidgin.

To 'patrol' means to visit villages routinely for inspections. In this thesis it is travelling from village to village for the purpose of offering nursing care. For the Lujere this is one of the ways primary care is offered. There is also the health sub-centre at Edwaki and the aid post at Akwom. In those instances the clients go to the care giver, with 'patrolling', the care giver goes to the clients in their own situation. The Papua Health Department (1975) terms primary care as rural health and its objective is:

> The provision of a comprehensive health service for all people in defined health-centre areas with a basic level of services through health centres and sub-centres and aidposts and through patrols, to carry out immunizations, disease control, environmental improvements, health education and community health nursing. (p. 85)

Chapters four to six which follow give details of the information collected while visting villages. These are ecological factors, subsistence patterns, infant nutritional habits and observations about undernutrition.

CHAPTER FOUR

LUJERE ECOLOGY AND SUBSISTENCE PATTERNS

It is explained in chapter one (p. 3) that the South Wapei where the Lujere people live has alluvial soil and tends to be swampy. It is from this swamp and some low lying hills that the Lujere people obtain their food. The swamp consists of grasslands, forests, streams, small lakes and rivers.

The Lujere people are very familiar with every feature of the area. They know where every track leads to, who owns the different sections of the land, and the boundary marks of village territories which may be certain trees, stands of sago, grasslands, streams or rivers. Over time with generations of hunting and gathering the Lujere have developed a unique relationship with their environment. This enables them to know where the pigs and birds are likely to be and where there is an abundance of wild vegetables to be gathered.

Dunn (1977) defines the hunter and gatherer and the ecosystem thus:

> The hunter-gatherer is an element in an ecosystem and cannot isolate himself from his environment... His relationship to the land, to his flora and fauna, and to his fellowman is intimate. Although he is never perfectly adapted to the condition of his environment there is a degree of adapted stability. (p. 106)

It could be said of the Lujere people that even though they know and understand what to expect of their environment their adaptation is not complete. This is endorsed by the fact that many of their infants and adults exist in an undernourished condition.

LUJERE ECOLOGY

Like most inhabited areas of the world, the South Wapei soil and climatic factors (rainfall, temperature and humidity) have a unique relationship, which enables plant and animal life to survive.

Howlett (1967) writes:

> Soil In terms of agriculture potential most of the New Guinea soils are poor or difficult. A wide range of parent rock, the youthfulness of the landscape and extreme conditions of topography and climate are responsible for this situation. (p. 41)

The South Wapei is not exceptional. Its soil is mainly alluvial swamp. The grasslands have a tight network of roots, the result of decades of burning. The rain forests use all the goodness of the soil to grow up to reach out to the sunlight. The Lujere idea of gardening, 'slash and burn' with no tilling or composting, does not help to bring quality into the soil. This is discussed more fully further on (p. 77 & 78).

Climatic conditions

The Lujere people think of their district as being the place where rain often forgets to stop. When a community of people think there has been enough rain, the men beat a special rhythm on their hand drums to tell the rain spirits to send the rain away. If the drought has been lasting for what seems forever, the women make rain by beating a small lake with special sticks. The Department of Primary Industry in a South Wapei field report (1979) records that there are "two seasons", a wet season, November to April, and a dry season, May to October".

Figure 4.1[I] confirms this, with the highest rainfall months being October to May and there being four months where the rainfall is lower in both the mountains (Lumi) and South Wapei (Edwaki). The annual rainfall being 2,646mm for Lumi area (Head waters of Yellow and Sand Rivers) and 2,994mm for Yellow River area for the year 1975. In the very wet months of November to March hunting is curbed because of surface water and flooded streams and rivers. Fishing in the stream only occurs in the driest months June to October. This is because it is easy to poison fish and set fish traps then. Garden produce is mainly available from December to March after planting in October and November. Some people try to define an actual wet and dry season, but there are simply high rainfall and low rainfall periods. In other words rainfall is a matter of degree and the dry season is simply a period of less rain.

Howlett (1967) writes:

> Just as people in New Guinea often refer to the 'wet' season and the 'wetter', so there is little distinction to be drawn between the temperature from month to month. (p. 4)

The Lujere generally speak of their place as being hot day and night. They keep out of the direct line of the sun as much as they can. Usually they work in the bush at midday when the sun is at its hottest. This has general connotations as Howlett states:

> The unpleasant combination of high temperatures and high humidity is universal throughout the lowland. (p. 41)

[I] Figure 4.1 Records obtained from Department of Primary Industry Vanimo

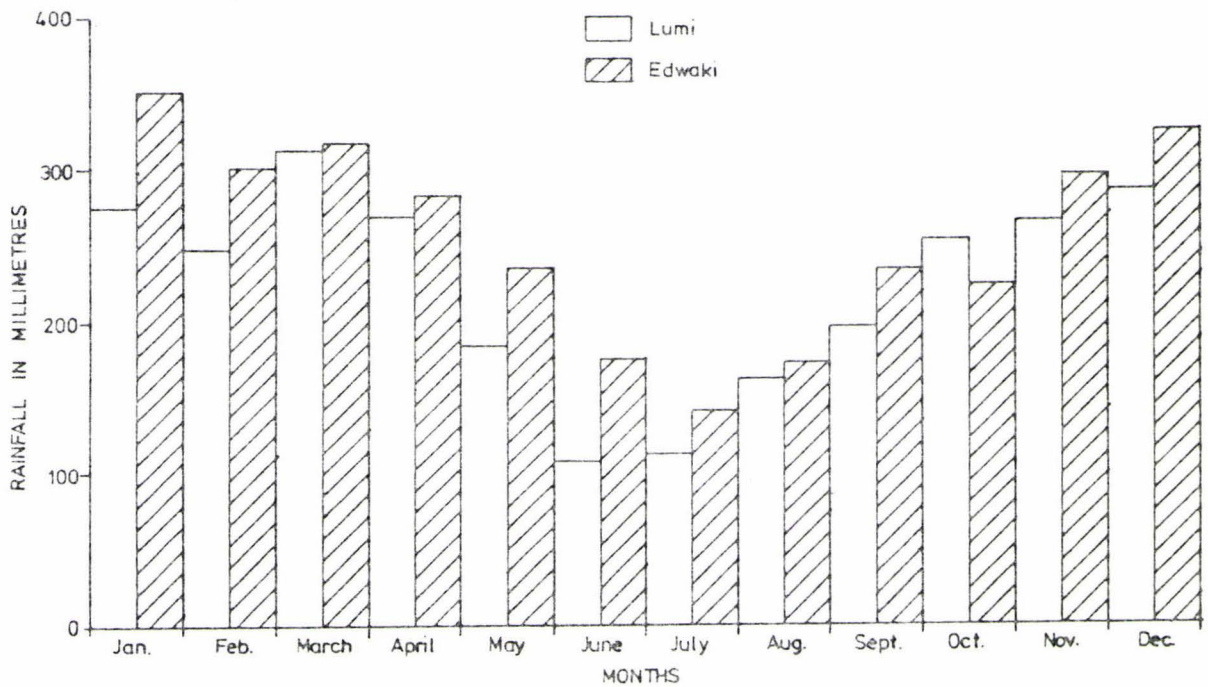


Figure 4:1: Rainfall Lumi and Edwaki Recorded 1975 - 1978

It should be noted that the Lujere people do not have a word for the concept of humidity.

The soil and climatic conditions in many ways govern subsistence. The Lujere people, when out in the bush and when it rains, build a shelter and sit and wait for it to stop. The grasslands are avoided in the hottest part of the day, but they remain hot whether the sun is shining or not. The Lujere do not drain their ground for gardens, neither do they irrigate when it is too dry or even make use of compost. When these actions are suggested, they do not yet appear to understand the need.

Lewis (1975) writes:

> Climate and seasons give a pattern to gardening. The gardening cycle is basically an annual one. New gardens are cleared each year by burning towards the end of the dry season and planted when rain begins. (p. 35)

The Lujere follow that pattern; they fish when the rivers and streams are low, hunt and gather food all the year round and plant gardens in the wet season.

LUJERE SUBSISTENCE PATTERNS

The Lujere people have certain patterns they use to subsist from their alluvial swamps and low hill lands. They are not often hungry, though their diet lacks quality. Protein foods are moderately short. It is hard work hunting. From their land, they obtain most of what they need. This is housing, some clothing, artifacts for hunting, fishing, gardening and food. They will trade for clothing, axes, bush knives, saucepans, eating utensils and mosquito nets.

To obtain the necessities listed above, the Lujere work hard in the bush. They give first priority to hunting, fishing and processing sago. They collect building materials, firewood, leaves for wrapping food, and food as they come and go in the bush. Their energy is divided between hunting, gathering fish, silvaculture and some horticulture.

Hunting and gathering:

> The traditional hunting and gathering is one of seasonal concentration in one place, followed by dispersal, according to availability of wild foods. Smith (1978, p. 35)

Because the Lujere are hunters and gatherers, they are semi-nomadic. Even so, they spend some time in their villages. Plate 4.1 shows a village situated in the forest and Plate 4.2 shows a cluster of houses built on a raised platform. It is unusual to find every family at home in a village at any one time, as the Lujere people live where they can find food. If they are not in the village they are at one of their many bush camps - a house with a raised platform, no walls and several fire places. (refer Plate 4.3).

Lee and de Vore (1968) comment:

> Characteristically, hunters and gatherers live in bands, each exploiting a territory. They face environments in loosely knit clusters of families, able to organize into sizeable groups or forage individually.

Hunting: The Lujere men spend their lifetime hunting. It is prestigious to be known as a good marksman and bring home plenty of game, though this is attributed to help

PLATE 4.1: An aerial view of a Lujere village

PLATE 4.2: Typical Lujere houses

from hunting spirits. On most evenings the team found the men sitting around a smoking fire, eating bananas or chewing betel nut. This is when they share stories of remarkable kills, and how the hunting spirits helped. Some stories were of the present and others came from the long distant past, and have been told many times. There also, they planned and discussed hunts of the future.

Lewis (1957) writes:

> The forests are the home of game resources which they hunt by various methods for pigs, wallaby and cassowary.
> (1) by drive;
> (2) by individual tracking or stalking;
> (3) by waiting and watching for wild pigs to feed on fallen fruit or prepared bait. (p. 48)

Lujere methods are similar (refer table 4.1). In the dry season they will light fires on the grassland and drive the wild life to waiting huntings. At night time they use torches and flares to hunt flying foxes, bandicoots and marsupials. They will patrol at night time, watching gardens, fresh pith from sago processing, fallen berries and bait for pigs to come and feed. They will climb trees and wait for birds to come and feed on berries. They will hide behind cut branches and wait for those birds that eat at ground level. For all the time and energy used in this, the catches are usually small, but this recreation is always enjoyed.

> Most game is hunted by bow and arrows.
> Sturt (1975, p. 3)

TABLE 4.1:[I] Wild life and Methods of Hunting (Sepik, Papua New Guinea)

English	Pidgin	Namie	Hunting Method
parrots	koki		climb food trees
birds	balus	iyo	climb food trees
pigeon	pisin	iyo liya	climb food trees
pigeon Crown Victoria	guria	iyo wani	hide behind ground camoflage
hornbill	kokomo	emagu	climb food trees
casowary	muruk	abi	hide behind ground camouflage and drive
bandicoot	mumut	lenali	torchlight
flying fox	blak boxis	momna	torchlight
(Marsupials):			
wallaby	sikau	pagla	drives by night
opossum	kapul	lwaip	drives by night
tree kangaroo	kapul		drives by night
fish	pis	pira	traps - poison, nets, lines
crocodiles	puk puk		lights at night drives at night
pig	pik	raingu	watch, food sources, stalking

There are a few guns. When the author asked the Lujere about guns, she was told that most are impounded at the Provincial Office, because the owners did not have enough money to pay the licences. During the period of the five months study there was very little game shot by the hunters. The author only saw pigs and one cassowary which had been killed in that way. These were killed at the villages

[I] Table 4.1 was compiled from the author's journal and the writings of Lewis (1975) and Sturt. (1975).

of Mantupai, Worikori and Akwom. Informants reported that all other game was killed with bow and arrows. Surplus game is smoked and eaten later during lean times when hunting is poor. The smoked meat will keep about six to eight weeks. Plate 4.4 shows the hunting equipment, metal tipped arrows, an axe, and the useful bush knife.

Gathering

Lewis (1975) writes:

> Gathering in the forest provides some food, e.g. men find eggs of the bush turkey by digging up moulds of decaying vegetation. Various beetle grubs, toad-stools (mushrooms), caterpillars, lizards, crickets, grasshoppers, beta nuts, frogs and snakes are collected mainly by women. (p. 50)

TABLE 4.2: [I] Food Gathering (Sepik, Papua New Guinea)

English	Pidgin	Namie
grasshoppers	grasop	wamu
crickets		matja
lizards	plei	
caterpillars		
beetle grubs	binitang	
snake	moran	
bush turkey egg	wail paul kiau	
frogs	rok rok	
turtles		
ferns	kumu	
gnetum gnemon	tulip	pani
mushrooms	talinga	
nuts	pikinini biloney galip	
wild figs	kumu	

[I] Table 4.2 has been compiled from the writings of Lewis 1975, and Williams & Wale 1975, and the author's journal.

PLATE 4.3: A bush camp

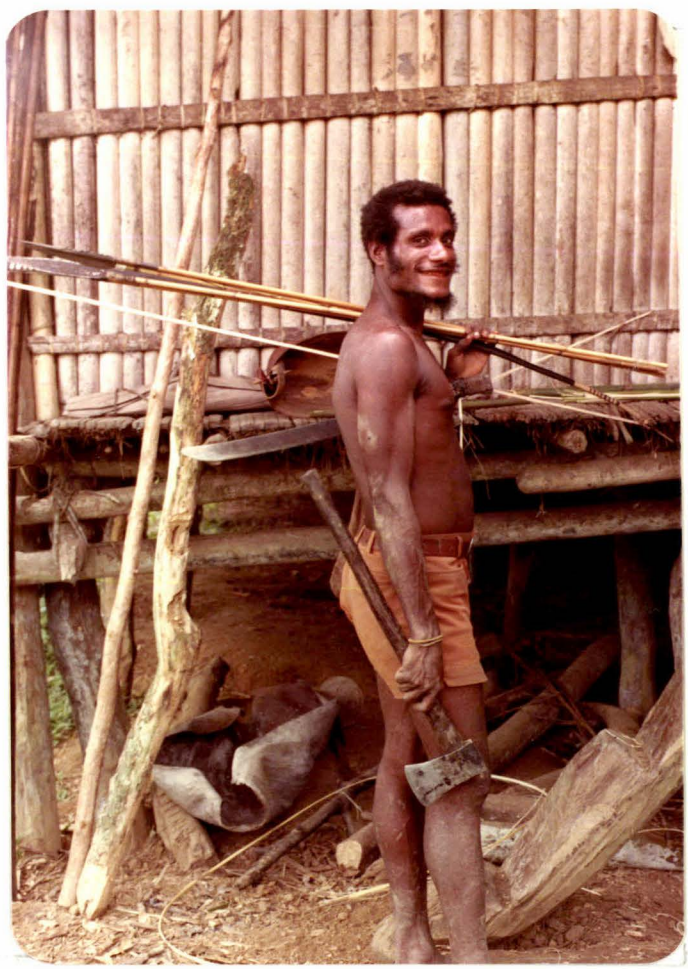


PLATE 4.4: Going hunting

The Lujere people do not seem to go on special gathering expeditions. Table 4.2 lists the wide variety of foods gathered while walking to hunting, fishing and gardening activities, or from village to village. When the patrol team was travelling from village to village, food was gathered all the time. There were turtles caught in streams, a lizard or two chased, bush turkey eggs grubbed for, tulip leaves, fern leaves and mushrooms picked, beetle grubs and caterpillars were also found. When the team arrived at their destination, or stopped for a snack, the food was cooked by the one who gathered them, and sometimes shared.

Howlett (1967) writes:

> The range of food stuffs available to hunters and gatherers is extensive, but in terms of time spent acquiring them, and of the food value, they are a minor reward except in that they relieve otherwise monotonous diets and provide recreation. A man may spend days in the ... forest or whole nights fishing to return almost empty handed. (p. 75)

Fishing This is a very important past-time.

Mitchell (1975) writes:

> Fish are trapped in many small waterways or are poisoned with pounded derris roots. (p. 417)

Mitchell (1975) is referring to the Lujere people who fish the streams. They fish when the streams are low. Fish traps are woven from split cane, and are supported in a sago leaf fence, which sometimes has a string net stretched over it, to prevent fish from swimming past. This is shown in Plates 4.5 and 4.6.

PLATE 4.5: Neting the river

PLATE 4.6: Setting fish traps

For poisoning, the crushed derris root is thrown into water holes. Sometimes dams are made of tree trunks and mud to keep the water back. The fish are stunned by the poison and float to the top.

Line and net fishing are common in the two rivers, Yellow and Sepik. In the Sepik canoes are used for netting and setting lines. In the Yellow River they fish from the banks. Lines and nets are set and gone round night and mornings. The surplus fish is smoked and dried and kept for when fish is scarce. They do not keep it longer than about six weeks. Line fishing is an all the year round activity for the villagers who belong to Tipas, Alkwon (hamlet of Iwani), Alia and Old Papi because they live on the banks of either the Yellow and Sepik Rivers.

Silvaculture

This is the deliberate planting of trees for food sources. Table 4.3 (p. 71) lists the trees that are planted from seedlings and given care in the first few weeks, then they fend for themselves. It is survival in a semi-wild state. Even so, the Lujere people know where their own trees are, and who owns the different trees.

Breadfruit These grow in secondary bush reasonably near to the village. They take three to six years to produce and grow to the height of twenty metres (Hale & William (1975, p. 31). They bear their crop between approximately March and May. Plate 4.7 shows the leaves of a breadfruit tree.

PLATE 4.7: Breadfruit tree

PLATE 4.8: Coconut palms

TABLE 4.3: The Sources of Foods Gathered by Silvaculture

English	Pidgin	Botanical name	Namie
sago	sak sak	metroxylon rumphii metroxylon aagu	na
breadfruit	kapiak	artocapus altilis	eilam
coconut	kokonuts	cocos nuifera	
paw paw	popo	carice papaya	mabiar
	tulip	gnetum gnemon	pani

Coconut. Where there is a village, there are coconut trees. Most families have several trees at the front or back door of their houses. "They can take up to ten years to produce and grow up to fourteen metres" Hale and Williams (1975, p. 16). Plate 4.8 shows coconut trees near the village house.

Tulip (gnetum gnemon) This tree's name comes from the English two leaves, as leaves grow in pairs. It is planted in secondary bush handy to the village. It also grows wild in the primary forests. "Tulip is a long lived tree" Hale and Williams (1975, p. 22). The bark is used to make string for skirts and bags and rope. It is the young leaves and seeds that are eaten.

Sago: Sago is the most popular food. It is the staple food or super food, that the Lujere people call their bread of life. This tree has more uses than food. Clothing and house roofs and walls are made from it. It is claimed to have supernatural powers which can preserve life and take life away. Plate 4.9 shows a mature sago tree. Plate 4.10 shows how sago is grubbed. There are two main varieties, those with thorns on the leaf stem and those without thorns.

PLATE 4.9: A mature sago palm

PLATE 4.10: Grubbing sago

Hale and Williams (1975) write:

> It grows from ten to fifteen metres, and is ready for producing in twelve to fifteen years. (p. 5)

It is planted in groves in the swamp as secondary bush. Townsend 1980 writes:

> The sago palm (tree) which grows wild in the swamp forest is the source of 85% of the caloric value of the local diet. The women extract starch from the trunk of the sago palm by scraping and pounding the pith and then rinsing and draining it in a trough. (p. 21)

It is stored as a flour and can be kept for up to two months. The Lujere people do not give much time to caring for edible food trees. They virtually give no care. All food produced through silvaculture, except sago and tulip are eaten as extras with or between meals.

To emphasize the importance of sago to the Lujere people the author retells this legend of the original sago, which she heard about many times.

THE LEGEND OF THE ORIGIN OF SAGO

It is said that until sago was discovered the Lujere people were hungry. They used to eat earth with small portions of meat, fish, birds or green leaves. This changed when a hungry dog accidentally stumbled across a strange tree growing in the swamp. This so fascinated the dog, that he forgot his hunger and ran back to tell his master and mistress. They went running with the dog to this unusual tree. In front of their eyes this mysterious tree became bigger and bigger, then grew a large flower.

Continued

> The dog and the humans discussed how they could prepare the tree for eating and what they would call it. They all agreed on calling it 'na'. Then the man chopped down the tree. The woman made a crude grubber from the branch of a tree, then scrapping off the outer layer she grubbed away at the pith producing a pile of sawdust like pith, which she washed in a trough made of the stem of the large sago leaf, and squeezed through a coconut fibre mesh. The flour settled as a sediment on the bottom of the lower bark and when the water was drained off they took the flour home and roasted it in the fire. To their delight this was a delicious food far more superior to earth.

Sago is indeed processed by this method today and roasted in the fire or stirred with boiling water to make a jelly. It has become a tradition to use sago as the staple for all members of the family from the time they have enough teeth with which to chew.

Horticulture

Gardening is not the Lujere peoples' first desire. They are subsistence hunters and processors of sago. Rapport (1967) explains:

> The technology of Tsembago (New Guinea) is simple... only a digging stick, the steel axe and bush knife is used for gardening. (p. 3)

The Lujere people use exactly the same equipment. The axe was used to fell large trees; the bush knife was used for scrub, for branches of large trees and for digging a hole to plant seeds. The digging stick was made on

the spot with the bush knife was used to dig out tubers and to plant cuttings and seedlings. In Plate 4.11 a garden with banana palms, sugar and weeds is shown.

The Lujere people enlist the help of supernatural spirits for gardening. They gain their instructions from the 'tankets' that mark the boundaries for them to keep within. These tankets are also taboo signs to keep out foreign spirits and humans. Because of this perception the gardens soon became rather overgrown with grass and regenerating scrub. A photograph of a tanket appears as Plate 4.12.

As mentioned earlier, gardens are seasonal. Most families and some whole communities make a new garden each year. There is now an exception. Market gardening is developing by villagers who live near one of the two bi-weekly markets at Edwaki and Akwom. This produce is being sold to those who work at communities schools, health subcentres aid posts, and for the mission, Department of Primary Industry and Provincial Affairs. Yegarapi, Yaru, Alia, Akwom and Naum are the villages which supply produce as they live reasonably close by.

The technique for gardening is 'slash and burn' technically known as 'bush fallow'.

Macewan (1977) defines bush fallow thus:

> Bush fallow is often referred to as shifting agriculture, a term which emphasises that a garden is abandoned after a period of cultivation... The forest is cut, what is easily burned is burnt and vegetables are planted. (p. 11)

Once a garden is abandoned, secondary bush regenerates quickly. Then some years later, the same land will be used for a garden again. Often plants, bananas, sugar and pit pit persist, and may be harvested many years after abandonment. This is seen in Plate 4.11.

PLATE 4.11:
A garden

PLATE 4.12
A tanket

Slash and burn (briefly referred to on p. 58) has been studied by Mitchell (1976) in the North Solomon Islands. His discussion suggests that slash and burn without composting and repeated cropping effects the yields. There are factors in the bush fallow system of 'slash and burn' that would repay careful study.

Mitchell (1976) (cited Macewan 1977) suggests that:

> The drop in yield could be due to any one of or combinations of:
>
> - a drop in the soils organic content, or other biological change
> - leaching of plant nutrients or change in the chemical composition of the soil
> - removal of soil by erosion
> - some change in the physical properties of the soil
> - build up of weeds, pests and disease.
>
> Normally, the precise causes will not be known, only the fact that the yield drops. (p. 22)

In the 1970s one Edwaki field officer for the Department of Primary Industry sent samples of soil away for testing of the composition. It is unfortunate that the field officer concerned had been transferred and the author has been unable to locate the results of these soil tests.

Gardening for the Lujere is a chore, no-one enjoys it much. Whole extended families work together and share tasks reasonably equally. Youths and young girls are often harassed or bribed to garden. The process of gardening is rather drawn out. Some time during the dry season, the families or communities choose their plot, then cut down large trees and scrub, leaving it to dry out by the heat of the sun.

then, when enthusiastic, they will burn what is burnable and leave the rest to rot away or grow mushrooms. The ground is not cleared, the garden is planted among the root stumps and tree trunks. Plate 4.11 depicts this scene. There is no order or rows; beans and yams will be planted where they can climb, and bananas are planted here and there to shelter smaller plants from the sun. After a shower or two of rain the garden is planted, seedlings and cuttings come from abandoned gardens and are planted into a home, made by the digging stick. Seeds are planted one at a time in a hole made by the bush knife. Plate 4.13 shows bush drying out before firing and Plate 4.14 shows kaukau being planted.

Until the seedlings, and cuttings are well established, the family weeds the garden, but it is not long before they lose their enthusiasm. The Lujere people visit their gardens while passing and watch the progress.

Lujere gardens certainly produce a variety of vegetables. There is an abundance of bananas, both cooking and ripe, sugar pitpit and aibika. Tubers are not too plentiful because many families do not plant them. Those who do, have problems with wild pigs rooting them out before there is a chance to harvest them. Table 4.4 lists the variety of vegetables and fruit.

Bush fallow, the method of horticulture explained above is changing the forest over years. The forest near villages is mostly affected. This is cut for gardens. Then when gardens are abandoned the area is left to regenerate to secondary forest. It is then many years before it is cleared and reused.

PLATE 4.13: This garden area is ready for burning

PLATE 4.14: This garden area has been burned and is being planted

TABLE 4.4: VEGETABLES AND FRUITS GROWN IN LUJERE GARDENS

English	Botanical	Pidgin	Namie
Beans:			
wing	psophocorpus tetragonolbust	bin	
snake	vigna unguiculata	bin	
wild lima	phasealus valgaris	bin	
Greens:			
pumpkin shoots		pumpkin cru	tablam
spinach	amaranthus gangeticus	opa	
hibiscus leaves	hibiscus manihot	aibika	nolu
sweet potato	ipomeoa batatas	kau kau lip	wolwani
chinese cabbage	brassica chinesis	kabis	
Tubers:			
sweet potato	ipomoea batatas	kau kau	wolwani
taro	colocasia esculenta violacem	taru tru	wolwani
taro	xanthosoma	taru kong kong	baimaku
greater yam	dioscorea alata	yam	nimapo
lesser yam	dioscorea esculenta	mami	nimapo
aerial yam	dioscorea	wel nami	nimapo
cassava	mani hot esculenta	tupiok	
Banana:			
ripe	musa saplentum	banana/ mau	nai
cooking	musa paradisiaca	banana	naia
Other varieties:			
sugar stem	saccharun officinorum	suga	yowi
cane flower	saccharun edule	pit pit	ku
maize	zea mays	kon	
pumpkin		pumpkin	tublam
watermelon		melon	
pineapple	ananas comosus	pin ap	

Sturt (1975) emphasises this point thus:

> Gardens now are on land which has become secondary forest, these are within walking distance of the village. Consequently, there is never much food in the village and women gather food daily. (p. 22)

When the Lujere people work at obtaining food they do not divide their time equally among tasks. If the weather pattern is not too hot and fine they will go hunting. When the rivers are low they fish; they will prepare a garden when it has not rained for a while. Gathering seems to persist in all weathers, as does the processing of sago.

Supernatural spirits are seen by the Lujere as part of the ecology, because they live in every aspect of the forest and are enlisted to help with gardening and hunting. What Fountain (1966) describes for the Wulukum people also applies to the Lujere.

> Both good and bad spirits dwell in the objects of the environment. The good spirits are individually or group owned and assist gardening, hunting or the health of children. For example, success in these spheres is not attributed to the care or prowess of the human owner, but to the powerful good spirits involved. A garden spirit helps the food to grow, a hunting spirit brings the game to the right spot and then enters the hunter to give him unerring aim. (p. 39)

It is obvious that knowledge of the relationship of the ecology to subsistence patterns is essential to trans-cultural nursing. The ethnographic data enhanced the opportunity of developing the helping relationship between the nurse and the undernourished client. The availability of food is the result of subsistence patterns interacting with the ecosystem.

Health of humans is related to food; undernutrition results from not having sufficient quantities of quality foods. Understanding ecology and subsistence patterns will enable the nurse to detect where this deficiency begins. Therefore, if nurses are going to intervene to prevent undernutrition and to rehabilitate, they must understand this. This knowledge can be integrated so as to extend the use of foods available and influence the health of infants. Food has as tremendous an influence on health as health does on food.

This is defined by Foster and Anderson (1978):

> Good health allows a person to eat a wide variety of foods, but poor health restricts a person's choice. (Solien and Scrimshaw write of people in Sana Marie). That they 'feed their children well not to make them healthy but because they are healthy. A good appetite is associated with health... Almost any degree of sickness, however, results in withdrawal of part of the food from diet. Unfortunately for the child this is most often the part of his diet furnishing protein'... (p. 273)

CHAPTER FIVE

THE INDIGENOUS AND INTRODUCED HEALTH CARE SYSTEMS IN THE WEST SEPIK PROVINCE

The two health care systems which interact together in the South Wapei census division are:

(a) 'the indigenous health care system' which is administered by the Lujere people, and

(b) 'the introduced health care system' administered at the health subcentre at Edwaki by an expatriate nurse, a Papua New Guinean nurse and two Lujere nurse aides and one aid post orderly. There is also an aid post orderly at Akwom.

Both systems, though they have vastly different methodology, prevent and treat disease, and deficiency conditions among the Lujere people.

TWO HEALTH CARE ORIENTATIONS

The introduced health care system is based on scientific facts which have proved to be effective when dealing with health and illness.

Henderson and Primaeux (1981) write:

> A scientific view leads to the assumption that disease is the result of a cause-effect relationship of natural phenomena and that the cure is achieved by scientific medicine. (p. 60)

This is the basis of the curative role of transcultural nursing. There is, of course, more to transcultural nursing than curing by medicine. It is the understanding of indigenous health practices, together with scientific methodology which meets the needs of clients.

Viewpoints on health

The scientific introduced perspective explains illness through the germ theory, congenital defects, deficiencies or abnormal growth of tissue. A nurse with such a scientific outlook treats her client with injections, tablets, capsules or mixtures, or sends them to a doctor for surgery. The Lujere people accept this readily. They do not avail themselves of it however if they have to walk too far to receive it. They acknowledge healing and relief from western medicines, but do not understand how they work.

The world view of the Lujere people encompasses two main assumptions. One is that they have magical beliefs about scorcery and the spirits of their dead ancestors. Secondly, they are animistic and perceive all living and important inanimate objects as having a living spirit or soul.

Henderson and Primeaux (1981) write:

> The belief in magic leads to assumptions that disease is the result of human behaviour and that cure is achieved by sorcery. A religious belief of the world leads to the assumption that disease is the result of supernatural forces and that cure is achieved by successfully appealing to supernatural forces. (p. 60)

Some Lujere people make good use of both the indigenous and introduced western health care systems. This can be said particularly of those who live within a reasonable walking distance of the health sub-centre or the aid post. These people seem to be reasonably dependent on this dual medical system which has developed. This can be seen by the fact that the health sub-centre keeps functioning and employs a number of personnel and as well that they treat over a hundred people most days. From observations of seeing medicine men coming and going from the health sub-centre it can be assumed that they too are not short of work.

It is unfortunate that the administrators of both of these systems understand very little about each other's world views and the philosophy which they both have developed. The Lujere people who are trained as aid post orderlies, nurse aides do have a certain understanding of the western world view, but are often confused about some of its beliefs and philosophies.

It has been the author's observation during all periods spent in Papua New Guinea - though more directly so during the field study - that there has been a marked inability to relate one to the other. For example, there is an over use of procaine penicillin by Lujere staff. A client will demand an injection although there appears to be no infection of any kind, just a fear of sorcery. On most occasions several injections have been given to satisfy the client. The author has been told that many Lujere people believe this particular injection is able to counteract the medicine man's spear as soon as it pierces the skin.

In their own health behaviour most Lujere health personnel use both systems of care. One of the staff had a severe urinary infection. He was transferred to Vanimo for

confirmation of the diagnosis and to have treatment commenced. His progress was slow, and when well established on medications he returned by plane. Within a day of being back he sought out the medicine man and had him remove an object (a metal tip of an arrow). From then he said he improved rapidly and recovered. When occasionally he has repeated attacks, he goes to the medicine man for object removal and recommences medication.

Health beliefs

Both the Lujere and the western health care systems have developed from totally different complexities of beliefs, attitudes, values, practices and roles which form philosophical ideas about health and illness.

Wilson 1975 writes:

> In order to understand health and illness we must pay attention as much to family, society and culture, which mould a man, as to the individual in need. There is no such thing as being a separate person, health is interpersonal. (p. 44)

For example, the Lujere health beliefs about environmental causality and treatment, stems from generations of people surviving off swamp land by hunting, gathering and processing sago. Then there are those who administer the western system, they have a cosmopolitan background. There are some among them, who are Papua New Guineans and others from various industrial technological societies. The societies have a technological outlook which is extremely complicated alongside the technology of a hunter and gatherer.

Cultural awareness

The two systems work together in reasonable harmony, with both aiming to alleviate undernutrition. All the same, there is still a need to be aware that the two cultures are very different. For example, there are totally different belief systems related to the causality of illness and many misunderstandings arise from this.

It is particularly important for the expatriate to be aware of both her own cultural biases and those of the Lujere people for whom she works.

Sohier (1980) recognizes this and writes:

> (1) Mutual sharing of knowledge about each other and the situation;
> (2) Testing of the nurse by the patient;
> (3) The emergence of a helping modality.
> (p. 27)

If there is not mutual sharing of knowledge between the client and nurse, many misunderstandings occur. These make it difficult for the nurse to give the right care for the right situation. It also makes what she offers to be less acceptable, or not comprehensible by the client.

Take this example. A very sick infant arrived at the health subcentre. The nurse diagnosed anemia and pneumonia. The infant received care for thirty six hours. Then the family disappeared with medical treatments unfinished. Six days later, they arrived back with a much weaker infant and expected the care to continue. The father told the nurse he had to go home and cut down a coconut tree. This kind of behaviour does not make much sense to the western orientated nurse. She only begins to understand when he explains the reasoning behind their disappearance.

This was that the family had perceived, after much discussion, that the mother had eaten fern leaves from underneath a specific coconut tree. It had rained the day before picking them. This rain had washed the coconut tree's spirit on to the ferns. Thus, the mother had eaten the coconut tree's spirit and then when the infant suckled, the spirit entered the infant and caused her to be breathless. Thus, to entice the spirit out of their child they took the child to the foot of the tree and chopped the tree down, so the tree would call its spirit home. Now there was mutual meaning to this situation. The nurse understood the parents' reasoning for the cause of the pneumonia. The father had had explained the actions of antibiotics and the need for continued treatment. Traditional methods and western medicine are both important in the treatment of the infant.

THE LUJERE HEALTH CARE SYSTEM

Assumptions

The Lujere health care system which is unique and indigenous has two major assumptions:

(1) the power of magic of the medicine man used for curing and the sorcery he uses for causing illness and death; and

(2) animistic religious powers of ancestral and supernatural spirits which dwell in the forests.

Appiah Kuhi (1975) writes:

> Therefore, health is not an isolated phenomenon, but part of the whole magico-religious fabric; it is more than absence of disease. Since disease is viewed as one of the most important social sanctions, peaceful living with one's neighbours, abstention from adultery,

> keeping the laws of the gods and people are all essential in order to protect oneself and one's family from disease. (p. 3)

Keeping social and spiritual order is a preventive measure, which keeps sickness from the door. An example of this was observed when the author was in the company of a family walking through bush land to the family's village. The husband coveted some sugar he saw in a friend's garden. He left the track to retrieve some. He suddenly spied a taboo sign and made a hasty retreat. He explained his actions. 'If I had gone past that sign, the spirits caring for the garden would have entered me and made me sick. Then he said 'if you want to keep healthy, it is wise to keep relationships smooth and not offend spirits or people'.

Traditional values

Read (1966) quoted by Wilson 1976) writes:

> for the Navaho, health is symptomatic of a correct relationship between man and his environment, the world around him and his fellowman. It is associated with good blessing, beauty... all that is positively valued in life. Illness on the other hand bears evidence that one has fallen out of this delicate balance. (p. 6)

The Lujere people too, like to have correct relationships and balance within the whole person. This they say keeps illness away.

A common philosophical saying among Lujere people is: If a family lives a good life, minds its own business, does not quarrel with others, produces children, has

strength and blood enough to do a good day's work, can find enough food to live on, and keeps spiritual order by not offending the spiritual world, this is positive living.

Therefore, positive living is having balance between the three components of a whole person.

(1) The mind 'ting ting' Pidgin - which is thoughts - keeping social order, minding one's own business and not picking quarrels, yet helping others when the need arises.

(2) The body 'bodi' - the biological being - having strength and blood enough to do a good day's work, and find enough food for the family.

(3) Spirit 'tewil' - keeping one's spirit happy by keeping spiritual order so as not to affend the spirits and thus, keep them frum intruding into the body, and causing disharmony.

For the Lujere people, as for other Papua New Guineans life revolves around traditional values.

The Papua New Guinea Department of Health (1975) states that these values are:

> as part of a unified system, are related to prestige, productivity, strength, life, respect for social values, behaviour, the avoidance of cultural taboos, or offerings to spirits, and the maintenance of satisfying relationships... (p. 45)

Nevertheless, they say that although the attainment of such ideas is found to be impossible in practice, they do try to maintain them. The close network of relationships, activities and shared beliefs in Lujere society does also assist their efforts.

Informants told me that most breakdowns are unintentional, like unconsciously saying the wrong thing and causing arguments; or a dog killing a chicken, or pet pigs rooting in a garden and eating tubers, or unthinkingly breaking a taboo.

There are also people who deliberately offend, like stealing food when hungry. An example of this can be seen in relation to a lady and her children who were living at Edwaki and whose husband was in prison. The generosity of relatives had worn thin and they refused to help her out with food. So she helped herself to hens, eggs and vegetables of a certain family. When accused she denied this. Some time later the infant of the accused woman became ill. She then accused the owners of the eggs and vegetables, of ordering a medicine man to cause the illness. She immediately enlisted the help of another medicine man to counsel and heal her daughter.

Nakwaru (the Medicine Man)

Any man who chooses to do so in his early adult life can train in this art. He will learn from a very old and wise 'nakwaru'. The apprenticeship lasts a number of years. The skills of the 'nakwaru' vary. Some have the art of setting bones and suturing wounds, as well as the talents of healing illness by magical powers. Others may have just a few magical powers. Some are said to murder by witchcraft.

Mitchell (1975) who has studied the functions of the Nakwaru in some depth states:

> Lujere witchcraft can be characterized by the way a witch murders his victim; it is representive of a generic type of witchcraft I shall call "sanguma witchcraft". Although the specific details vary among cultures, the general procedure for a sanguma witchcraft murder is

as follows:

(1) the victim is rendered unconscious,
(2) his skin is cut,
(3) the incisions are healed without scars,
(4) returned to consciousness he is without memories, of the assault,
(5) he becomes progressively ill
(6) he dies.

The assertion is also frequently made that once a person is attacked in this way death is inevitable. (p. 419)

The author heard stories about how past sanguma men (Nakwaru) killed, but not how they actually performed the activity. A mother who had teenage children told me one of her babies was killed by the sanguma man but did not say surgery was the cause (refer to chapter 6). Interestingly enough, the author was told few sanguma men perform the art today. The informants told me that there were none who practised murder by surgery in their village, but they thought that the village of Iwani had a very old man who knew the art, but they said they had not heard of him using it lately.

All the 'nakwaru' or sanguma men are seen to be extremely powerful. They are known to be able to give life, preserve life and take life; these powers make them greatly feared. Even though they are greatly feared, they are respected. Their healing services appear to be well used and they are not too costly. The cost can be a kina or two. (Fifty five New Zealand cents is equal to one kina), a meal or two of (sago) 'naba' and some smoked meat or fish. Also they may be given some tobacco or betel nut.

Foster and Anderson (1978) write:

> The stereotypical picture of the traditional curer is known to us all: a wise and skilled person who knows not only the patient, but also the family, who is aware of the social and personal tensions of the patient's life, who sees relief from interpersonal stress as essential to relief from physical symptoms. (p. 249)

This description could also apply to the family doctor in some western societies. The Lujere medicine man functions in this way and his counselling and diagnosing has these factors incorporated into the way he deals with clients. He chooses his own methods of healing and as well, the type of ritual needed for spiritual healing.

RITUALS

'Taimoi-ei' manoevre:

The author witnessed this being performed on a youth. This is used for many illnesses besides undernutrition. The 'Nakwaru' was preparing his instrument when the author arrived to watch the manoeuvre. He was spitting red saliva (produced by chewing betel nut and lime together) into a bundle made of a shredded sago tree heart. When he had finished this he laid it beside the youth.

The next step was to counsel the youth. This was in Namei. An interpreter informed me that the 'Nakwaru' was being told the youth perceived that there was a metal spear in his abdomen and he wanted it removed. He told this 'Nakawaru' that an enemy 'Nakwaru' had shot it into him while walking in the bush and this was why he was sick.

Next step - the Taimoi-ei manoeuvre - this was simply working the skin to extract the spear head. The 'Nakwaru' probed the skin, found the spear head and pinched it between his thumb and finger. Then he quickly placed the bundle of betel nut spittal and sago heart on top of his hand and held it there, while he slowly worked the spear head out of the skin. When the time was right he released the youth's skin and showed him and the audience, a metal spear head in the bundle made of sago heart. The youth felt relieved and got up off the floor and went outside. Mitchell also describes this manoeuvre and illustrates the description with plates (refer to Mitchell (1975) p 420-423.

'Na wowi' ritual

The author did not witness 'Na wowi' but had this described a few times by different men. This is organized by the family and a maternal uncle or cousin performs the dance. 'Na wowi' is performed for chronic undernutrition and chronic sores. 'Na' means sago and 'wowi' spirit. This dancing ritual is used when it is perceived that the sick person has a sago-spirit in them, causing illness.

To prepare for 'Na wowi' male relatives go hunting for pigs and the women relatives produce sago. When there is enough pig caught and smoked, the mask is constructed out of bits and pieces of a sago tree - the stalks of the leaf and leaves, some cane, feathers and paint. The mask resembles the sago spirit as perceived by the community. When this is completed it is left hidden in the bush, while green leaves are gathered.

Next, a feast is prepared (usually about mid-morning). Then the sick person is instructed to sit outside their house, cross legged. Women or infants do not witness 'Na wowi', so if the sick person is a woman or infant

their eyes are covered. Then the mask appears. The holder is inside and can not be seen except for his feet. He dances all day to the beat of hand drums while the sick person sits still. At dusk the dance ends and the mask is taken back to the bush. The sick person rises and the whole village joins in beating hand drums, singing, dancing and feasting all night.

Soon after daybreak the sick person sits again, outside his house and the mask appears. This time the sole dancer holds a bamboo length with potion made from rubbish around where the specific sago spirit in the sick person lives. After dancing for a while he touches the sick person with the skirt of the mask several times, then pours the potion over the sick person.

This action causes the spirit to leave the sick person and follow the mask. When the mask holder perceives he is being followed he lures the spirit out of the village and guides it back to where he perceives it lives. Then the mask is broken up and thrown around where the spirit lives. After this ritual, the sick person slowly recuperates. If not, other measures may be tried. In undernutrition, the 'mit' (Pidgin for muscle) is supposed to return to the body.

Mitchell (1975) actually witnessed this ritual. His description differs from the verbal information the author received. She was told nothing of the dancer having his penis erected and "sheathed by a foot and a half long gourd" and the effect this had on the dancer for that if he looses his erection he leaves the clearing and another man assumes his costume and returns to the clearing. As well he mentions that women can view the "na wowi" 'because a dancing "na wowi" was first discovered in the forest by two women" (p. 426). Whereas the author was told they definitely did not go near.

The author was also informed of another ritual, but 'Pani's' family did not use this, they decided to have 'Pani' drink medicine in the form of milk first.

"Weibau wowi" ritual

This is the marking of a line on the forehead of the infant with a piece of sharp bamboo. This is performed by a 'Nakwaru' in the house of the parents of the infant. It is said to be the last measure when death is imminent. It is used only for 'Aliawi'. The rationale behind this ritual is that the spirits have fused the skin together and 'mit' can not develop.

The ritual To chanting of song by the 'Nakwaru' of observers, the 'Nakwaru', using a piece of bamboo, marks a line or two on the infant's head. Then he squeezes the juice from leaves of ginger over the forehead. Chanting and song continues, as the spirit is seen to leave the child. It's departure enables the skin to separate and 'mit' to develop.

These rituals have been explained because they are three methods of healing undernutrition. They are fully understood by the Lujere people and at least one is tried, before parents will consent to rehabilitation treatment at the health subcentre. Families try what they understand. It is a mystery how protein foods like milk can restore muscle and subcutaneous fat and make an undernourished infant reasonably healthy, just as it is a mystery for the nurse how those rituals can restore health.

'Patim skin' ritual

The author again never saw this performed, but it is a popular ritual which most infants are subjected to. 'Pitim skin' - (Pidgin) is used to encourage walking by hitting

the skin to develop 'mit' and give strength to the legs.

The maternal uncle initiates this ritual, they are responsible to see that infants walk. The uncle brings to the parents' house the specific seed pod empty of seeds, called 'pikinini diwai'. He has collected it from under a special tree.

The infant is held by it's mother and the light pod is pounded in a gentle manner at the knee and ankle joints. The rationale is to transfer strength from the strong stately tree into the infant to promote walking.

All these rituals are interesting and illustrate the concern the Lujere have for undernutrition and the fact that they recognize it when muscles begin to waste. The Lujere do not seem to relate undernutrition to food, to growth and health but do relate it to strength and hunger. Growth is the concern of the infants own spirit inherited from ancestors and helped by the above ritual.

Food and Illness

Campbell and Chang (1981) comment of the Chinese that:

> Food is thought to play a part in the cause and treatment of disease. (p. 162)

The comment that food is seen as being hot and cold and this has an effect on the type of illness manifested. This certainly is a different way to look at food causing illness. It is quite different from the western idea of some illnesses, like undernutrition being caused by not eating enough of the right food, or like obesity with eating too much of certain foods, known to fatten people.

The Lujere point of view is also different, in that they perceive that all food native to their area has a spirit. As do dead ancestors and some special forest trees and swamp water. The latter can enter a person through food being used as a medium.

For example, if lush vegetables are growing below a specific spirit possessed tree, the rain water dripping off the tree can transfer the trees spirit into the vegetables. Then when these are eaten the spirits enter the eater and cause illness. The remedy is to cut down the tree and its spirit will cry out in pain for the spirit to come home.

An example of a food's spirit causing illness is eating sago. Often beside the sago's own spirit there can be the spirit of the water used for processing the sago, which has entered the processed sago. This is a common cause of undernutrition in that the mother has eaten some sago with these bad spirits in them and she passed the spirits on to the infant through her breast milk. The treatment here is to use a dance ritual to entice the spirits to leave the child. This is spiritual healing and incorporates as Wu (1973) explains:

> appeasing of evil spirits (offering) supplications to gods etc. (spirits) to drive illness out of the body. (p. 18)

An example of this was explained on (p.88). All these perceptions of causes and methods of treatment are extremely important to transcultural nursing. They help the nurse to understand tensions and constraints, and can be useful when recommending rehabilitation and preventtive measures.

THE INTRODUCED HEALTH CARE SYSTEM

Of health, Wilson (1975) writes:

> Our model of health is a medical one. It is also individualistic. We assume that health is an ideal state of human life in which illness and handicaps have been eliminated from each and every individual. We seek health by prevention, diagnosis and treatment in individual patients. Health is a positive quality of well-being. (p. 2)

This definition explains how an introduced health system operates to produce a quality of well-being. In the Lujere situation, there is a need to extend this model, by gaining insight into the Lujere traditional practices and beliefs. Then, this needs to be followed by incorporating any suitable Lujere practices and beliefs along the lines recommended by Wilson and his perspectives on health care. This should then bring about a positive quality of life for the Lujere people.

This method of functioning is relatively new in Papua New Guinea. The Papua New Guinea Health Department commented in 1975:

> The designs of the health services have been determined largely by imported western systems and values. Traditional beliefs and practices were either ignored or considered significant only because of their effect of impeding or frustration the development of the western system.

At the national and provincial level much has been done to change the functioning and incorporate transcultural health care.

The West Sepik government which plans for Lujere communities has developed a 'five point programme' for 1979-1983.

This is their fifth point:

> In order to provide comprehensive health care at the local level, see that all development-orientated activities be correlated and balanced so as to highlight our top priority problems as seen through the eyes of the community and our provincial health system. To achieve this, basic, simple and down to earth programmes must be initiated that will meet the local needs.

Meeting the local need:

The provincial health office has developed a holistic approach and recommends that field staff do the same. The nurse in charge of staff at the health subcentre have been adapting their health practices to holistic care so as to meet the local needs. An example of this is provided in this case study. 'Nai' was bitten by what was thought to be a non-venomous snake (as there were no fang marks) at 7 p.m. one night. This happened in close proximity to his father's grave. 'Nai' concluded, as he saw the snake dart away, that the snake was his father's spirit and it had bitten him to kill him and take him to the spirit world. By midnight he was delirious with fear and pain at the bite site. He was sure he was going to die, and did not want to.

One expatriate nurse and three Lujere trained male health workers counselled 'Nai'. The Lujere men talked with him about his perceptions. He was given a local injection into the bite site to relieve the pain he felt. The health workers' counselling and the injection of local anesthetic seemed to prevent 'Nai's' father from claiming him. One of the health workers provided an all night vigil. This seemed to be meeting local needs and using transcultural health and, importantly, brought in a human relations dimension.

Human relations dimension:

This is an important dimension of the western health care system, when functioning across cultures.

Henderson and Primeaux (1981,b) writes:

> The more effective nurse is in tune with conditions that promote a patient's physical and emotional well-being.
> (p. 196)

This is being sensitive to the need for a person to person relationship like 'Nai' received when he was being treated for a snake bite.

On many occasions, as the author began to insert a feeding tube into a seriously ill marasmic infant, the author sensed the fear even though each step of the tube feeding procedure had been explained in Pidgin. When, however, an auxiliary (indigenous) health worker is brought into the situation, and interprets in their own language, the entire atmosphere changed in minutes. This makes transcultural nursing a reality by considering the tension a new procedure can cause when it is watched for the first time and the stress reduction possible when the manoeuvre is explained in familiar terms.

Whichever health care system a client uses, all medical systems can provide as Henderson and Premeaux (1981):

> (1) a rationale for treatment;
> (2) an explanation for the 'why' of health and illness;
> (3) a rationale for social and moral norms. (p. 63)

The medicine man is extremely good at this. Therefore, this is an art which could be transferred to the introduced system. This will help show the effectiveness of the western system and, where appropriate, maximise its application. For instance, within six weeks the value of drinking milk is visibly demonstrated by development of the arm and leg muscles of an undernourished infant.

Foster and Anderson (1978) write:

> When, on the basis of empirical evidence, traditional people see that scientific medicine is more effective than their own, and when they have scientific medicine on the terms they deem acceptable, they are very apt to turn to it. (p. 245)

The Lujere people do not seem to show resistance to western medicine as long as treatments like tube feeding and intravenous drips are explained fully in language they understand.

There are times when the two systems operating in the South West Wapei do have disagreements. Then, when both parties come to an understanding of each others philosophical ideas and a transcultural approach is used, needs are met.

An example of this can be instanced. On one occasion, it was difficult to explain this administration problem to an irritated father, whose infant needed treatment at Vanimo. He was determined to accompany his wife and infant to Vanimo. He just could not understand it was health department policy for only one guardian to accompany infants. He kept repeating that he had to go with his wife because she could not speak Pidgin or English. In the end he gave up the idea and his family went without him, but he kept inquiring every week until they returned as to how his child was getting on.

An important feature of the Lujere health care system is that health is when there is balance between the mind, body and soul. Therefore there is a need to understand the mind-body dichotomy and a caring for the total human being.

Henderson and Primeaux (1981) give this sound advice:

> The mind-body dichotomy gives way to viewing the patient as a biological, psychological and spiritual whole existing in a specific environment. (p. 63)

CHAPTER SIX

CULTURAL ATTITUDES AND THEIR INFLUENCE ON NUTRITIONAL PRACTICES IN INFANCY

Cultural attitudes, for example those related to the ecology and subsistence patterns, do have an important influence on nutritional practices in infancy and on the incidence of undernutrition. Both ecology and subsistence patterns need to be understood if transcultural nursing is to be applied. As already discussed in Chapter Four it is the ecosystem which generates plants and sustains animal and human life. The Lujere people hunt and gather from such a system to harvest suitable food. The selection of a particular food is influenced by cultural attitudes and the nutritional practices regarding infant feeding are many and varied.

Those cultural attitudes which determine what selection of food is offered to Lujere infants (birth to five years) are of central concern in this thesis, as are the general practices related to infant rearing.

The Lujere mothers try hard within the cultural context of their ecosystem, to preserve the health of infants, but a breakdown can, and often does occur and under-nutrition results.

Canosa (1968) writes undernutrition:

> is one result of an adverse interaction between children and the social, physical and biological environment in which they function. (p. 399)

CARING

Ross Mitchell (1975) states in general terms how dependent infants are on adults by suggesting:

> It may fairly be claimed that the social background of the patient is more important in infancy and childhood than any other time of life. The young child is almost wholly dependent on adults for his basic needs of nutrition and protection and has little control over them. (p. 195)

Good nutritional practices and cultural norms extend the quality of life. Lujere families do try to do this with their children. They lovingly give of what food they have, to their infants to enable them to be strong. As an illustration of this caring behaviour the author recounts the following observation.

On one occasion when the team arrived at Tipas village, a young mother was seen sitting cross legged by a fire in a 'haus win' (pidgin for a shelter with a roof, floor and no walls). On her lap lay an eighteen month old infant suckling at the breast. As the infant suckled the mother attended to food cooking on the fire. She was baking some small herrings which were tied in a leaf bundle, and also was roasting sago in a battered frying pan. As the team stopped to put down their rucksacks and string bags the baby stopped suckling, and the mother took the sago and fish off the fire and gave some to her infant. At the same time she also herself ate some of the food.

This demonstrates the dependency of the under two year old on the mother. It also, however, demonstrates that the mothers awareness of, and attention to, the infant, is constant.

Leininger (1978), when reporting on Papua New Guinea field work emphasised that:

> The 'tiny baby' must be watched closely by the mother, fed and protected. The dominant caring behaviours are surveillance, touching, stimulation, nurturance, succorance and social bonding. (p. 386)

Lujere mothers try reasonably hard to fulfil this function. They find these functions satisfying, because they enjoy caring for their infants. Being a good mother has an important social value because Lujere mothers fear being classed as bad mothers. When their infants are little, Lujere mothers and fathers integrate this caring function into their daily living. Neither the baby's needs nor household functions are neglected.

An example of this again at Tipas, was when Wulinaki was conducting a church service. There were approximately fifteen to twenty mothers among the crowd of people who had gathered there. Some of the mothers were more occupied with child care than listening to the sermon. The author noted on this day a variety of activities that the mothers were engaged in as she sat and watched from the step of a nearby house.

> One mother with an approximately two and a half year old was playing hide and seek with a carving knife and the child was greatly enjoying this as a knife went in and out of a string bag.
>
> A second mother was holding an approximately two to three month old infant up from under the arms, making faces and rubbing noses while the infant was responding by laughing.
>
> A third mother with an infant between twelve to fifteen months was seen looking into her infant's eyes and mimicking the sounds her infant was making.

> A fourth mother was found trying to pacify a crying infant of approximately six months of age by putting a nipple in its mouth. The more she tried the louder the infant cried but she did not make any gestures towards other measures to pacify the child.
>
> A fifth mother tried to stop her four year old from talking to another child around the same age by offering them both some roasted sago she had in her string bag.

These were common occurrences that could be noted whenever people gathered together, whether they met for a church service or a clinic or as part of daily village or bush life.

The extended family pools resources to help with the care and to allow bonding to be established between baby and mother and between the baby and themselves. The Lujere do have a dual bonding, as explained by Leininger (1978)

> There is a dual bonding of mother-infant and the infant and his immediate social group. (p. 386)

For the Lujere the immediate social group consists of his parents and other siblings. The author noticed on many occasions that when a mother of a small baby was preparing a meal, or carrying a heavy load or processing sago the husband or elder girl would care for the baby. The pattern of behaviour during this time was that of stimulating the baby, by touch, moving him around, or cuddling tight. As well, sometimes the infant would cry and the care giver would bounce the child until the mother was able to breast feed her infant.

FEEDING PATTERNS

Lujere communities pool their resources when hunting, for animals, when foraging for food and when fishing. A list of the varieties of animals, vegetables and fruit used in the Lujere diet are recorded in tables 4.1 to 4.4 (p. 65 to p. 81).

On one occasion when returning from Norambalip the team met, going in the opposite direction, the Yegarapi medicine man with a group of about thirty people of all ages. They were carrying a variety of artifacts, including bush knives, axes, bow and arrows fish traps and equipment for processing sago. After asking 'yu go we', pidgin for 'where are you going', the author was told they were going as a family to hunt, fish, forage for food and process sago in some bush near Mantupai (approx 10 hours walk away). It was common to meet people in the forest coming and going from such expeditions. It was also not uncommon for the expedition to be of such a length.

On another occasion when the team had been walking for four hours from Edwaki and were on the way to Mantupai, they met a group of six people returning from a bush camp to Edwaki. They were laden with food. They had been hunting with the 'sut boi' (gun man) from Mantupai. They opened their bags and proceeded to give Wulinaki handfuls of cooked pig meat and some smoked marsupial meat. Yorc carried this meat to Mantupai and back to Edwaki, so they could share it with their family. It was no light weight to carry for fourteen hours along with patrol equipment. Sharing of food resources, however, is a natural thing to do in Lujere ecology.

Tipas, because it was situated on the bank of the Sepik River, was an ideal place for fishing. The author on most visits was amazed at the amount of fish that was

caught. On the second to last trip the author made to Tipas she counted the number of canoes which brought fish into the hamlet. There were about forty people milling around the area. Six canoes were noted each with two to four people. They all brought from their canoes as much fish as they could carry. The varieties of fish they carried were 'kol pis' a herring 'maus gras' and 'bikmaus' (pidgin terms) varieties of cat fish. That night the village had a strong aroma of fish being cooked and smoked. No other village was ever seen to have such an over abundance of fish, and their catches were much smaller. The Tipas people do not have a fishing season like the other Lujere villages who fish in the streams which drain the swamp.

Staple foods

When talking to the Lujere people about food habits they claimed to have two main meals a day which consist of sago with green leaves or meat. Sago is prepared by mixing sago flour with boiling water. This is named 'naba' in Namei. Or the sago can be roasted in leaves, small tins or frying pans on the fire. This is called 'emnawalbai'. Townsend (1980) writes this of East Sepik Province people:

> Sago is the source of 85% of the caloric value of the local diet. (p. 21)

This proportion of sago in the diet is similar for the Lujere from the West Sepik. The portions of sago they eat at one meal are large in comparison to the meats and greens which accompany it. The Lujere people remark that they will not just eat 'naba' by itself, they must have meat and/or greens, to help it down. They will, however, eat 'emna walbai' by itself.

Plate 6.1 shows a family waiting for sago made with hot water to be served. While the teenage girl waited she cooked green leaves in a tin.

Townsend (1980) further comments that:

> ten percent of the diet is composed of meat and domestic pigs, small game, fish and insect larvae. (p. 21)

The Lujere do not eat domestic pigs with their daily meals. They are used for feasts. Animals and birds are smoked when caught and small portions are eaten with sago and green leaves. These are listed in Table 4.1 (p. 65). If they have no meat, green leaves only are eaten with the sago. Townsend (1980) comments that

> green leaves, along with other vegetables provide 5% of the diet. (p. 21)

Green leaves are probably eaten in a higher percentage by the Lujere, as the author noted they were always plentiful. As well the team didn't have any problems about buying them for their meals.

Plate 6.2 illustrates sago flour. It is crumbled in the fingers before mixing with hot water or roasted in the fire.

Subsidiary foods

Sago, green leaves, animal meat and fish are the main staple foods and, as mentioned (p. 110) are eaten at meal times. Vegetables and fruit like bananas, tubers, pumpkins sugar cane, paw paws and breadfruit are snacked between meals. Some of these foods, such as the sugar cane, ripe

PLATE 6.1: Cooking green leaves (in a tin) and serving up Sago made with hot water

PLATE 6.2: Sago flour before it has been crumbled.

bananas, and papaya are eaten raw and often in large quantities while foraging, gardening or fishing. Foods like tubers, cooking bananas, pumpkins and pit pit are cooked by roasting in the fire or boiling. These are often eaten while waiting for the sago and meats to be prepared and cooked. The Lujere people may have just eaten three or four large bananas, but if asked if they had just had a meal they would say no. A meal to them consists of sago with green leaves or animal flesh, or fish baked in the fire or boiled in a billy.

The infant's share of food

Bailey (1963) writes of the New Guinea highlands:

> Invariably the foods introduced (to infants) are simply portions of the adult fare and chiefly the staple food stuffs in that locality. There is no tradition of infant feeding with foods specifically prepared to suit the infant's digestive powers and relatively higher protein requirements. (p. 9)

Often at dusk the author strolled around the village where she was camped. A number of houses had fire places on a verandah and the author would observe families sitting around the fire. Mother would usually be making sago whilst father, older children and dogs would be sitting waiting for their share. On the fire in tins, billies or just in the flames other food would be cooking. Often the food in small tins was the children's and this would be food that they foraged for themselves.

When it came time to eat, large banana leaves heaped with sago would be put in front of the family and what was cooking on the fire would be added to it. If a child had a special tin he would quickly devour it and then

look to the family billy and leaves for more food. The whole family, normally using their fingers, would quickly be in for their share. If the children were too young to eat sago made with hot water it was interesting to note that sago was roasted for them. Dissimilar to western culture it appears that roasted food was deemed to be more suitable than boiled food. If there was pig meat, marsupial or large fish, then it was noted that the infants would, also, not be allowed to eat them since they were perceived to be taboo. Taboo foods are explained on (p.123).

Breast feeding

Leininger (1979) when writing of the Gadsup people explained informal and natural breast feeding in the following comment:

> All infant feeding is in relationship to his needs and there are no feeding schedules. The mother breast-feeds the infant whenever she feels he needs food and cries. All night the infant sleeps close to the naked body of the mother, cuddled under her arm and sleeping on one side of her body. (p. 386)

The Lujere mother too, has no feeding schedules or schedule of care. She is always there 'on call' for her infant who is the prime concern of the mother, until it can fend for itself. Mothering with breast feeding is the first concern and is displayed wherever the mother happens to be. Most of the time the infant is carried in a cloth sling, with his head resting near the popular breast. Plate 6.3 demonstrates how infants are carried. The older child on the shoulders and the younger infant in a sling so that the infant can casually breast feed. Plate 6.4 illustrates how working and feeding occur concurrently. The small infant is always seen to be near the breast day and night.

PLATE 5.3:

The smaller infant is carried in a sling and the older ones on the shoulder

PLATE 5.4:

Infants are breast-fed on demand no matter what the mother is doing

Sometimes the husband or other women and girls would share the caring of infants, but mother would always be reasonably close. If there was a whimper, the infant would be returned to the mother for attention. Mothers enjoy being mothers and show this by spending time playing and talking to infants, even when walking or sitting in a canoe or wherever they are. When writing about Papua New Guinea generally and commenting about the custom of suckling Chowning (1973) states that:

> The mother generally seems to enjoy suckling the infant, it is a long drawn out procedure during which the child is fondled and talked to. As the child grows older he is allowed to go increasingly longer periods without milk, and the mother tends to be more casual about suckling, sometimes not holding or looking at the child. (p. 62)

Breast milk is the staple food for infants until they are weaned. This was found to be approximately between twenty months and two years of age. It is the only food provided until two teeth appear. Breast feeding bonds the infant to its mother. The infant and mother are seen as a single unit until at least the infant is eating his/her full quota of solids and this bond does linger on in a reasonably close fashion until weaning. It does, however, begin to lessen when a child is given his spiritual name, which will be some time before teeth appear. This name is never spoken by the child or its maternal relatives. In other words it could be said that the Lujere mothers experience the infant as one with the self, until it is reasonbly independent.

Becroft (1967) writes of the Highlands of New Guinea that:

> Weaning is a matter for mutual decision between the mother, child and father. Some children wean themselves, but most are weaned when their parents decide it is time for a new baby. (p. 81)

Lujere parents have a similar pattern, though most of the infants wean themselves off breast milk gradually. When eating solids begins, so does weaning. This is when the desire for milk lessens. This means handling is less. Walking too, is beginning and the child is more mobile. Thus, the child can be seen going to its mother for a drink when thirsty or just to wash down a meal. The mother sees this as the beginning of the developing of a separate personality and the lessening of the bond developed through breast feeding commences. As the child's mobility develops, so does talking. This is a sign that the infant will soon be able to go and use the bush as a toilet, and eat meat and green leaves. With these activities, breast feeding ceases. Thus, the bond built through breast milk, becomes less secure and the infant joins 'the multi-aged society of children'. The bond does not disintegrate altogether. It is during day light hours that the child goes with other children foraging for subsidiary foods and the mother goes processing sago, foraging and fishing. They come together at meal times and also sleep on the same bed.

Spillius (1958) writes that in Tonga:

> the traditional method of feeding babies in the first year is said to have been exclusive breast feeding for eight to nine months, followed by rapid weaning and by sudden introduction of solid foods... Tongan babies have the problem of making a transition from the high protein diet of milk to the extremely starchy diet of adults. (p. 61)

This weaning is much more traumatic than the Lujere mothers' slow method. Though, if the Lujere mothers become pregnant before weaning occurs, weaning is abrupt. When this occurs the father separates the child from the mother and cares for it separately, introducing it to other children and meat and green leaves.

Several mothers the author talked to said that with most of their children weaning was initiated by the child. Their children just stopped drinking breast milk and ate more food at meal time. A few other mothers said it was due to the fact that they became pregnant and had to wean their infants. One mother said this happened with a daughter who then went to live with her grandmother. Another mother said she had had two sons who needed quick weaning and on both occasions the husband took the boys to the 'haus boi' pidgin for the men's house where the men sleep, live and hold religious ceremonies.

Earlier in this chapter examples were given of mothers sitting in a church service fondling their infants. Lujere mothers like to be seen fondling and talking to their children. They see this as marking them out as good mothers and they want this to be known. If they are not regarded as such it is a social stigma. If it becomes general knowledge that they are bad mothers, it is said the 'sanguma man' (pidgin for medicine man) will kill this infant in a slow way. First by causing gastro-enteritis and then by letting it become dehydrated and die. This fear of death keeps the mother active with her nutritional care, especially breast feeding. This, and similarly expressed beliefs can be understood as their way of defining the environment and what they experience within that environment.

A Norambalip mother told me this story in confidence. It was about how the 'sanguma man' killed one of her babies because of a careless mistake. She said that one day she had no green leaves to eat with her sago, so at midday she left her suckling infant with her old mother and went in search of leaves. In the meantime an electrical storm occurred and she was stranded with a flooded stream between herself and her house. It was dark when she arrived back at the village. From a distance she

could hear the cry of her infant. She began to run to her home, but was stopped by angry women who were accusing her of being a poor mother by leaving her infant without food.

A week later her infant suddenly became violently ill with diarrhoea which ran like water. She quickly realized, as she explained, that a sanguma man had caused this, so went running first to her personal sanguma man for help, and then to the missionary. But none could help her and the infant died. She said after that incident that she never left any of her babies, to go gathering food but took them with her and she has never lost any of them to a sanguma man since.

The infants' solids

The Lujere custom of introducing solids to their infants was noted to be more nutritious than that found in other areas in the West Sepik. First foods are given at approximately seven months when the first teeth erupt. This is much later than European societies who usually introduce vegetable juices, fruit juices and solid bland diet at approximately three months. The standard treatment information supplied by the Health Department of Papua New Guinea emphasizes implementing the change of this pattern of feeding to the European style by introducing solids at four months (refer to Appendix D p.225). Mothers told me that if there was fish being caught they gave their infants pieces of small 'kol pis', pidgin for herrings. First they premasticated them. As well they gave ripe bananas, which they squashed in their fingers. They were placed in the mouth in very small amounts and washed down with breast milk. Unfortunately some infants miss out on having fish because 'kol pis' are only caught between May and October when the streams are flowing at a low level.

TABLE 6.1: ORDER OF PERMITTED INTRODUCTION OF FOOD TO INFANT

Approx. age	Indication of Development	Food
birth until seven months	being born	breast milk
seven to eight months	two teeth	premasticated fish squashed, ripe bananas breast milk continued
twelve to fifteen months	crawling well, standing up and six to eight teeth	cooked bananas roasted sago tubers breadfruit papaya pumpkins beans breast milk continued
eighteen months	walking well and beginning to talk	coconut and milk breast milk continued
twenty months to two years	talking weaned toilet trained running around all teeth	sago made with hot water green leaves fern leaves animal meats (marsupials, pigs rodents) insects (grasshoppers, insect larvae) fish (karewai, mausgrass hik maus, kolpis)
2 years to 5 years	joined the child 'multi-aged Society'	adult diet

The Lumi infants were seen to be less fortunate since they do not get the chance to have fish. Wark and Malcolm (1968) write:

> For babies aged between eight and twelve months, taro which has been cooked in the fire, is premasticated and fed in small quantities as are bananas. (p. 130)

Table 6.1 sets out the times of introduction of specific foods to the Lujere infant. Note that they do not taste their staple food sago until they have six to eight teeth. Then it is given as a rusk and infants nibble on it all day long, as they run around. At this time also, subsidiary foods are introduced which are eaten between meals; these are pumpkins, cooking bananas, beans, corn, tubers, breadfruit seeds and such like (refer [illegible]).
With the introduction of solids there comes more social bonding, but the infant still is seen as being part of the mother. Thus infants can be seen gulping breast milk quickly after eating food.

Table 6.1 is an interesting table, in that it contains a list of foods and the time at which it is culturally acceptable to introduce these to infants. On examination, it can be noted that an infant is approximately seven months old before it is given solid foods to taste. Then, this adjustment is taken slowly, because it is a further seven months before all the available solids, except meat, certain fish and green leaves are eaten.

It is a further three months before they eat the full adult diet. The transition from breast feeding to a complete adult diet is a vulnerable time. Observations indicate that it is during this transition that they are prone to under-nourishment. If Table 6.1 is compared with Figure 6.1 it can be seen that from the sixth month to the twentythird month the weight path of the average infant is slightly slower.

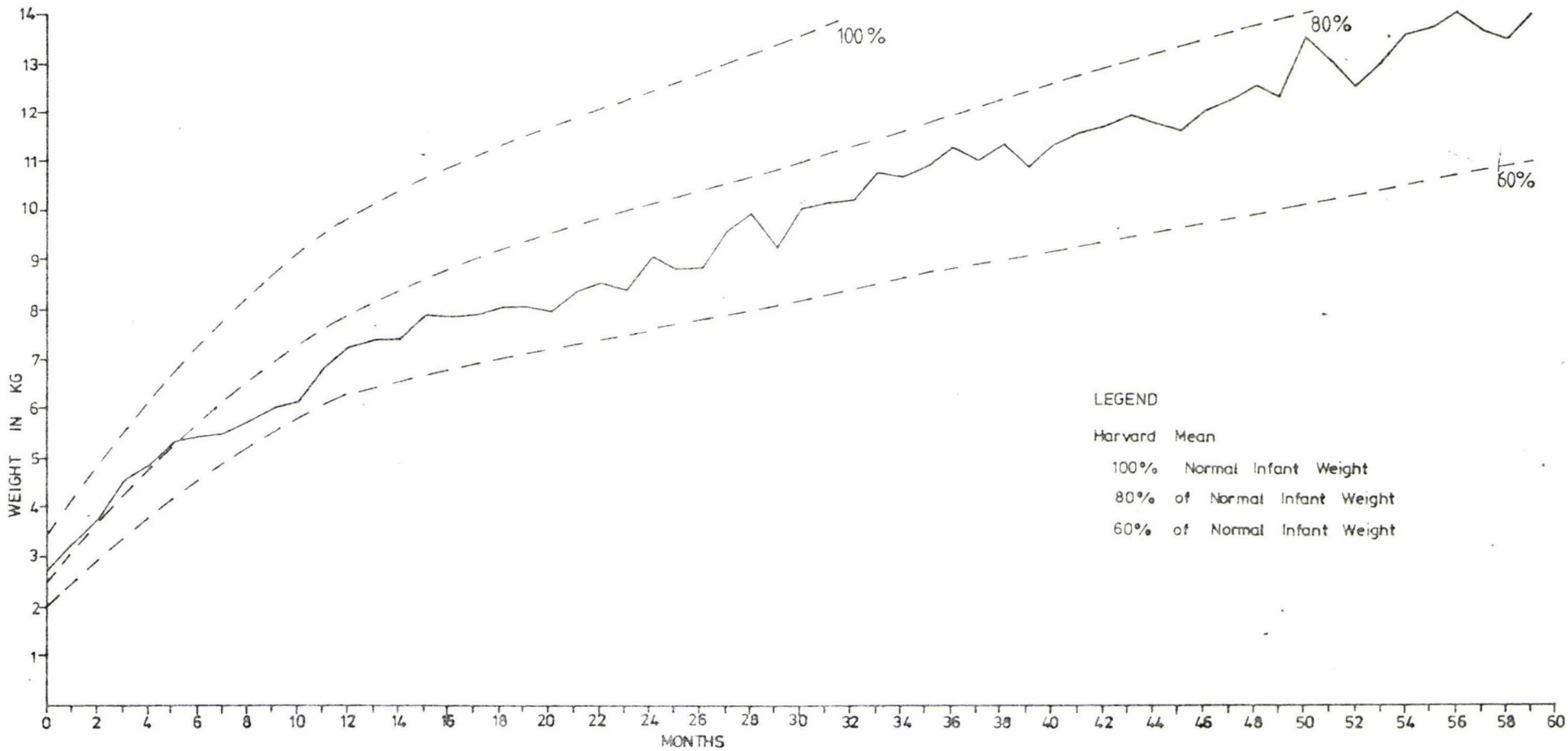


Figure 6·1 : Average Growth Curve of Lujere Infants

Close examination of Figure 6.1 reveals that until six months of age the infant has a reasonable gain and then the increase of weight slows considerably until eleven to twelve months. Weight then increases again and continues to do so until seventeen months when it flattens and then moves in spurts till five years of age. Between six months and ten months teething and the introduction of solids occur together. This could be a factor related to the weight loss. Where there is again a decrease and a slow fall until about twenty-four months, the causative factor is likely to be the withholding of animal meats, most fish and green leaves. When the infant is eating the full adult dietand is established in foraging methods the weight seems to increase once more. In a unique way the infants, although showing increasing and decreasing weight gains do at the same time show signs of growth, albeit a slow growth.

Figure 6.1 has been compiled from averaging each weight recorded on the fifteen village scattergrams. From these scattergrams an average graph has been compiled for each village and then averaged to form Figure 6.1 (refer to Appendix B). Table 6.1 has been compiled from a journal recording noted from observations when watching children eat and information given by mothers and confirmed by Yorei.

Food taboos

The author first learned about food taboos when working earlier (1960's and 1970's) among the Wapei and Au people at Anguganak and Lumi. It was noted then that they were strictly adhered to by the Wapei and Au people. A general observation among the Lujere people did not, however, reveal the existence of food taboos. It was when actually having some meals with families that the author noticed

that mothers with infants who were wholly dependent on breast milk, avoided eating pig meat. Even though infants were aged between seven months and two years she noticed that pig meat and other meats and green leaves were withheld from them. On these occasions enquiries revealed also that lactating mothers did not eat pig meat or green leaves until their infants ate sago.

From a similar enquiry the author learned that pig meat, marsupials, most fish, rodents and green leaves were not given to infants under two years of age. The reason given was that the supernatural spirits resident in the above were too strong for the infants immature spirit. If the infants ate such foods they would surely die. Food taboos are lifted when the infant can talk. It is as though the spirit of the infant can now order intruding supernatural spirits to leave the body. A group of Mantupai mothers told me that the reason they did not give green leaves to infants who were not toilet trained was because they did not like the smell when they had to clean up bowel motion messes.

Lewis writes (1975) of the Gnau children of the West Sepik province:

> when at about two years they are allowed to eat meat, and starch tubers, their diet improves and they are given titbits. Little children play together in the day, catching crickets, butterflies grasshoppers and lizards, which they roast on the fire and share ... The older boys spend much time at hides to shoot birds and share these among smaller children, as hunters do not eat what they kill themselves. (p. 91)

Lujere infants do the same. They join what is called the multi-aged society of children. At first they go off playing, with a parent not too far away. They eat there and then, what they can find.

GAINING INDEPENDENCE

As mentioned above, the months between twenty months and twentyfour months are a period of radical change for Lujere infants. They opens a new world - '*the multi-aged society of children*'. The mother would be seen to stay at a distance and to observe her child adjusting. She would be just a call away if difficulties arose.

It is then that a bond develops with other children; older children care for them helping with foraging for food and cooking delicacies like grasshoppers, small rats and birds. The author observed this frequently as she walked to and from the villages and, also, whilst in the villages or bush.

Leininger (1979) referring to children from one to three years comments:

> During the next two years, the mother lets the child explore his immediate world... Most mother's activities are done in seeing distance of the exploring child in his physical and social environment. (p. 86)

Once the Lujere child joins the 'multi-aged society of children' and becomes a person, separated from his mother, he has no more milk but the mother child bond stays firm. Incidentally, children show no desire for the milk. They seem to be content without it. Older children would refuse milk when this was offered at the health subcentre.

Infants once weaned, seem to gain a real hunger for meat, birds, fish and insects. This drives them at a young age to forage for insects, birds, rodents and marsupials. Then when they can, male children go on pig hunts with

the men, to hold the flares or torches.(refer plates 6.5 and 6.6). . . These older children help and teach the under fives how to forage for food.

Aspects discussed in this chapter demonstrate how cultural attitudes influence nutritional practices. These attitudes were noted in the caring which Lujere infants receive and which encompasses feeding patterns and the gaining of independence. Table 6.1 illustrates how, in a unique way, the Lujere people monitor growth and development and then change the patterns of caring related to nutritional practices. Also it demonstrates that they take time to introduce their child to a full adult diet and that when it has reached that goal it is independent. The close bond of infant-mother stays firm and a new bond develops with the children of the 'multi-age society of children'. Now the child plays with those children, foraging for most of his own subsidiary foods such as grasshoppers, insect larvae and mushrooms. As well the child still makes some trips to the forest with his parents. The mother is still the primary person for guidelines and remains so for most of the growing years of the daughter. For the son the father becomes the primary person as sometime after weaning he goes to the men's house to sleep with his father.

These culturally backed nutritional practices seem to have some relationship to undernutrition. Undernutrition is the result of an inadequate supply of protein and some deficiency in carbohydrates. When one examines the foods said to be given and their availability, it is obvious that cultural habits such as no solids until teeth appear, small amounts of fish, and beans if they can be found, must affect the protein intake for the under two year olds. Then for the two to five year olds the foraging for foods to subsidize sago, means that these foods must be protein foods as sago is a starch. Being children, they are limit-

PLATE 5.5:

Giving a demonstration on the use of a bow & arrow

PLATE 5.6:

Using skills learned in 'the child's multi-aged society'

ed to what they can find - green leaves, insects, small birds, probably fish and maybe rodents. Parents do share meat from hunts with their children, but children are near the bottom of the food chain as men and youths have the largest share and the women are given much smaller portions. Incidentally the man who saw and killed the animal or bird does not eat what he has killed. The reason being he fears the spirit within the animal or bird could cause him to become ill as the animal's or bird's flesh knows he killed it and may seek revenge. These habits must limit the amount of protein obtainable and therefore influences the incidence of undernutrition.

CHAPTER SEVEN

CLINICAL EVIDENCE OF UNDERNUTRITION AMONG INFANTS AND YOUNG CHILDREN OF LUJERE COMMUNITIES

The use of weight for age

Weight for age was the method used to support the clinical evidence of the presence of undernutrition in the Lujere infants (birth to five years of age). The value of this method is demonstrated in two research studies discussed below:

Garrow's Jamaican study (1966)

> This study is quoted by Waterlow (1978)
>
> In reporting data on the relative frequency of different patterns of severe malnutrition as they present in a hospital or clinic, both qualitative differences and severity are important. The population under study must be defined as far as possible, i.e. the criteria of admission to the study should be stated. This is seldom done. When it is done, the most frequent criterion for classifying a child in the 'malnourished group' is that he or she falls below an arbitrarily chosen level of weight.
>
> (p. 531-532)

Garrow analysed a series of cases of severe malnutrition in Jamaica using the following criteria:

> (1) No child was considered to be severely malnourished unless he was below 70% of the expected weight for age, using Harvard standards. Garrow based this criterion on work by Stuart and Stevenson (1959).

> (2) The criteria for 'kwashiorkor' were: child at minimum weight no less than 60% of expected weight for age; oedema present, plus hepatomegaly or dermatosis. (This is not applicable to this study because kwashiorkor does not seem to occur among the Lujere).
>
> (3) The criteria for 'marasmus' were: child less than 60% of expected weight for age; no oedema or other specific signs.
>
> (4) Children who were less than 60% of expected weight, with oedema or other signs were classified as intermediate (marasmic/kwashiorkor). These formed the largest group - nearly 70% of all cases. (Not applicable to this study it is not known to occur among the Lujere).

This research gives explanations which are extended into the Lujere study and Clark and Cogill's (1980 p. 87-91) research. This is the criterion for classifying a child as undernourished.

> The much discussed problem of standard comparisons is extricably bound up in the concept of 'normality'. It is gradually becoming recognized that it is impossible to define the normal except in arbitrary operational terms, i.e. the characteristic of a certain population as shown by apparently healthy people of a higher socio-economic level.
>
> Waterlow (1971 and 1976 p. 535)

Clark and Cogill (1980 p. 87-91) extends Garrow's 1966 research. The comment:

> The limitations of weight for age as an indicator of malnutrition in a population are accepted. It is anticipated that a more appropriate classification of malnutrition will evolve.

Clark and Cogill's Papua New Guinea study, 1980

Clark and Cogill's criteria are three categories of nutritional status based on the Harvard weight for age standard:

Above 80% weight for age
- well nourished

60-79% weight for age
- mildly malnourished

Below 60% weight for age
- severely malnourished

The percentage of children falling into these categories, were calculated for each age group.

0 - 11 months
12 - 23 months
24 - 35 months
36 -47 months
48 - 60 months for each clinic.

Seven census divisions which cover many different ethnic groups were used over a period of three years. The study examined:

nutritional status by weight for age;

change in malnutrition rates 1974-1975 to 1978;

nutritional status by altitude;

nutritional status by language group.

Garrow (1966) and Clark and Corgill (1980) both used the Harvard standard weight for age and what they both measured was 'wasting' and 'stunting' Clark and Corgill (1980). The three percentage categories mentioned already (on pages 16 and 17). Thus in the Lujere study it was found to be appropriate to use similar categories, to discover when, and what kind of transcultural nursing intervention is needed to raise the nutritional status of Lujere infants.

DISCOVERING UNDERNUTRITION AMONG LUJERE INFANTS

Time and space

The team spent five months doing weekly patrols. Of the fifteen villages visited, all except two had five visits. These were not visited because Yoredi and the author were sick at the time these visits were scheduled. The villagers brought their infants (birth to five years) to eight assembly points.

Collection of available data already recorded

(1) The nature of the data required to perform the study was names, birth months and ages of all children (birth to five years) who attended the monthly infant welfare clinics (refer Chapter Three).

(2) The source of this data was village registers, kept at the health subcentre and taken by the team on patrols. Also the infant record books held by each mother and brought to each clinic.

Recording ongoing data

At each clinic, the children were weighed using a spring balance scale. These weights were recorded in the baby's own record book and the village register (held by the nurse). From these registers the author constructed a scattergram for each village. To identify each month a different symbol was used to score the weight on the scattergrams (refer Appendix A). To identify each child the weights were joined by a pencil line. Figure 7.1, and Tables 7.1 and 7.2 have been constructed from these, as was the graph shown in Figure 6.1 p.122 which gives an average weight curve for all the infants and children of the Lujere communities included in the study.

Use of Harvard weight for age standard

The Harvard weight for age standard was chosen because it is used widely throughout Papua New Guinea. The Papua New Guinea Health Department recommended its use in 1975. Also it has been used widely by the United Nations in developing countries. Waterlow (1976).

The criteria used in this study for classifying 'undernourished groups' and measuring 'wasting and stunting' was:

- above 80% weight for age - well nourished
- 62% to 79% weight for age- mildly undernourished
- below 58% weight for age - marasmus.

The cut off points for mildly undernourished and severely undernourished and marasmus are different to those used by Garrow (1966) and Clark and Corgill (1980). This was because it was noted that the clinical signs of the severely undernourished became obvious at the point selected for this study, that is, at 62%. Further it was noted that marasmus developed in infants at 58% or lower.

Subject population

Four hundred and eighty three infants from fifteen villages were seen at seven assembly points during a period of five months. The total population in the clinic registers was five hundred and eight. Six of these were excluded because there was no record of a weight in the first month of life and thirty were never seen at all by the team.

Figure 7.1 displays the nutritional status of the four hundred and seventy seven infants who were subjects in the weight for age study. Of this number 72.75% were

noted to be below the 80% of normal weight line and can be said to be suffering from undernutrition in one form or another. Only 27.25% could be said to be well nourished.

The group said to be mildly undernourished look like normal well children at first glance. When physically examined they seemed to have reasonable muscle development and certainly enough subcutaneous fat. But they may have been short in stature, the height was not measured and some, especially at Papi did have red hair.

The severely undernourished group was below 62% of weight for age. There were 19.29% of the infants in this category. These infants had varying degrees of muscle wasting and loss of subcutaneous fat.

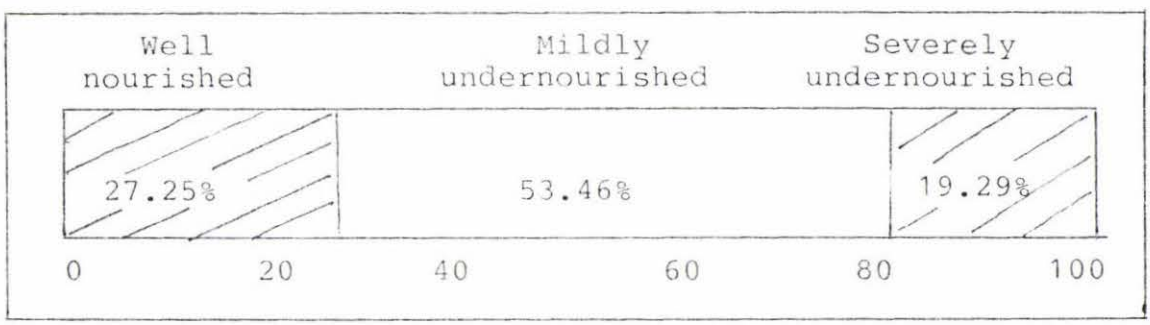


FIGURE 7.1: Percentage Distribution of Lujere Infants by Nutritional Status

The average attendance was three hundred and seven. Thus, four hundred and forty seven infants were weighed from one to five times. This population of infants were those for whom a baseline[I] weight was available.

[I] Baseline weight is the weight of the infant within the first month of life.

Table 7.4 outlines the age breakdown of the severely undernourished infants. This shows that it is the under one year olds and under two year olds that severe undernutrition effects most. There are forty six (41.44%) of one hundred and eleven infants that have been classified as having severe undernutrition, three of whom had signs of marasmus and one died. In the second year of life there are twenty four (22.85%) of one hundred and five who have been classified as having severe undernutrition. One of these had marasmus and died. There were twenty two of two hundred and sixty one infants over two years with severe undernutrition for the percentage of each age group.

There are seventy infants out of two hundred and sixteen, under two years with severe undernutrition. This demonstrates that the first two years of life are critical. Culturally, infants are not given solid food until they have two teeth. Then there are some very little pieces of premasticated small herring fish and small portions of squashed banana given to infants. When there are six to eight teeth, roasted sago is given. Any meats, other fish and green leaves are taboo until the infant has all teeth, says a few words and is toilet trained. Cultural factors are discussed in detail in Chapter Six. This must have some bearing on the infants' nutritional status. Figure 6.1 (p.122) reveals a decrease in weight at seven months (teething time) and this keeps a low profile until twenty-six months when there is a marked increase.

TABLE 7.1: Age Break-down of Severely Undernourished Infants Seen at All Clinics

Age	Severely Undernourished	Total Population
- 1 yr	46 (41.44%) of	111
1 - 2 yrs	24 (22.85%) of	105
2 - 3 yrs	11 (10.47%) of	105
3 - 4 yrs	7 (8.44%) of	83
4 - 5 yrs	4 (5.47%) of	73
Totals:	92 (19.29%) of	477

Table 7.1, a frequency distribution table of the nutritional status of Lujere infants emphasises that the extent of undernutrition among Lujere infants (0-5 years) is serious . Not one village has a greater number of well nourished infants than undernourished infants. The nearest village population to achieve the mark is Alai village. Alai is a village with a population of one hundred and forty three people (refer to Table 2.1 P. 24). The village is situated on the bank of the Yellow River and is thirty five minutes walk from Edwaki. This village is well known for being good at hunting, fishing and gardening.

The author made frequent visits (about every two weeks during the five months stay) to Alai and on each occasion saw numerous fishing lines tied to wild sugar cane that was growing on the banks of the river, but she was never there when they were pulled up. Further, the team often walked through Alai territory and was impressed by the number of gardens producing abundantly. Their gardens were seen on plots close to the Yellow River or nearby streams. The greater availability of food, both abundant fish and productive gardens, can doubtless, be the reason why no severely undernourished infants were found in Alai.

Table 7.2 shows that fourteen infants (48.3%) were well nourished and fifteen (51.70%) were mildly undernourished. This also indicates a better over-all level of nutritional status for infants of Alai village. The Alai village is walked to the health sub-centre for clinics and out of a population of 30 the average attendance was 20 and the absentee rate 10.

Another village worth commenting about is Worikori. Worikori village is four hours walk from Edwaki but the villagers do not visit Edwaki very much for medical treatment. Instead they make greater use of the Aksom aid post. The Worikori villagers are remarkable hunters. On three out of five occasions the author found them to have caught pigs which were being cut up or being cooked when the team arrived to camp the night. Only once had a gun been used while hunting. The rest were caught with bows and arrows. Worikori is a small village with a population of one hundred and seventy five (refer table 2.1 p. 24). The clinic population is thirty one; the average attendance was twenty two with absentee rate of nine. It can be noted that in Worikori thirteen infants were well nourished (43.30%) and the same number mildly undernourished with four (13.40%) severely undernourished (refer to Table 7.2). The team encouraged four of the families with undernutrition to go to Edwaki for rehabilitation. It was disappointing that none of them arrived. This could have been because of distance or the fact that they did not see the need.

When coming and going from Worikori the team noticed that there were some large gardens near the walking tracks. They were mostly producing food in small quantities only. At a deserted hamlet there were several gardens regenerating to secondary bush. Informants told the author that those gardens were community gardens and that only 2 families had gardens of their own.

TABLE 7.2: FREQUENCY DISTRIBUTION OF THE NUTRITIONAL STATUS OF LUJERE INFANTS BY VILLAGES (N = 477) OVER A FIVE MONTH PERIOD

Villages	Well Nourished		Mildly Under-nourished		Severely Under-nourished		Total
	N.	%	N.	%	N.	%	
Iwani	7	18.43	22	57.89	9	23.68	38
Mantupai	9	39.13	11	47.83	3	13.04	23
Papi	3	8.57	18	51.43	14	40.00	35
Aiendami	1	11.11	6	66.67	2	22.22	9
Worikori	13	43.30	13	43.30	4	13.40	30
Alai	14	48.30	15	51.70	0		29
Yaru	11	35.49	16	51.61	4	12.90	31
Yegarapi	13	31.71	19	46.34	9	21.95	41
Gwidami	5	13.15	28	73.70	5	13.45	38
Naum	4	15.38	13	50.00	9	34.61	26
Nami	8	27.59	14	48.27	7	24.14	29
Tipas	16	37.21	24	55.82	3	6.97	43
Norambalip	14	32.55	22	51.17	7	16.28	43
Yawari	4	14.29	14	50.00	10	35.71	28
Akwom	8	23.53	20	58.72	6	17.75	34
Total	130		255		92		477

Yaru village is a village with a difference. The author noted that they were working to improve their lot. They have a school teacher employed at the community school who has a great deal of influence on the industry. As well there is a male nurse aide who is employed at the health sub-centre, then a male enrolled nurse who (1983) has returned from training. Even so, the village has 12.90% of severe undernutrition, with 51.61% of mild undernutrition (Table 7.2). One mother with her infant was staying at the health sub-centre when the study commenced and received supplementary feeding for the infant till she lost interest and returned to Yaru.

The author walked through this village when visiting Norambalip. Yaru was always a hive of industry. The youth with others from Yegarapi worked a sweet potato garden. Different families farmed hens and pigs in a small way. Several families owned a cow, a bull and two steer calves. Gardening was reasonable but not extensive as at Alai. These gardens were family gardens and were producing tubers especially taro, beans, and copious bananas. Much of the produce like eggs, fruit and vegetables was sold at the biweekly Edwaki market, but it was obvious that some of the produce was given to infants.

Four of the villages, Papi, Gwidami, Yawari and Naum were found to have a greater quantity of undernourished infants. Papi is the one which concerned the author most, because when ever the clinic was held the people who gathered always looked very thin and were covered with tinea, far more tinea than was seen in most other villages. Table 7.2 shows that Papi had three (8.57%) infants classed as well nourished and eighteen mildly (51.43%) undernourished with fourteen (40%) severely undernourished. Ten mothers were given the choice to go to Edwaki for rehabilitation of their infants but none came. In this instance the main reason would be that they were so used to living with undernutrition that they did not see the need.

It was generally implied that the Papi people were poor hunters because they were not a well people. The author saw no evidence of hunting, there was no smoked pigment in the baskets above the fire place, but did see some fishing, as one hamlet of Papi, known as 'Old Papi' is on the side of the Yellow River. On one visit made it was noted that some lines has been tied to wild sugar cane. Also the author saw some evidence of gardening but none which was productive. Generally, one can say that the ecosystem was hostile or that their interactions with it were fruitless.

The Papi attendance at Clinic was reasonable. There were thirty one infants on the roll and the average attendance was twenty two and the absentee rate nine. The village itself has a total population of two hundred and twenty who live in four hamlets. Some of these mothers carried their infants for two hours when attending clinic. For population figures refer to Table 2.1 (p.24).

An interesting feature with the Papi clinic was that Papi mothers established two clinics at the Papi rest house on two consecutive days. The scheduled clinic was held as the team passed by on their way to Tipas where they camped the night. When the team returned the next day there was usually a group of ten to twelve mothers waiting for a clinic. Their usual comment was "We heard you held a clinic yesterday but were unable to attend then, now we would like to be weighed".

Gwidami, the village with the largest population of two hundred and eight, had a clinic population of fifty four (refer to Table 2.1 p 24). Gwidami is a village that needs a lot of attention from health personnel. Their clinic attendance was poor with an average of nineteen out of fifty four on the clinical roll attending and an average of thirty four not attending. The team had hoped

to use Gwidami as an assembly point, since its need was so obvious, but were told that Nabaija was more central and had better accommodation. Five families from Gwidami were given the choice to go to Edwaki for feeding and these infants and never came. Two mothers who had never been to a clinic since their baseline weight had been recorded, however, took their infants to the Edwaki health sub-centre for feeding. These infants had severe under-nutrition.

The Gwidami people have a large territory and spend most of their time living in their bush camps. Their nomadic life style is, one of the main reasons for poor attendance and possibly not bringing their infants to Edwaki for rehabilitation. They are known as being good hunters and fishermen, but poor gardeners. They said they only had some small community gardens. The team saw no evidence of gardening when they walked through their bush. Two hamlets are close to the Sand River and they canoe down to the Sepik River for fishing when the river is not flooded.

Finally, Yawari village is the further most village from Edwaki. It takes twelve hours to walk to Edwaki from Yawari. No health personnel has, as yet, visited it for clinics. Instead the villagers walk two hours to Mantupai, the nearest assembly point. The author with the team was the first to visit and hold clinics at Mantupai.

The Yawari village population is reasonably large with two hundred and nineteen people. The clinic population is thirty five (refer to Table 2.1, p. 24). The average number of infants attending clinics was nineteen and the absentee average was fourteen. Six mothers were given the choice to go to the health sub-centre for rehabilitation and there also none came. They all said that it was too far to walk and carry infants and food. One can see

an implicit need here for development of culturally acceptable, available and accessible health care services. Four infants (14.29%) were noted to be well nourished, fourteen (50%) were noted to be mildly undernourished and six (17.15%) to be severely undernourished.

The Yawari territory is large. Walking to Mantupai from Edwaki takes seven hours of walking through territory jointly owned by the Mantupai and Yawari villages. The bush in this territory has plenty of game and on the four trips we met people coming from hunting with full game bags. Also the bush rang with the chorus of birds like hornbills, parrots and pigeons. The author saw no gardens belonging to the Yawari people, informants said that the Yawari people do not garden. It would seem that cultural practices in selecting suitable food is an important factor in undernutrition when availability is not altogether a problem.

Naum is a small village with a population of 165 people (refer table 2.1 p. 24). But is not without undernutrition problems, as 50% of the infant population who attended the Akwom clinic were found to have mild undernutrition and 34.61% deemed to have severe undernutrition. This village is within close proximity to the Yellow River, even so the author did not observe line fishing. An informant said that they do not line fish but only fish in streams and small lakes with fish traps and Derris root poison (refer Chapter four p.69). The author saw some evidence of hunting with a little meat in the smoke baskets but no fresh meat. As well she saw evidence of gardening as a community effort. This was bananas, a little taro and a moderate sized sweet potato patch, said to be grown for sale to the Akwom community school teachers and Aid post situated thirty minutes walk away.

There was one mother with a low weight toddler for whom she was continually asking to go to Edwaki for some suplementary feeding but the father said he did not see this as necessary. He said his wife and toddler spent sometime receiving feeding help last year and he felt that added time away from the village was not necessary as the toddler was not sick and was strong enough. It is obvious that the Naum village subsistence efforts are insufficient for the needs of their infants and children.

In this discussion examples have been taken from five villages and explanations offered as to why there were more undernourished infants than well nourished ones. It has been noted, also that the Lujere people clearly need help with choosing food for their infants. There is certainly plenty of game, wild vegetables, fruit and sago. Of the ninety six infants who were severely undernourished approximately eighty were spoken to about the advantages of residing at the health sub-centre so that they could receive rehabilitation for their infants. Of the eighty, only five came and ten others who had not attended any clinics before came of their own accord. One family asked to take their child to the health sub-centre for feeding, they did actually go, but the child died the next day. Another from Iwani was brought in without being asked and this infant died a month later. From this response it could be assumed that taking families away from villages for rehabilitation is not the best alternative for providing care. It could be associated with the outcome so, where possible, care should be instituted in the usual place of abode.

Conclusion

The categories of nutritional status based on Harvard weight for age standards, reveal that only a small percentage of infants, that is 27.25% are well nourished and that 72.25% are undernourished. It is obvious that Lujere

communities need to learn about alternative ideas of nutritional practices in infancy.

It would be opportune to offer intervention in the form of counselling to those parents whose infants are between 79% and 62% of weight for age. The idea first would be to study ecology and subsistence patterns and cultural attitudes and nutritional practices belonging to infancy. This has been discussed in chapters four and five. This information could be used to explain how the foods they offer to their infants develop 'mit' (pidgin for muscles). Also some encouragement could be given to obtaining more fish and growing more beans and tubers, so as to subsidize the sago they give their infants under two years of age. For the older infants (possible) mothers could be persuaded to forage for a few more insects, green leaves, lizard and such like so as to subsidize what their infants find for themselves.

For the severely undernourished, rehabilitation would be necessary. Those below 60% may need hospitalizing and have some education. Those between 60% and 62% may be able to be rehabilitated in the village. Wherever the infants are rehabilitated there is a need to make sure parents understand about the need to prevent further 'wasting' and 'stunting'. Also a need to understand what rehabilitation is all about.

The discussion of Table 7.2 emphasises the need to introduce the concept of rehabilitation to the Lujere people. This discussion explains that the Lujere people do not see the need for going to the health sub-centre and learning about alternative methods of feeding which will improve the nutritional status of their infants. The health sub-centre does not seem to attract those that the nurse sees as needing help. This can be deduced from the fact that of 80 people asked to go for treatment only five actually

went. Later, ten of those who did not attend at first brought their undernourished infants and asked for help. Thus, some developed a measure of understanding of a need for rehabilitation.

The study of weights using a 'norm' as a criterion gives valuable evidence that there is undernutrition among Lujere communities and that the incidence of this could be decreased ed by applying transcultural nursing when infants drop below 80% of the 'norm'.

CASE STUDY

As further evidence of undernutrition a case study of 'Pani', an infant who showed clinical signs of marasmus and was undergoing rehabilitation at the health sub-centre is presented. Plate 7.1 is a picture of 'Pani' on admission. It clearly shows a child with very poor nutritional status. Pani's' birth was recorded in the village register, but no weight was entered in the records. Her mother had never taken her to a clinic. She was born early in November and arrived at the health sub-centre with clinical signs of marasmus, the first week of January, 1982. Her father admitted concern when he presented his infant for treatment. In halting pidgin he explained 'Pani's' condition. He claimed she was born in a puny state and had never grown. It was concluded she must have been born dysmature. 'Pani's' father said that 'Pani' was born with 'aliawi' because there a swamp water spirit had entered her when her mother had some time before eaten some sago.

'Pani' was given a physical examination. She was 'skin bun nating tru' (pidgin) or in Namei 'aliawi' and was a typical marasmic infant. As she was apathetic, her muscles had wasted away, there was no subcutaneous fat and growth was certainly stunted (see Plate 7.1). On

PLATE 7.1:
'Pani' and Mother in January

PLATE 7.2:
'Pani' and Mother in May after intensive feeding

the day seen, 'Pani' at two months weighed 2.5kg. As a comparison an average Lujere infant at two months weighs 3.9kg. Figure 6.1 p.12 shows an average graph for Lujere infants. 'Pani's' mother too, looked unwell, her husband said she was 'aliawi' as well and her lactation was nil. Thus, rehabilitation was needed for both 'Pani' and her mother.

'Pani' was immediately given medications to prevent pneumonia or any other infection and antimalarials. To eradicate worms, she was given an anthelmintic drug. These courses lasted several days (refer to standard treatment Appendix D).

Next a feeding programme commenced, and 'Pani' took to milk (made from full cream milk powder) exceptionally well. Her first meal was very small and her mother offered her this from a spoon off and on all day. In two days, mashed, ripe banana was added to the milk. From then on 'Pani's' mother came to the rehabilitation kitchen three times a day for milk and mashed banana.

'Pani's' progress was slow, sometimes gaining weight, sometimes losing it and sometimes staying the same. Like all Lujere infants, she was subject to malaria. She seemed to have an attack about once a month. At these times there was a slight change in weight patterns. Figure 7.2, which is 'Pani's' weight chart shows how she suffered from frequent malaria and one attack of pneumonia as well. Fortunately 'Pani' was not subject to nutritional diarrhoea, even when she was adjusting to her milk and banana diet. Her physical condition began to alter remarkably. Plate 7.2 shows this improvement and was taken at the end of the survey.

'Pani' was still having supplementary feeding when the author left Edwaki and on the last weigh had lost weight. A report from the health sub-centre on 'Pani's' progress

said 'Pani' continued to lose weight. Tests performed on 'Pani' showed that she had tuberculosis and treatment began immediately. Soon there was a marked improvement in physical condition and weight. Approximately a month later, 'Pani' and her parents disappeared and have not been seen since. The staff at the health sub-centre have heard that 'Pani' is still alive and living with her parents at a bush camp.

'Pani's' mother was given milk to drink (this was refused) but rice and tinned meat or tinned fish was readily accepted. This food supplemented the green leaves she foraged for daily and the sago she processed at varying intervals. Fortunatley 'Pani's' mother could travel within a day to her sago grove to obtain sago. Even so with the extra protein obtained from the meat or fish and 'Pani's' continued vigorous suckling, lactation however, never returned, but 'Pani's' mothers physical condition did. Plates 7.1 and 7.2 if compared, reveal a tremendous change.

With an interpreter 'Pani's' father was interviewed about how he had cared for his wife and baby during their illnesses. He related that even though his wife had no milk 'Pani' still sucked at the breast, and that no other food was given to 'Pani' and no other woman wet nursed her.

The father's description of his wife's illness, and how long she had been ill, was hard to interpret. It was gathered that she must have been suffering from undernutrition when 'Pani' was born, and that she was able to feed her then, but, suddenly, she became worse and had no milk. At this time 'Pani' seemed to become smaller and weaker.

When asked if he sought help from the 'Nakwaru', Namie for medicine man, he answered that there had been counselling and he had performed 'Taimoi-ei' Namie for removing

the perceived cause of the illness out of the body. This had been performed twice on his wife and once on 'Pani'. Also that he (the father) had helped with the performing of 'Na wo we' a dance using a mask made of the sago tree, to help heal his wife and infant, but to no avail. He had brought his wife and infant in for medicine. He was determined that his infant should receive milk which he referred to as a medicine. He thought this would give his child meat on her bones.

Chapter five explains 'taimoi-ei' as witnessed by the author and 'na wowe' as explained by informants. As well there are other comments on rituals related to health and illness of infants.

Even though 'Pani's' family did voluntarily come asking for milk for 'Pani' they did not appear to recognize the connection between food and health. They saw rituals as the important variables. This is typical of most Lujere families and also in Jamaica, as Jelliffe and Jellife (1969) comments:

> Most important there is rarely any recognition of the connection between certain foods and resulting health and growth, or between other foods and the presence of malnutrition. (p. 404)

UNDERNUTRITION AND INFECTIONS

When 'Pani's' growth chart Figure 7.1 is examined there is reference to three incidents of malaria and one of pneumonia. This raises the question. Are infections related to undernutrition?

Morley and Woodland (1976) suggest there is a relationship.

> The longer the infection lasts, the more likely it is to cause malnutrition. This may be due to one or several of the following: anorexia, increased

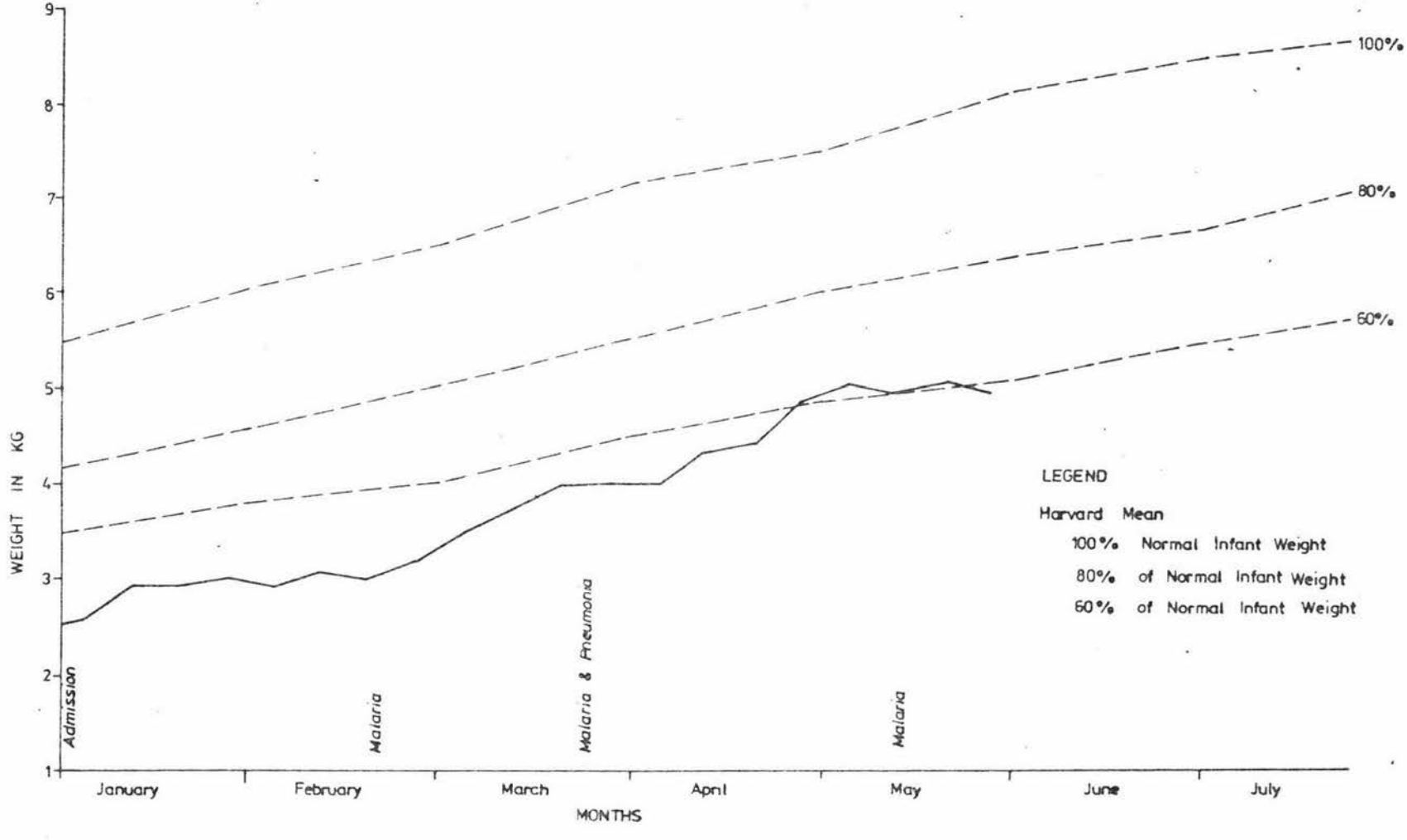


Figure 7·2 : Pani's Weight Pattern

> metabolism, malabsorption, and local beliefs about the appropriate diet for a sick child. This relationship can be influenced, for example if the duration of the infection can be reduced by the use of antibiotics. (p. 89)

'Pani's' graph (Figure 7.2) does not show a great loss of weight during the time of infection, but it is possibly due, as Morley and Woodland (1979) write, to getting immediate treatment.

When collecting data for this thesis the infants' record books, which show hospital treatments, were examined. Special notice was taken of the nine infants of Yegarapi, who live fifteen minutes walk from the health sub-centre. These nine infants had been treated monthly since birth, for malaria. Also six of the nine had been treated three times in the lifetime for pneumonia, and the other three had had pneumonia once. The weight on most occasions decreased a little or stayed flat, a similar pattern to 'Pani's' graph (Figure 7.2).

Dr Maeyer (1976) found the following in his studies:

> The child who is undernourished and retarded in growth is more prone to infections which produces higher mortality in such children. (p. 45)

It is evident from the above discussion that repeated infection has a similar effect to infections lasting a lengthy period of time, as there is some loss of weight which reveals the nutritional status is lowered. This is enhanced by the custom of withholding food during illness.

MATERNAL LACTATION AND INFANT UNDERNUTRITION

'Pani's case study reveals that her condition was predisposed because her mother too had undernutrition and her lactation had ceased.

Wark and Malcolm (1969) state the following regarding Lumi:

> Malnutrition in infants aged under six months, was associated with grossly inadequate or failed maternal lactation. Failure of lactation in the Lumi mother appeared to be associated with those mothers whose body weight was significantly lower than that expected for their age group, and this is almost certainly related to suboptimal nutrition. (p. 130)

Mothers were not weighed at the Edwaki health sub-centre, but their body condition did reveal loss of subcutaneous fat and some muscle wasting. From this, it was concluded that many with insufficient lactation had undernutrition.

There were fifteen infants under five years being rehabilitated while this study took place. Eight of these mothers were noted to have failure of lactation. Three of these were due to breast abscesses, and the rest said to be undernutrition.

Morley and Woodland (1976) write this about breast feeding:

> Adequate breast feeding is the single most vital factor in growth and development in developing countries. (p. 149)

This data reveals that when there is insufficient breast milk the child is at risk for undernutrition. 'Pani's' father said 'his wife had no milk and 'Pani' became smaller'. It is an interesting remark because the Lujere do not

usually equate milk with growth and this reveals the importance of checking the lactation of mothers when mild undernutrition is discovered.

To sum up this chapter, a great deal has been written on the evidence of undernutrition, such as using weight charts to diagnose undernutrition before clinical signs can be seen. The role that home treatments play has also been studied with care. Whilst these may be harmless, yet they have to be considered, because they often delay rehabilitation through high protein diets at the health sub-centre.

Another factor is infections; malaria and pneumonia are endemic in Lujere communities among infants. Also gastroenteritis is seasonal when the rivers and streams are low. From 'Pani's' graph (Figure 7.2, p. 150) it is seen that they do affect weight. The last factor discussed was the health of mothers with undernourished infants. It was obvious that this affected lactation as eight out of fifteen mothers at the health sub-centre had lactation problems. Therefore, it is necessary to understand clinical evidence as mentioned in this chapter. As well as prevention and treatment from the client's points of view, one must allow for the point of view which comes from being a nurse, working with another ethnic group. Also the client needs to understand that there are alternative ideas that can be beneficial if their infants are undernourished. They also need to be willing to try them. Transcultural nursing can and does help in these situations.

Leininger (1978) has a helpful suggestion:

> The nurse needs to be aware of the many covert and overt ritual behaviours and their values to health... Ritual behaviour is especially important to maintain a well person and to avoid illness...Rituals help people grow... They are positive means to assure a healthy child. (p. 359)

Reference was made (p. 95) to a ritual used to aid 'Pani' and her mother's healing. This and several other rituals are described in chapter five (p. 96).

CHAPTER EIGHT

VARIATION IN WEIGHT DISTRIBUTION OF LUJERE INFANTS OVER TIME

This data was collected during nurse/client interaction of eight assembly points. It has been analysed to determine more precisely the nature of undernutrition present in Lujere infants. Weights were recorded for children in each village every four weeks. Each month a different symbol was used for recording the infant's weights and the results placed in a scattergram. This enabled identification of each of the 477 infants, and their weight distribution over the period of their study. The scattergrams for each village are attached as Appendix A. Verbal information related to the weight of infants was recorded in the journal.

Method of presenting data

The results presented in this chapter have been produced from the fifteen village scattergrams. From them twenty one tables have been constructed. They set out the data with the intention of demonstrating the variation of weight distribution by village and over time. Eight of the tables demonstrate the extent of the weight gain or loss over the total five months period, that is the growth for infants who visited the clinic four and five times. The tables for infants and children who visited the clinic three times or less are set in Appendix C.

King et al 1967 wrote of the importance of noting the rise and fall of weight scores.

They write:

> If the infant's growth curve is rising he is growing and is healthy
> if the infant's growth curve is flat his weight is staying the same and is in danger
> if the infant's curve is falling he is losing weight and is in great danger.
> (p. 27)

It is therefore important to study the variations of weight distribution over a period of time.

When weighing the infants, care was taken to identify any oedema which is a sign of 'kwashiorkor' but none was detected. Oedema would have increased the weight. As already mentioned in Chapter Seven 'kwashiorkor' was not seen among the Lujere infants.

Characteristics of the subjects

In Chapter Seven the Harvard weight for age method of estimating undernutrition was introduced and discussed.

The three categories which show the characteristics of the subjects are:

- well nourished - above 80% of weight for age
- mildly undernourished - between 62% and 79% of weight for age
- severely undernourished below 62% of weight for age.

Three variables are important when considering the nutritional status of Lujere infants and children under five years. These are age, weight and time. This chapter examines the data in the light of the time variable.

The total time period is five months in which visits were made four weeks apart to venues when mothers brought their infants for weighing and other clinic procedures.

TABLE 8.1: Percentage Distribution of Visits to Village Clinics Over All Three Categories of Nutritional Status (N = 447)

No of Visits	Well nourished		Mildly Under-nourished		Severely Under-nourished		Total	
	%	N	%	N	%	N	%	N
5	14.61	(19)	10.59	(27)	17.39	(16)	13.0	(62)
4	24.62	(32)	27.06	(69)	23.91	(22)	25.58	(122)
3	27.69	(36)	26.27	(67)	20.66	(19)	25.78	(123)
2	20.0	(26)	30.39	(52)	14.13	(13)	19.08	(91)
1	13.08	(17)	15.69	(40)	23.91	(22)	16.56	(79)
Total	100	(130)	100	(255)	100	(92)	100	(477)

This table shows that only 13% of the mothers brought their infants to clinics the maximum number of five times. There possibly would have been a higher percentage if the Mantupai venue had had five visits. The venue was only visited four times because in the month of April rainfall was high and the swamp and rivers were impassable. As well, the author and Yorei were unwell (refer to Chapter Two).

Another important feature of this table is that 64.36% of the infant population were brought to the clinic at least three times. When names of the non-attenders were mentioned other villagers offered excuses.

The three most common excuses were:

> *"They were not told that the clinic would be held to day and have not come".*

> *"They are at their kush camp and the rain has prevented them from attending".*

"They were hungry and could not wait for clinic so they have gone processing sago".

A second outstanding point of the table is that when the five time attenders in each of the three categories are examined it is those who need the clinic most who have the largest percentage of attendance. This is the severely undernourished group. This percentage is 17.39%. Those whose attendance was the lowest were the well nourished with 14.16%.

As well, the severely undernourished and the mildly undernourished equally have the largest attendance for the one visit category. This is 23.91%. The group of mothers with severely undernourished infants had much attention focussed on them and were always being invited to go to the health sub-centre for supplementary feeding. Often after this encounter they were not seen at clinic again. Other villagers would explain their absence by stating *"They have gone bush"*. One mother who had spent a month or two at the health sub-centre receiving supplementary feed and nutritional education and lost interest and left, continued to attend clinics but refused any more help.

WELL NOURISHED INFANTS

The well nourished infants belong to the group whose weights are scored within the normal range of 80% to 100% or over according to the Harvard mean (refer appendix A (p.209). In contrast with the severely undernourished infants with poor muscle development and little sign of subcutaneous fat, these infants appear to be well nourished. Tables 8.2 and 8.3 which follow and the tables in Appendix C display the weights according to age over time, of the well nourished infants and the rise and fall of those weights over time.

TABLE 8.2 : WELL NOURISHED INFANTS:
FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 19)
(No. of visits = 5)

Villages	Age in Months of first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Papi	5	6.7	6.8	7.0	7.2	7.0
Worikori	2	5.2	5.4	6.1	6.7	6.8
	12	9.0	9.3	9.2	9.7	10.0
	50	14.0	14.7	14.6	14.7	14.6
Alai	8	8.1	8.6	8.4	9.0	9.4
	15	8.9	9.1	9.0	9.5	9.8
	24	12.2	12.4	12.5	12.0	12.0
	32	11.5	12.5	11.7	11.4	11.5
Yaru	1	5.4	6.5	7.0	7.5	8.5
	18	9.9	9.7	9.8	9.6	9.5
	35	12.1	12.4	12.5	13.0	13.1
	46	14.6	14.8	15.0	14.5	14.5
Yegarapi	28	11.7	12.0	12.2	12.5	11.6
	56	15.5	15.0	16.0	16.0	16.0
Nami	0	3.0	4.6	5.4	5.8	6.0
Norambalip	35	15.0	14.8	15.2	15.3	15.5
Tipas	7	7.2	7.4	7.5	7.5	7.9
	38	12.3	12.6	12.6	12.7	13.4
Akwom	38	15.2	15.7	15.4	15.4	15.5

Infants who visited clinic five times

Table 8.2 displays the weights of infants from birth to five years of age who visited one of the eight clinics five times. Mothers from the four villages of Iwani, Aiendami, Gwidami and Naum did not manage to bring their well nourished infants five times to clinic. The reason for this is not known. As has been already stated earlier, illness and inclement weather prevented one clinic being held at Mantupai and Yawari.

A perusal of Table 8.2 shows that the rise and fall of the subjects' weights differs considerably. This is demonstrated in Table 8.3 shown below.

TABLE 8.3: Comparison of Growth of Well Nourished Infants
(N = 19)
(N. of visits = 5)
(T5 - T1)

0 to 23 months (N = 9)				24 to 59 months (N = 10)			
Age in months at 1st visit	Increase kgs	No change kgs.	Decrease kgs.	Age in months at 1st visit	Increase kgs	No Change kgs	Decrease kgs.
5	0.3			50	0.6		
2	1.6			24			0.2
12	1.0			32		0.0	
8	1.3			35	1.0		
15	0.9			46			0.1
1	3.1			28			0.1
18			0.4	56	0.5		
0	3.0			55			0.5
7	0.7			38	1.1		
				38	0.2		

Table 8. 3 summarizes the differences in the weights of T1 and T5. Thus, the table shows the comparative rise and fall of growth scores over a five month period for two group of Lujere infants. the first group of children from birth to twenty three months is compared with the twenty four to fify nine month group of children. This division is important for it is at twenty four months that the transition occurs from breast feeding supplemented by solids, to the full adult diet with foraging for some subsidiary foods.

It should be noted that the weight gain for most infants in the earlier age group is greater than that of the older group. King et al 1978 suggest in a graphic form that:

> A healthy baby gains approximately half a kilo (500g) a month from six months, then approximately 330g till twelve months. Thereafter the gain is approximately 2 kilos every twelve months. (p. 317)

Hence the increase can be expected to be greater for the infants under twenty months. Two of the younger infants do follow this pattern. Overall the weight increase in the first group range from 0.3 to 3.1 kgs whereas the range for the second group in 0.2 to 1.1 kgs. The one younger infant who has a weight loss was probably beginning the weaning process and therefore was making the transition between the two feeding regimes mentioned above. For the older group the decrease range is 0.1 to 0.5 kgs.

The infant in the birth to twenty months group who increased weight by 3.1 kgs belongs to a family which has had the advantage of greater education and knowledge of alternative feeding regimes. His father is an English speaking school teacher and his mother is a lady from the southern highlands province. They are proud of their healthy son and do not keep this a secret. They also freely share the information that he began receiving vegetable juices

and a solid bland diet from three months to complement the breast milk he receives. Another infant who has gained three kgs is completely breast fed. Her parents spend some time acting as guardians for school children attending the community school. This father ocassionally has labouring employment which enables he and his wife to benefit from the purchase of extra protein food, such as tinned meat and fish, at the trade store. The effect of good nourishment for the mother is reflected in her baby's healthy growth. The distribution of scores of children in the twenty four to fifty nine month age groups growth pattern is much slower. The child who is thirty five months old is the oldest child of the school teacher and was often to be seen returning from the trade store carrying tinned milk and tinned meat. The thirty eight month old child belongs to the Tipas people who are enthusiastic fishermen (refer Chapter Seven). They also involve themselves in some hunting and a little gardening. Both these children gained a kg or more in weight. It is obvious from the availability of protein food for both children that the weight gain is due to eating wholesome meals.

Those infants with weight loss reside at Norambalip, Yaru, Yegarapi and Alai villages. The Norambalip village people are nomadic and are said to be always mobile and moving around their various bush camps. Therefore availability for regular sources of protein may be irregular. The other villagers garden and hunt and fish. In addition the mothers have ample opportunity to learn about alternative methods of infant feeding as their villages are all within an hours' walk of the health sub-centre where nutrition education is a regular feature.

The children, however, have either had a poor weight increase or small losses of weight. Illness could be a causal factor for this failure to thrive although the health of the children could not be monitored in the

TABLE 8.4 : WELL NOURISHED INFANTS:
FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N =32)
(No. of visits = 4)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kg.s
Mantupai	11	9.2	9.6	9.9		10.0
	11	8.7	9.2	9.4		9.5
	26	10.8	11.2	11.4		11.0
	29	11.8	12.2	11.6		11.4
	39	12.8	13.2	13.1		13.8
Worikori	4		6.3	7.3	7.3	7.5
	6		6.8	7.0	7.0	7.4
	27	11.9	12.2	12.0		11.8
	36	14.3	14.4	14.5	14.7	
Alai	10	7.4	7.5	8.0	8.5	
	15		9.8	9.5	10.0	10.6
Yaru	11	8.8	9.0	10.0	10.0	
Yegarapi	6		5.9	6.5	7.0	7.4
	13		8.8	9.1	9.2	9.4
	25	11.1	11.2	11.5	11.5	
	28	11.7	11.7	11.8		11.8
Gwidami	19	9.8	9.0	9.2	10.1	
Nami	3	5.8		6.5	6.7	6.5
Norambalip	0	3.2	3.6	4.2	4.8	
	8	8.4	8.2		8.5	8.8
	18	9.2	9.6	9.9	10.2	
	30	13.4	13.4	13.2	13.1	
	34		12.2	12.4	12.2	12.4
Tipas	3	5.7		6.3	6.8	7.0
	15	9.5		9.8	10.0	10.1
	24	10.6	11.3		11.0	11.1
	45	14.6		15.0	14.5	14.2
	56	16.0	16.3	16.4	16.0	
Yawari	1	3.6	4.8	5.0		6.0
	36	14.0	14.2	14.4		14.6
Akwo m	11		8.2	8.4	8.4	9.0
	12	8.3	8.4	8.4	9.0	

intervals between weighing. However it was possible to determine, either from clinic records or questioning, what the children did suffer from such as endemic diseases like malaria and pneumonia.

Infants who visited Clinics four times

Table 8.4 shows the frequency distribution of well nourished infants who have made four visits to the clinics over the five months on four consecutive visits. This group represents eleven villages. The four villages with no representation are Iwani, Papi, Aiendami and Naum. Iwani and Aiendami families were consistently poor attenders. It needs to be noted that the Iwani people have about a two hour walk to clinic whilst the Aiendami people are nomadic.

Table 8.5 has been constructed to demonstrate the differences between the babies that are primarily breast fed and those that are beginning to forage for food.

The infant's weight gains or losses recorded in Table 8.5 belong to infants whose weights are spread over the five clinics. Thus those who attended the first and last clinics and two others in between. Not all infants attended in this sequence. Hence not all the infants whose weights are recorded in Table 8.4 have gains or losses recorded in Table 8.5.

TABLE 8.5: Comparison of Growth of Well Nourished Infants (N = 15) (N of visits = 4 times) (T5 - T1)

0 to 23 months (N = 7)				24 to 59 months (N = 8)			
Age in months of 1st visit	Increase	No Change	Decrease	Age in months of 1st visit	Increase	No Change	Decrease
	kgs	kgs	kgs		kgs	kgs	kgs
11	0.8			26	0.2		
11	0.8			29			0.4
3	0.7			39	1.0		
8	0.4			27			0.1
3	1.3			28	0.1		
15	0.6			24	0.5		
1	2.4			45			0.4
				36	0.6		

The range of increase in weights for the under twenty three month infants differs considerably to that which occurred in the twenty four month and older infants. The younger infants range is 0.4 kgs to 2.4 kgs whereas the older infants range is 0.2 kgs to 1.0 kgs. Among them are three infants who are possibly learning the art of foraging for insects and small animals and birds who show a decrease of 0.1 kg to 0.4 kgs.

In the birth to twenty three month infants (N = 7) a one month infant from the village of Yawari shows the greatest weight increase. This infant was, at the time, completely breast fed. After not seeing the infant for two months the author recorded a gain of one kg. This is in line with what King et al (1976) inferred in their description of weight gain in infants (refer p.162). The other infant who gained 1.3 kg over five months belongs to the village of Tipas where fish is always plentiful. A comment in the journal notes that the mothers at Tipas appear to look reasonably healthy. The health state of the mother is the likely reason for a steady 1.3 kg gain in the infant, as healthy Lujere mothers are reputed to have plenty of breast milk.

The pattern of weight distribution for the twenty four to fifty nine month infants (N = 9) is different. The three infants whose weight decreased are from the villages of Mantupai, Worikori and Tipas. The journal records that the people of Mantupai and Worikori villages are good hunters and both have large community gardens and one or two family gardens. The third infant belongs to Tipas village where fish is plentiful (refer p.173). They possibly have the opportunity to have protein foods frequently but may be not frequently enough for them to maintain a rising weight score.

Infants who visited Clinics less than four times

The frequency distribution tables for this group have been produced from three categories of visits recorded tables AC1, AC2, and AC3 which form Appendix C. The attendance of children from this group at the clinics was too infrequent to make examination of change to be any value. These tables record children who represent all the fifteen villages and account for seventy-nine subjects who belong to the well nourished category.

SUMMARY

To summarize, the group of well nourished infants brought by their mothers to clinics is (N = 130) 27.25% of the total population (refer figure 7.1 and table 7.2). Of this population 14.6% (19) attended five times (refer figure 7.1) and 24.62% (32) attended four times. This is a reasonable representation of the one hundred and thirty well nourished subjects. The summaries in tables 8.2 (p.160) and 8.4 (p164) show that fifteen birth to twenty month infants increased their weight over time (five months). Their increase range is from 0.3 kgs to 3.1 kgs, there were no infants who showed no change and one that lost 0.4 kgs. This shows some difference to the twenty four to thirty nine month old infants with ten scores ranging between 0.1 kg to 1.1 kgs and one infant with no change, and seven infants with decreases ranging from 0.1 kgs to 0.5 kgs.

MILDLY UNDERNOURISHED INFANTS

This category (refer figure 7.1) has the highest total of infants attending clinics with a percentage of 53.46 (N = 255). The rise and fall of weight scores of infants

TABLE 8.6: MILDLY UNDERNOURISHED INFANTS FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 14) (No. of visits = 5)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Papi	8	6.6	7.0	7.0	7.5	8.0
Worikori	22	8.5	8.2	8.4	8.6	8.6
Alai	1	3.0	3.8	4.4	4.6	5.7
Yaru	7	6.0	5.8	5.9	7.0	7.0
	16	6.9	7.4	7.5	7.9	7.9
	20	8.4	9.0	9.5	9.5	10.4
Yegarapi	0	2.4	3.2	3.8	4.4	4.8
	17	8.5	8.5	8.7	9.0	9.7
Gwidami	9	7.2	7.4	7.6	7.6	8.0
	9	6.3	6.5	6.8	7.0	7.6
Naum	10	6.2	6.4	6.4	6.8	6.8
Tipas	2	4.2	4.6	4.5	5.5	5.7
	4	5.2	5.5	6.0	6.6	6.4
	18	8.2	8.5	8.5	8.4	9.4

who attended four to five times show the infants to be fairly healthy even though their weights are plotted below 80% of the normal and stay between 63% and 79% of the normal weight curve or Harvard mean. The journal recordings state that infants in this range appear to be well developed and that there was not much evidence of muscle wasting and loss of subcutaneous fat, but that they were often reported to be ill.

Infants who attended clinic five times

Because of the number of infants in this group, the frequency distribution of weight over five visits is shown in two tables. Tables 8.6 and table 8.7. Table 8.6 sets out the frequency distribution of weights for infants under twenty three months. That is, for those infants where breast feeding is still an important part of infant nutrition. Infants from eight villages are represented here. The seven villages with no representation are Mantupai, Aiendami, Nami, Norambalip, Yawari and Akwom.

Table 8.7 sets out the actual weights of the children for whom breast feeding is no longer used as a food. As explained in Chapter Six (p. 125) these children have begun to forage for their own food either with the 'multi-aged society of children' or with their parents.

Table 8.8 represents seven villages. The villages not represented are Iwani, Mantupai, Aiendami, Nami, Norambalip, Yawari, Akwom and Naum.

Table 8.8 is a summary table which compares the differences in weight scores between the younger and older groups of infants in the mildly undernourished category.

TABLE 8.7: MILDLY UNDERNOURISHED INFANTS
FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 13)
(No. of visits = 5)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Papi	24	8.6	8.8	9.8	10.0	10.4
	48	11.2	10.8	11.2	11.0	11.2
Worikori	49	11.2	11.4	11.4	12.1	12.1
	35	9.8	10.8	10.6	10.2	10.4
Alai	25	9.0	9.0	9.4	9.6	9.7
Yegarapi	35	10.5	10.5	10.5	10.5	10.7
	55	12.6	13.0	13.2	13.5	13.8
Norambalip	29	10.2	10.2	10.0	9.8	10.0
Tipas	27	9.5	9.4	9.6	9.5	9.0
	31	9.2	9.4	9.4	9.4	9.5
	36	11.2	12.2	11.9	12.1	12.6
	39	10.0	10.4	10.7	10.5	10.6
	45	13.4	13.1	13.4	13.5	13.9

TABLE 8.8: Comparison of Growth of Mildly Undernourished Infants (N = 27) (N of visits = 5) (T5 - T1)

(Table 8.6) 0 to 23 months N = 14				(Table 8.7) 24 to 59 months N = 13			
Age in months at 1st visit	Increase	No changes	Decrease	Age in months at 1st visit	Increase	No change	Decrease
	kgs.	kgs.	kgs.		kgs.	kgs.	kgs.
8	1.4			24	1.6		
22	0.1			48		0.0	
1	2.7			49	0.9		
7	1.0			35	0.6		
16	1.0			25	0.2		
20	2.0			35	0.7		
6	2.4			55	1.2		
17	1.2			29			0.2
9	0.8			27			0.5
9	1.3			31	0.3		
10	0.6			36	1.4		
2	1.5			39	0.6		
4	1.2			45	0.4		
18	1.2						

Table 8.8 shows that all the infants under twenty three months gained weight with an increase ranging from 0.1 to 2.7 kgs. The picture for the above twenty three month children is considerably different from that of the younger group. In the older group nine infants are noted to have gained 0.2 to 1.6 kgs. One infant only had no weight gain and there are two with decreases of 0.2 kg and 0.5 kg.

The infant in the earliest age group that had the small gain of 0.1 kg was twenty two months at the beginning of the study. It is possible that this also was because the child in the transition period between the two regimes

TABLE 8.9: MILDLY UNDERNOURISHED INFANTS (0-23 months) FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 33) (No. of visits = 4)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Iwani	0		2.5	3.2	3.1	3.6
	3	4.3	4.6	5.4	6.2	
	8	4.2	5.4	5.4	6.3	
Mantupai	7	5.8	5.8	6.2		7.0
	9	5.9	7.0	7.3		7.4
	15	7.2	7.6	7.4		8.1
	20	9.5	9.5	9.3		9.3
Papi	1	3.2	3.5	4.4	4.9	
	4	4.6	4.4	5.4	6.0	
Aiendami	5		5.2	5.3	5.5	6.0
	23	9.4	9.8	10.4		10.4
Worikori	11	7.2	7.7	7.6	7.9	
	18		8.8	9.0	8.6	8.7
Alai	17	7.6		7.9	8.0	8.5
	22		9.0	8.5	8.8	8.4
Yaru	1		4.2	4.6	5.2	5.4
Yegarapi	9		7.0	6.9	7.0	7.2
	22	9.7	9.8	9.8		10.0
Gwidami	0	3.3	3.0	3.5	4.2	
	14	8.0	8.3	8.4	8.2	
	19	8.2	8.8	9.0	9.5	
	19	7.8	-	8.5	9.2	9.2
Naum	3	4.4	4.6	5.6	4.8	
Nami	18		6.8	7.2	7.5	7.9
Norambalip	3		4.5	4.9	5.4	6.2
	16		5.8	6.2	6.0	6.5
	9	5.9	6.2	6.5	6.5	
Tipas	10	7.0	7.2	7.4	7.6	
	13	7.5	8.0	9.0	8.5	
	18	8.0	8.2	8.4	8.8	
Yawari	8	5.8	6.1	6.4		6.2
	17	7.6	7.8	7.4		8.9
Akwom	13	8.2	8.2	8.1		8.5

of feeding was still learning to forage for subsidiary foods like grasshoppers, small animals, and birds. It is interesting to note that some infants in this group who are over twenty three months of age have increased by 1.0 to 2 kgs.

A comparison with the same aged infants in the well nourished group shows that even though the infants' overall weight is much higher, the gain during the study is much lower. This is noticeable when a fifteen month infant gains only 0.9 kg and an eighteen month old infant looses 0.4 kg. Therefore, it can be stated that the mildly under-nourished infants referred to above are progressing reasonably well on low protein intake.

The two infants of the twenty-four month and over group who have lost weight come from the Nomadic village of Norambalip and the fishing villages of Tipas. The journal records that the Norambalip villagers rarely garden. If they do it is in a communal garden belonging to the whole community. As it could be said to be somewhat restricted interaction with their ecosystem it could be a factor related to the loss of weight of their children. Other factors affecting increase of weight could be related to the distribution and sharing characteristics among the villagers. The infant from Tipas has a substantial loss, for by his age, he should be starting to establish foraging skills and fishing skills. Tipas infants learn at a young age about fishing, since more fishing than hunting is done by Tipas villagers, and they generally can catch moderate quantities. Illness, however, may be a factor contributing to the substantial decrease.

Infants who visit clinics four times

Table 8.9 shows were the infants who at their first visits were aged from birth to twenty months (N = 33). It contains

TABLE 8.10: MILDLY UNDERNOURISHED INFANTS (24-29 months) FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 36) (No. of visits = 4)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Iwani	56	13.0	13.4	13.5	13.8	
	56	12.5	12.8	12.9	13.0	
Mantupai	42	11.1	11.9	12.0		12.5
	51	13.2	12.6	12.4		13.2
Papi	30	10.0	10.0		10.2	10.6
	31	8.6	9.0		8.7	9.2
Worikori	56		13.0	13.2	13.0	13.0
Alai	30	9.4	10.0	9.9	10.0	
	33	9.4	9.7	10.0	10.0	
	37	11.5		12.0	12.5	12.5
	43	12.2	12.5	12.5	12.7	
Yaru	32	11.2	10.9	10.0	11.2	
	37	10.6	11.0	11.4	11.5	
	45		10.5	10.8	11.2	11.6
Yegarapi	24		7.5	7.9	7.6	8.1
	38		11.8	12.0	12.1	12.5
	44		12.6	12.9	12.4	12.9
	50	11.8	12.6	12.7	12.6	
	52	13.0	13.2		13.0	13.5
Gwidami	26		9.0	9.6	10.1	10.2
	45	11.3	10.9	12.0		11.7
	56		13.7	13.8	13.7	13.6
Norambalip	24		8.8	8.9	8.6	10.2
	27	10.5	10.2		10.5	10.5
	39	12.2		12.4	12.2	13.2
	46		11.2	11.6	11.7	11.8
	55	12.5	13.6		14.6	14.0
Tipas	24	9.6		9.9	10.4	10.4
	36		9.8	10.0	10.0	10.4
	41	12.4	12.6	12.0	12.6	
	56		13.2	13.4	13.5	13.8
Yawari	42	11.9	12.2	11.6	12.5	
	42	12.6	12.7	12.8		12.8
	52	13.5	13.8	13.9		13.9
Akwom	28	9.9	9.5	9.9	9.8	
	36	10.8	11.4	11.2		11.8

representatives from all the fifteen villages. The infants' attendance patterns are either spread over the five months or four consecutive visits. The infants and children whose increase and decrease scores are recorded in the summary table are those whose attendances range from T1 to T5 (N = 11).

Table 8.10 displays the infants who at their first visit were aged from twenty-four months to fifty-nine months and who are representative of twelve villages (N = 36). The villages not represented are Aiendami, Naum and Nami.

The summary table 8.11 is compiled from 8.9, which shows the weights of the under twenty three month infants while table 8.10 shows the weights of the twenty-four to fitfy-nine month children.

The infants' weight gains or losses recorded in Table 8.11 belong to infant's whose weights are spread over the five clinics. Thus, those who attended the first and last clinics and two others in between. Not all infants attended in this sequence. Hence not all the infants whose weights are recorded in Tables 8.9 and 8.10 have weight gains or losses recorded in Table 8.11.

TABLE 8.11: Comparison of Growth of Mildly Undernourished Infants (N = 11) (N of visits = 4) (T5 - T1)

(Table 8.9) 0 to 23 months				(Table 8.10) 24 to 59 months			
Age in months at 1st Visit	Increase	No Change	Decrease	Age in months at 1st Visit	Increase	No Change	Decrease
	kgs	kgs	kgs		kgs	kgs	kgs
7	1.2			42	1.4		
9	1.5			51		0.0	
15	0.9			30	0.6		
20			0.2	31	0.6		
23	1.0			37	1.0		
17	0.9			52	0.5		
22	0.3			45	0.4		
19	1.4			27		0.0	
8	0.4			39	1.0		
17	1.3			55	1.5		
13	0.3			24	0.8		
				42	0.6		
				42	0.2		
				36	1.0		

All except three infants in table 8.11 have a weight increase and the range for both groups is similar. The younger infants' range is 0.3 to 1.4 kgs and the older infants range is 0.2 to 1.5 kgs. One of the three infants differs with a loss 0.2 of a kg whilst two older infants remained the same.

A perusal of table 8.5 (p. 165) which summarizes well nourished infants who paid four visits shows that more infants lost weight and that the decrease range is higher than that for the mildly undernourished in table 8.11. The difference is that three well nourished infants lost weight with a range of 0.1 to 0.4 kgs and only one mildly undernourished infant had a weight loss of 0.2 kg.

The infant in table 8.11 who lost weight resides in the village of Mantupai and was twenty months old at the first visit. This is also an instance when the infant was in a transition period between the two feeding regimes. Once this infant establishes foraging his weight should again increase as food is readily available at Mantupai. A similar comment can be applied to the two infants whose weight remained the same.

Infants who visited clinics less than four times

There are six tables [AC4, AC5, AC6, AC7, AC8 and AC9] which set out the weight distribution of the less frequent attenders. Due to the irregularity in attendance there is no value in comparing their rise and fall of weight. One hundred and fifty subjects are amongst this category of children.

SUMMARY

The total population of this category (refer table 8.1) is far larger than the other two categories (N = 225). It represents 53.46% of the total population brought to clinics by their mothers (refer figure 6.1 p. 122). In this population of mildly undernourished infants and children 0.49% (27) attended five times and 26.27% (69) attended four times. This is a reasonable representation of the population and a goodly number for comparative purposes.

A perusal of the summary tables 8.8 (p. 171) and table 8.11 (p. 175) shows that the subjects that increased their weight scores over time were forty two and their increase ranged from 0.1 to 2.4 kgs. It also shows that three infants showed no change and three lost between 0.2 and 0.5 kgs. But overall there is a reasonable increase of weight for this group.

When comparing the differences between the fall and rise of weight scores, the scores do show some difference. Table 8.8 for the infants that attended five times shows the most difference. The range for the under twenty three month infants is 0.1 to 2.4 kgs with no infants whose weights are unchanged or decreased, whereas the range for the over twenty three month infants is 0.2 to 1.4 kg with one infant showing no change and two infants with a decrease ranging from 0.2 to 0.5 kg.

The second summary table 8.11 for infants who visited clinics four times shows little difference. The twenty three months and under infants' increase ranges between 0.3 and 1.4 kgs and there are no infants whose weight is unchanged and only one with a decrease of 0.2 kg. Whereas the older group's range is 0.2 to 1.4 kg and there are two infants with no change in weight scores and no infants who have decreased their weight scores.

TABLE 8.12: SEVERELY UNDERNOURISHED INFANTS FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 16) (N of visits = 5)

	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Iwani	2*	2.5	3.0	32.	4.6	4.5
	20	6.2	6.9	7.2	7.5	7.9
	24*	6.2	6.2	6.2	6.5	6.9
Papi	7	5.2	5.3	5.4	6.0	6.2
	8	5.1	5.1	5.1	5.4	6.0
Yaru	7*	6.2	6.2	5.7	5.6	6.2
	24	7.8	8.2	7.4	7.8	8.2
Yegarapi	0	1.5	1.8	2.5	3.8	4.1
	23	7.5	8.0	8.1	7.8	8.0
Gwidami	30	8.0	8.2	8.3	8.4	8.6
Naum	10	6.1	6.4	6.3	6.7	6.8
Norambalip	1	3.2	3.4	3.0	4.0	4.0
	23	8.0	7.0	7.3	7.4	7.6
	26	7.9	8.0	8.1	8.7	8.8
Tipas	12	4.6	5.0	5.9	6.0	5.8
	17	6.4	6.2	6.9	7.7	7.6

* received supplementary feeding at health sub-centre

THE SEVERELY UNDERNOURISHED INFANTS

This category of infants are the most vulnerable. During the period of study there were none who lost weight drastically. But in the preceeding month some either lost weight or, as is possible with the younger infants, they were possibly born dysmature[1] or premature.[2]

Because of chronic low weight patterns they are at risk for survival. The health sub-centre at Edwaki has a programme to rehabilitate such infants whose weight pattern is found to be so low. The infants with problems who attended this programme will be discussed later in this section of the study.

Infants who visited clinic five times

Table 8.12 sets out the frequency distribution of the weights of severely undernourished infants who attended clinics five times. These infants represent eight villages. The villages not represented are: Mantupai, Aiendami, Alai, Worikori, Nami, Akwom and Yawari. The table explains that three infants received supplementary feeding. Two of these were treated for the five months of this study. One mother and infant who was admitted to the health sub-centre before this study began suddenly left in the month of February. The mother continued to bring the infant to clinic but would not return for supplementary feeding. Treatment of undernutrition at the health sub-centre followed the standard treatment outlined by the Department of Health (refer to Appendix D).

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1 Dysmature is failure to develop muscles and subcutaneous fat while in utro and being born at 40 weeks or more gestation. Weight is usually well below 2.500 kg.

2 Premature is an infant weighing between 1,000 and 2,500 kgs and is usually born before the 35th week of gestation.

Table 8.13 summarizes the differences in weight gain from T1 to T5 for the infants in the two main growth groups.

TABLE 8.13: Comparison of growth of Severely Under-nourished Infants (N = 16) (N of visits = 5) (T1 - T5)

0 - 23 months (N = 12)				24 to 58 months (N = 4)			
Age in months at 1st visit	Increase	No changes	Decrease	Age in months at 1st visit	Increase	No change	Decrease
	kgs	kgs	kgs		kgs	kgs	kgs
2	2.0			24	0.7		
20	1.7			30	0.6		
7	1.0			24	0.4		
7		0.0		26	0.9		
8	0.9						
0	3.2						
23	0.5						
10	0.7						
1	0.8						
23			0.4				
12	1.2						
17	1.2						

In comparison the younger infants score a higher range of increase, that is, 0.5 to 3.2 kgs. This group has one infant with no change and one infant with a loss of 0.4 kgs, whereas the older groups range is 0.4 to 1.7 kgs with no infants remaining the same or losing weight.

In the birth to twenty three month age group (N = 10) the outstanding gain of 3.1 kgs belongs to a Yegarapi infant whose mother lives next to the health sub-centre at Edwaki. The infant was born prematurely at a gestation of thirty-five.

TABLE 8.14: SEVERELY UNDERNOURISHED INFANTS FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 22) (N of visits = 4)

	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Bapi	3		3.2	3.5	4.4	4.0
	9	5.6		6.2	6.8	6.4
	11		5.4	5.4	5.4	5.6
	17	6.4	7.1	7.1	7.5	
	19	6.4	6.9	7.0		7.9
	38	8.4	8.6	9.2		
Yegarapi	15	6.5		7.2	7.0	7.6
	20		6.5	6.4	6.5	7.0
	53		10.9	10.8	10.5	10.8
Gwidami	16	6.4		6.8	6.4	6.7
Naum	4	3.2	3.5	3.8	3.8	
Nami	5	4.5	4.8	5.0		5.0
	18		6.9	7.2	7.4	7.5
	30		10.2	10.5	10.8	10.9
Norambalip	9*		3.0	3.5	3.8	4.2
	9	5.6	5.9	6.0	6.5	
Tipas	27	8.0	8.7	8.9	8.9	
Yawari	7	5.2	5.2	4.9		5.1
	9	5.5	5.1	5.4		5.9
	17	7.6	7.5	7.4		7.5
	36	8.8	7.5	7.6		7.9
Akwom	6	6.0	5.8	5.9		6.1

* Supplementary feeding at Health sub-centre

The mother was a teenager who had an abundance of breast milk and she gave her infant a solid/bland feeding regime at three months of age. This contained mash bananas and expressed breast milk. As well the mother had part time employment and, therefore, she had money to buy extra protein food for herself. The infant with 2.0 kg gain is Pani who is the subject of the case study in Chapter Seven (p. 145). The infant that has no fall or rise in her scores is the infant who was taken away from the feeding programme by her mother but continued to attend clinics for weighing.

In the twenty four to fifty nine month infants (N = 14) one infant that gained 0.7 kgs received supplementary feeding for the time period of this study. The twenty month infant with 1.7 kgs increase comes from the Aulkom hamlet of the Iwani village group. This hamlet is built on the side of the Sepik River and the infant's mother would have access to plenty of fish. The gain could possibly be the result of fish given to the infant during the transition from breast feeding to the full adult diet.

Infants who visited clinic four times

In Table 8.14 the weights of infants who came to the clinic either four times over five clinics or attended four consecutive clinics are set out. The population of this table is (N = 22) and they represent nine villages. The villages not represented are Iwani, Mantupai, Alai, Aiendami, Worikori and Yaru. The scores of infants who attended clinic over the period of five months have had T1 taken from T5. For the purpose of examining the fall and rise of weight the results appear in the summary table 8.15.

The infants' weight gains or losses recorded in table 8.15 belong to infants whose weights are spread over five clinics. Thus, those who attended the first and last clinics and two others in between. Not all infants attended in this sequence. Hence, not all the infants whose weights are recorded in table 8.14 have weight gains or losses recorded in table 8.15.

TABLE 8.15: Comparison of Growth of Severely Under-nourished infants (N = 9) (N of visits = 4) (T5 - T1)

0 - 23 months (N = 7)				24 to 59 months (N = 1)			
Age in months at 1st visit	Increase	No changes	Decrease	Age in months at 1st visit	Increase	No change	Decrease
	kgs	kgs	kgs		kgs	kgs	kgs
9	0.4			36			0.9
19	1.5						
15	1.1						
16	0.3						
7			0.1				
9	0.4						
17			0.1				

The scores of the younger group who have increased range from 0.4 to 1.5 kgs whilst two infants have a loss 0.1kg. For the older children there are no infants with a weight gain. One infant has a marked decrease of 0.9 kg.

For the birth to twenty three month infants, two reside at the village of Papi. These infants gained 0.4 and 1.5 kgs. The infant with 1.5 kg gain belongs to Yegarapi. This village is within close proximity to Edwaki, and is only ten minutes walk away. Recordings in the research journal show that over the last few years the villagers of Yegarapi have increased their gardening activity and spend less time hunting in distant bush. Informants told the author all the families have a gardening plot and some more than one. Gardens belonging to this village were visited by the author who noticed how proud the owners were about their achievement.

Three men who own guns watch the Yegarapi closely for pigs. They have some good success stories to tell which they do frequently. Pig meat shot with these guns was often for sale at the bi-weekly market at Edwaki.

One infant with a weight gain of 0.3 kg is from Gwidami. This is a large village with a poor attendence record and has been the subject of discussion in Chapter Six. The infant with a 0.4 kg increase and the infants who both lost 0.1 kg are from distant Yawari village where, as explained earlier in the chapter, a large number of hunting activities take place.

The one infant over twenty three months which had a marked decrease of 0.9 kg had been recommended at each visit to go to the health sub-centre for feeding, but never did. The excuse for not going was: "that Edwaki was a long way to walk and it would take her two days; it would be too difficult to carry her infant and food that distance." It should be noted that men carrying very little walk this distance in a twelve hour day so their excuses are more than justified.

Infants who visited clinics less than four times

The tables related to this section [AC10, AC11 and AC12] have been placed in Appendix C. A perusal of the tables shows that four infants who were weighed three times and mentioned in table AC10, and two infants weighed twice and one weighed once only spent some time at the health sub-centre receiving supplementary feeding.

Feeding Programme

Nutritional rehabilitation is a term used to describe feeding programmes. Koppert (1977) describes nutritional rehabilitation as:

> a practical nutrition training in which mothers learn by participation in preparing appropriate diets from locally available foods, and feeding their malnourished children back to health. (p. 3)

This programme was supervised by the resident nurse and she enlisted two auxiliaries to implement care and teach, preparing cooking and feeding skills. The regime of care follows the standard treatment of care which the Papua New Guinea Health Department have instituted (refer Appendix D. (p.255).

Mothers and infants who join this programme are given food to supplement what they themselves bring from their own territory. Those who succeed usually come from territory reasonably close to the health sub-centre and visit it regularly to process sago and forage for food. Those who cannot return to their territory on this basis rarely come for help. It is a point which repays thought when solutions to the problem of undernutrition in Lujere infants and children are sought.

Help is given by monitoring health and nutritional status and treating accordingly. Medications are given to prevent illness and if illness occurs mothers and infants are given high protein food to supplement their own food. The mothers will be given rice and tinned meat or fish to prepare under the supervision of an auxiliary. This is either for themselves or for the child if over twenty-four months. The twenty-three month and less infants are encouraged to suck on the breast frequently. The mothers with small infants are given food to prepare solid bland diets. The food given to mothers is milk powder, ripe bananas, papaya, pumpkin and sometimes peanut oil. The mothers prepare this food for their infants.

Mothers with older children are given some of the following foods: rice, tubers, cooking bananas, beans (if available at the Edwaki market or in the health sub-centre garden.) All infants are given milk to drink with each meal.

Many mothers become discontented with the programme and without any warning or goodbyes return to their villages or bush camps. One reason for discontentment is that the programme is lengthy and marasmus infants need treatment for over six months. Pani's parents did stay this time before discontentment set in (refer Chapter Six p. 148). But most who appear in the tables in this chapter stayed one to three months and then disappeared.

The infant feeding programme in 1981 received financial aid from World Vision[I]. This introduced a new dimension into care and an Agro-nutrition project was commenced. In 1982 an expatriate Agriculture/horticulture specialist came to supervise the project. From its conception the project had a committee of men elected. They represent villages in close proximity to the health sub-centre and make decisions about how the finance will be used. A Papua New Guinea male nurse began working in the infant feeding aspect of the programme in June 1982.

The aim of the project is to have families with severely undernourished children live in an especially constructed settlement near to the Agro-nutrition farm. There, they are to learn skills related to food production, preparation of foods, and principles related to nutrition and growth. Letters regarding this project, report that small numbers of families are utilizing the service.

SUMMARY

The severely undernourished infants have been referred to as the vulnerable group. The low weights and moderate rise and fall of weight set out in the tables in Appendix C.

I World Vision is a Christian humanitarian organization which finances health/social improvement projects in third world countries.

endorse this label of vulnerability. The rise and fall of weights is moderately low. There are three exceptions. Pani who received five months supplementary feeding; the premature infant who received a solid/bland diet at three months and the Yawari infant who lost 0.9 of a kg in weight.

The difference between the birth to twenty month infants and the twenty-four to fifty-nine month infants is high with the range for the younger infants being 0.3 to 3.2 kgs and the older infants 0.1 to 1.7 kgs. Then the younger infants have three decreases ranging from 0.1 to 0.4 kgs and the older infants one decrease of 0.9 kg.

DISCUSSION

A perusal of the comparison tables shows that the well nourished infants have one infant with no change in body weight and two who experience weight loss. The difference between the younger and older children was notable with the range for the younger children being higher. at (0.3 to 3.1 kgs) and the older children lower at (0.1 to 1.1 kgs).

The mildly undernourished infants show one infant with no change and five with decreased weights.

The severely undernourished infants show that one infant had no change and four experienced decrease in weights. The undernourished infants who attended five times showed sameness in the gains and one loss which belonged to a younger infant. It is normal for those under one year to gain more weight, but it is not normal for infants to lose up to 0.9 kg as was the case of one severely undernourished child.

The author has emphasized the feeding regimes with complete infant breast feeding till approximately seven months. then breast feeding with a restricted diet of solids till somewhere between twenty months and two years. This is followed by a transition to the adult diet and learning to forage for food with either the multi-aged society of children or with adult caregivers. It appears from the loss in weight that infants are most vulnerable to loss of weight when they are making the transition between breast feeding and the adult diet and learning to forage for subsidiary foods. There are three infants between eighteen months at first visit to twenty-three months at first visit who lost weight. In comparison there are eight between twenty-four months and thirty-six months and two betwen forty-five and forty-six months who lost weight. This lends weight to the assumption the transition period between feeding regimes is the time of greater vulnerability for the children.

Figure 8.1 has been constructed for the purpose of examining the percentages of positive and negative aspects of the weights. Positive outcomes were experienced by the infants who experienced increased or no change in weight. Negative outcomes are those related to infants who decreased their weights.

For the group who were weighed five times the severely undernourished infants from birth to twenty three months had the highest percentage of infants with weight gain = 64.71%. The lowest percentage of positive gain was the severely undernourished twenty-four to fifty-nine months with a gain = 29.41%.

The group who had the highest percentage of weight loss were the well nourished group twenty four to fifty nine months. This percentage = 21.06%. There are two groups who revealed no loss in weight. The mildly undernourished,

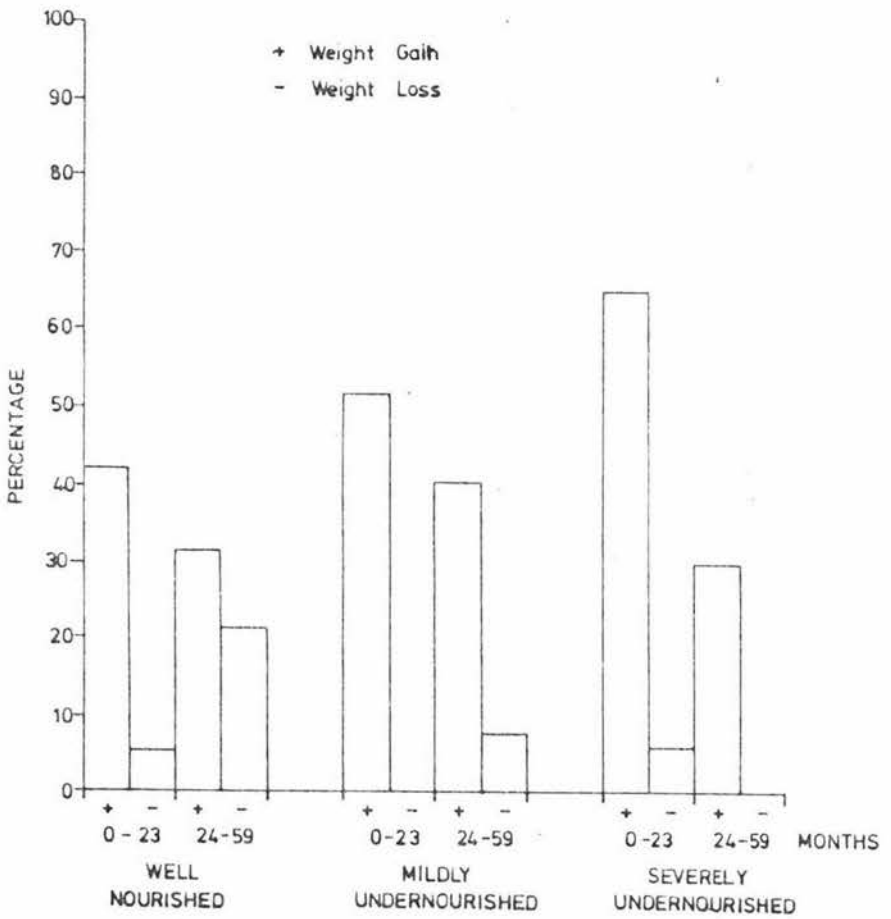


Figure 8·1 : Weight Rise and Fall Percentages (n = five visits)

birth to twenty three months, and the severely undernourished, twenty four to fifty nine months.

Figure 8.2 sets out the rise and fall percentages of those infants who attended four times over the five months. The highest percentage of infants with increase in weight were the severely undernourished, birth to twenty-three month old infants with 66.67% and the lowest were the severely undernourished, twenty-four to fifty-nine month old children who had nil percentage since they did not attend clinic.

The highest percentage of infants that lost weight were the well nourished group between twenty-four and fifty nine months with a 20% loss. The lowest were the well nourished birth to twenty three month infants and the mildly undernourished infants between twenty four and thirty nine months.

THE NURSES' ADVICE

During this study there were plenty of opportunities to give advice. Even so, it was not easy to give advice about feeding infants when the foods needed were not on hand, and the mothers did not have finance to obtain food like tinned meat, fish and powdered milk.

The advice took the form of encouraging families to garden, fish and hunt more. It is unfortunate that the Lujere people, generally, only plant one garden a year and most people fish when the streams are low. Whilst hunting begins when the swamp water begins to recede ending when the surface water in the swamp is knee deep. There was a very short period between these events and most years hunting occurred all the year round.

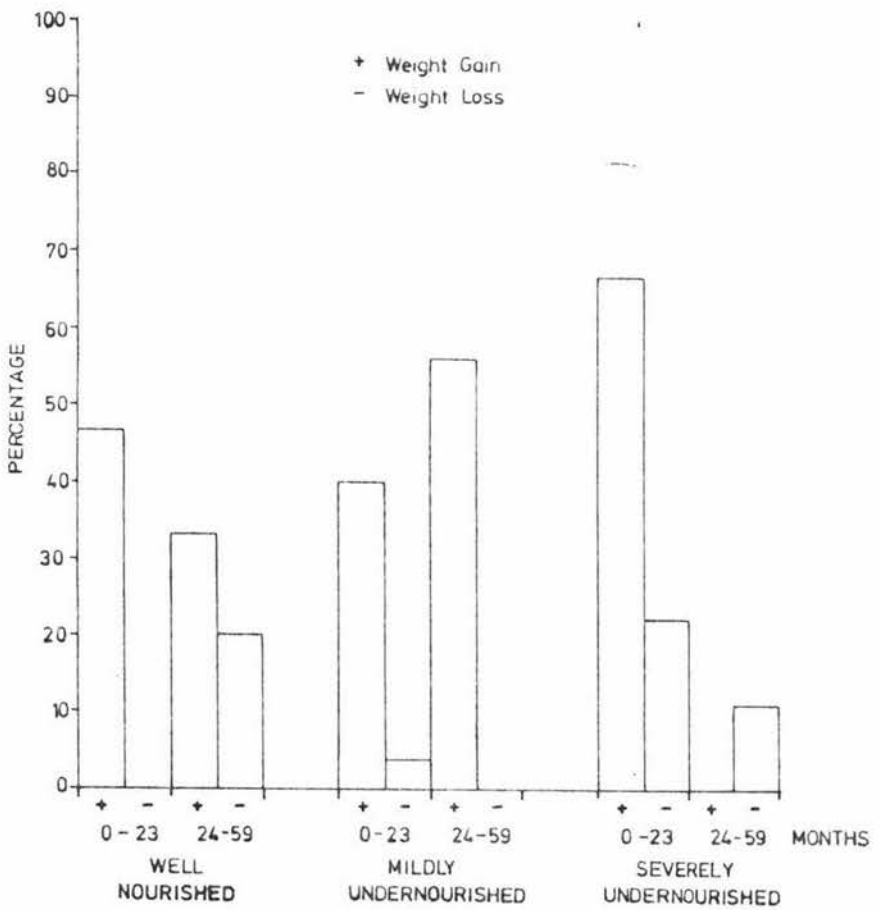


Figure 8·2 : Weight Rise and Fall Percentages (n = four visits)

When giving advice and teaching about what foods to offer to infants the team did not encourage families to break taboos. Actually this subject was not discussed when education was given unless they themselves introduced the subject and asked for advice.

Simple messages were given about body building foods like animal protein. When discussing food for those infants still receiving breast milk fish was used as an example of body building food and mothers were encouraged to give large quantities to their children as they usually gave them small quantities only. Beans also were much talked about. Mothers were encouraged to grow those for their infants.

Vitamins and mineral foods were spoken of as protective foods and mothers were encouraged to give ripe bananas, papaya, water melons and pumpkins to all infants.

For energy supply the use of sago was talked about as were tubers and cooking bananas for all children.

When discussing the needs of the older children mothers were encouraged to supplement the foods they obtained through foraging by sharing more meat and fish from hunting and fishing expeditions.

These communications about diet education were given by conversations for there were no large scale education programmes where groups gathered and nutrition was talked about. Food was talked about when walking in the bush, when sitting around the fire, and at clinics. No opportunity was missed to discuss the food requirements of children.

It is obvious from this analysis of the variation in weight distribution over time, of the subject population of the study, that education about diet is important as food is necessary for growth. This point was talked about often as the Lujere people did not appear to grasp its importance. They think that growth is a matter for the spirirtual world and food is related to the cause of illness.

People like the school teachers and those employed as nurse aides, aide post orderlies, and auxiliaries who were Lujere people, appeared to have some understanding about food and growth. The author spoke often with them on the subject and encouraged them to talk freely with their friends and relatives about the relationship food has to growth. Learning through those who are a part of one's known and defined world is a more natural and acceptable process.

CHAPTER NINE

CONCLUSIONS: IMPLICATIONS: RECOMMENDATIONS

This study has shown that the behaviour patterns of the Lujere people as they interact with their ecosystem do influence the nutritional status of infants and children under five years. This study uses the Harvard mean weight for age to determine the nutritional status of infants. These status categories are:

well nourished
mildly undernourished
severely undernourished
(refer to Chapter Seven p.133)

The use of the Harvard mean weight for age measurement showed that 72.75% of the total population of infants and children seen at the clinic (N = 477) had undernutrition in varying degrees.

From four different categories of culturally based interactions and their relationships to undernutrition certain conclusions are made, implications drawn, and recommendations offered.

These are:

- The cultural patterns of interaction with the ecosystem for subsistence
- interactions springing from cultural attitudes related to infant nutrition
- interactions associated with culturally based conceptions of the causality of disease (undernutrition)
- interactions influenced by the cultural incongruity between the care givers and care receivers.

CULTURAL PATTERNS OF INTERACTION WITH THE ECOSYSTEM FOR SUBSISTENCE

These are many and varied and are centred around obtaining food to satisfy hunger and give strength to the body. Climate is an important variable, particularly the incidence of rainfall. The effect of rainfall, either locally or in the Torricelli Mountains, determines when interactions take place (refer to Chapter Four p.60).

Fishing, hunting and gardening are the activities mainly affected. All these activities, at least as the Lujere pursue them, appear to be insufficient to maintain a reasonable nutritional status in infants and children from birth to five years of age.

Fishing is one of the main sources of protein and for those who only obtain fish from the streams which drain the swamps, fishing is seasonal. Some of the Lujere population are fortunate to live on the banks of deep rivers like the Yellow and Sepik. Because of the depth of these rivers they catch fish with lines or nets. Such fishing is not seasonal. Two villages, Alai and Tipas and the hamlet of Old Papi and Aulkom, a hamlet of Iwani village, fish by this method as well as using streams when they are low.

The rest of the population use fish traps for larger streams and/or crushed derris root to "poison" fish in the water holes of smaller streams. For these latter methods to be effective the streams need to be very low.

If results of weighing are examined it is noticeable that the two villages whose complete population catch fish with lines all the year round have a low percentage of severe undernutrition. Infants and children attending clinics from Alia showed no incidence of severe under-

nutrition and only 6.97% of the infants and children from Tipas were in the severe undernutrition category. However in both cases the percentages of mild undernutrition are similar to all the other villages being 51.70% for Alai village and 55.82% for Tipas villages.

A comparison with Papi village which has a small section of the population who fish with lines all the year round and the Yawari village, where the adults do no line fishing, reveals a marked difference in the amount of undernutrition. 40% of the infants and children from Papi village and 35.71% of the Yawari village children have been placed in the severe undernutrition category. The percentage for mild undernutrition is lower than that of Tipas and Alai villages. These are 51.43% for Alai village and 50% for Yawari village. The scores for these percentages were collected during the time rainfall was high. Unfortunately scores were not available for the low rainfall season (refer Chapter Four p. 59). This could be a reason for the high incidence of undernutrition as there was less fish around at the time of this study. It is obvious that seasons and fishing methods affect the level of severe undernutrition and mild undernutrition among children under five years. It appears that all the year round fishing controls sever undernutrition but is not enough to prevent mild undernutrition from occurring.

Hunting, especially pig hunting supplies large quantities of meat spasmodically. An intermittent meat supply must contribute to undernutrition. On the regular village visits there were villages like Papi which never showed evidence of a recent hunt and Naum which only occasionally did. They both demonstrated high levels of severe undernutrition during the study. As stated above 40% of the Papi village children were in the severe undernutrition category as were 36.61% of the Naum village children.

If these results are compared with the Worikori village (percentage 13.40%) and Mantupai village (percentage 13.04%) a marked difference in the level of severe undernutrition is noticed. The latter villages show much more evidence of hunting.

Some of the hunting was carried out with a gun but mostly bows and arrows were used. As well as fishing, hunting is an important way of ensuring sufficient protein for the village so that children under five years are given their share.

Gardening is also important in maintaining nutrition of the children. Most of the vegetables and fruit supply vitamins, minerals and carbohydrates. Legumes and green leaves are the protein sources. All the villages that the author visited had an ample supply of green leaves. These were ferns and tulip leaves from wild and semi wild sources. Then pumpkin and sweet potato leaves as well as beans from cultivation were used on occasions. It was noticeable that three villages gardened productively. It appears that their motivation for gardening was to sell produce to employees at Edwaki and Akwom whose occupation prevented them from regular gardening. This produce was sold at markets at Edwaki and Akwom twice a week. During the wet season there was usually a goodly supply.

In Alai, Yaru and Yegarapi most families had gardens which were productive. There was little sign of gardening around Yawari and Papi but around Naum there were some signs of gardening activities. Gardening activity is also seasonal with most of the produce being available in the form of vegetables and some fruit from January to April. Bananas are an exception and both ripe and cooking bananas are available all the year round (refer Chapter Four p.75).

The weights of infants and children under five years at Yegarapi village were shown to be 21.95% in the severely undernourished category and for Yaru village 12.90%. Then, as mentioned earlier, Alai village did not have any infants attend clinic with severe undernutrition. However, the Yegarapi percentage is much higher than Yaru and Alai but still it is obvious that these villages do reap some benefit from gardening. This is more obvious when these percentages are compared with the percentages of severe undernutrition in the villages of Alai with 40%, Naum with 34.61%, and, lastly, Yawari with 35.71%.

It, therefore, can be concluded that fishing, hunting and gardening, the methods the Lujere use to interact with the ecosystem, are insufficient for the nutritional needs of their infants and children under five years of age. Thus, a premise can be made that the Lujere people have a need to increase their productivity of protein foods. Such an approach to this problem would increase productivity through fishing, hunting and gardening activities.

How then can the nurse help?

A nurse who takes a transcultural approach to her work can definitely help by pointing out the need, for an increased protein supply and by explaining the types of food which will increase protein intake. This, of course, does not improve productivity, but by enlisting the help of others with nutritional, horticultural and agricultural skills, old skills could be improved and new skills introduced. First the team would need to monitor the level of fishing, hunting and gardening activities and understand the Lujere methods of interaction. Interactions, for instance, related to the use and efficiency of the bow and arrow, the effectiveness of trapping fish, and the pragmatism of slash and burn and, where desirable, these well developed skills can be built on.

The nurse who has anthropological skills and knowledge can extend the research described in this study and further examine the variables described by the author.

CULTURAL ATTITUDES RELATED TO INFANT UNDERNUTRITION

Cultural attitudes to food do significantly govern what foods infants receive, as some food is perceived as having spiritual powers which can cause illness. Because of this view smaller infants have constraints attached to their diet. These constraints relate to protein foods, therefore, the premise can be made that cultural beliefs do effect the incidence of undernutrition. The author was unable to discover any specific reasons for constraints. But this could be a culturally engendered reluctance to discuss what might not be comprehended by the 'expatriate'. The popular replies when asked why certain foods were not offered to children was:

> *Insect, animal, bird and certain fish flesh is too strong for the infant's immature spirit*
>
> *The mothers did not like the smell of faeces when their infants ate green leaves.*
>
> (refer Chapter Six p.125)

In Chapters Six and Eight weight scores do show that restriction of food does affect growth in some instances. Figure 6.1 demonstrates the average growth curve for all Lujere infants weighed (N = 477) at the clinics over the five month period. This curve shows that over the months from birth to six months, when babies are totally dependent on breast milk, their aggregate weight growth overall the villages is stable.

First solid foods are introduced when teeth erupt. Thus the introduction of food needing chewing and not sucking coincides with teething (refer Chapter Six p. 120). This as well as the varieties of foods used could also be regarded as factors related to slow growth which occurs at that time (refer Figure 6.1).

One of the first foods is squashed ripe banana, these are reasonably plentiful all the year round and grow around the houses of the villages and bush camps. Premasticated small fish is also a first food, and is rich in protein. The problem with fish is its availability (refer Chapter Four p. 68).

Figure 6.1 shows slow growth from six to ten months which alters when at eleven to twelve months there is a 1 kg gain and then the slow pattern continues until twenty-four months. It can be presumed, if a comparison is made with table 6.1, that most food eaten during that period of time does not contain sufficient protein for quick growth. The foods that do are beans, small fish and breast milk. Beans and fish both have availability problems. This leaves breast milk as the reliable source of protein, that is if the mothers' lactation is sufficient.

The cultural variable related to this situation is the late introduction of solids which coincides with the eruption of teeth. The principle involved here is, as more teeth appear and the ability to chew becomes apparent, more varieties of food are introduced.

Evidence shown in figure 6.1 shows this habit does affect growth. Therefore the early introduction of bland solids, fruit and vegetable juices could be advantageous. Two examples in Chapter Eight (pp. 162) show that if foods are introduced at three months there is a marked gain in weight.

Therefore the premise can be made that the introduction of solids coinciding with eruption of teeth affects growth and the incidence of undernutrition. Therefore, if bland solids were introduced to all infants at around four to six months growth would possibly remain stable during teething and the incidence of undernutrition could lessen.

In Chapter Eight the growth of children twenty-three months and under is compared with the growth of children twenty-four months to fifty-nine months. The data produced shows a difference in weight gain between these groups of children. The younger infants have a greater gain in weight than the older children. Then the older group of children have a greater number lose weight (refer tables 8.3, 8.5, 8.8, 8.11, 8.13 and 8.15. Figure 6.1 endorses this finding because there is a difference in the weight curve after twenty-four months as the rise and fall of the growth curve shows many weight losses with progressive accelerations of weight gain.

Discussion in Chapter Six reveals that as a child grows he experiences a number of cultural changes related to his physical development. First there is weaning with breast feeding and a restricted diet and then the transition from a restricted diet and breast feeding to the full adult diet. This change of diet does not appear to cause many incidences of weight loss. But the adjustment that follows could cause the difference in weight gained. This adjustment is learning and practicing the skill of foraging for subsidiary foods that mainly contain protein.

A premise can be made that the food foraged by children does not provide sufficient protein to satisfy the child's hunger. The parents notice this and share some of the food from hunts with them, but usually they are near the bottom of the food chain as men and youths have the largest share with women and children given small amounts only.

Therefore, it is obvious that the cultural restraints on food namely protein foods along with availability of food do relate to the cause of undernutrition. Thus the health care giver has the responsibility to make parents aware of the need and offer help during this crucial period.

How then can the nurse offer help?

One method would be with knowledge of restricted foods and the rationale for restrictions, offer an alternative diet with insights from another culture. To do this, there is a need to first convince those concerned that they do have a need, then to motivate an increase in production by methods mentioned earlier in the text (see p.).

Interrelated with this idea is access. Those who realize they do have a need, and those who need to be helped to appreciate this need, should have access to this care and monitoring of growth as well as having attractive alternative proposals offered. It would be feasible to use a multi-disciplinary team to teach village representatives who have some understanding of the alternative diet and its relationship to cultural restraint, and of methods of improving production. This instruction would need to take place at a common base and then they could, in turn, return to their village and share their skills. To improve access to the facility of monitoring of growth there is a need to establish more assembly points at villages where the current access is over two hours walk away. To a non-Lujere reader even a two hour walk could seem to be grossly excessive!

To implement these ideas the research of this study would certainly need to be extended to discover methods of improving the availability of food, using and extending

the technology already available. Thus transcultural nursing with the fusion of nursing and anthropology would be extremely useful for this exercise as it uses both cultural and nursing variables.

CULTURALLY BASED CONCEPTIONS OF THE CAUSALITY OF DISEASE (UNDERNUTRITION)

This concept has been discussed in its relation to restricting foods to infants and children. It was told that certain foods are perceived to have spiritual powers which can impair health. This was especially so for children because it is perceived that their immature spirit is unable to evict the unwanted spirit from the body (refer Chapter Five p.99).

This concept and the certainty that Lujere people do not perceive connections between certain foods and the resulting undernutrition makes the introduction of supplementary feeding and regular monitoring of weights difficult to implement.

The idea of the spiritual powers of food causing illness is contrary to the western idea that it is deficiency of food that causes undernutrition and micro-organisms that cause infection (refer Chapter Five p. 85). Because of these contrary factors it will not be easy to implement the ideas discussed earlier of an alternative diet through increasing production of foods containing protein. But whilst not easy, a study of cultural factors and ecological realities will make it possible to achieve doing so.

Because the Lujere perceive the modality of cause of disease, including undernutrition, to be due to supernatural spiritual powers which have intruded into a person's soul or

spirit they use rituals to remove the cause. This again is contrary to the western ideology implemented by western based health care.

How then does the nurse bring these contrary ideas together to make sense of them so as to successfully implement alternative methods of feeding infants and children from birth to five years.

Firstly the concept that food affects growth needs to be shared and demonstrated effectively before it can be implemented. This study would need to be extended so as to discover a link that could be made to bring together, for the Lujere, the relationships of food to growth. This certainly is a situation that would need sensitive handling if undernutrition is going to be alleviated. For it appears that some specific culturally orientated nutritional health patterns may need changing if the overall nutritional status of all the children under five years is to be improved.

CULTURAL INCONGRUITY BETWEEN THE CARE GIVERS AND THE CARE RECEIVERS

The care receivers freely use their own caring and curing rituals and also use western medicine to relieve the symptoms of illness. In Chapter Five the harmony between Western and indigenous healing has been discussed. This harmony is maintained by the indigenous system giving service in the village house or gathering place. The western system uses an aidpost or health sub-centre or a specific clinic set up in the village. One does not encroach on the territory of the other but an integration of skills and knowledge of both systems could lead to mutual and desirable use of both"territories".

Incongruity is noticeable in the apparent acceptance by families of the offer of a supplementary feeding programme. Sometimes they do not even turn up at the health sub-centre. Even if they do many lose interest before the children have completed treatment. The culturally based perceptions of causalty and cure of disease certainly has an impact on how the Lujere people utilize the western health care, in particular, their acceptance of supplementary feeding programmes.

How then does the nurse alleviate incongruity between the care given and care received?

The expatriate nurse and the indigenous health workers should work as a team with the help of the agro-nutrition committee to solve this problem (refer to Chapter Five p.101). The level of severe undernutrition of children in seven villages ranges from 21.95% to 40%. This requires more urgent assistance than the long term effects than can be gained from changing fishing, hunting and gardening habits. A team approach to a feeding programme therefore becomes important.

Hence, the existing programme which has many incongruities needs revising to include cultural variables acceptable to both systems of care.

In order to find out what cultural variables will be needed the team formed, needs to extend this research to discover reasons for incongruity. Then they can offer a service according to the cultural needs of the 19.29% percent of the (N = 477) infants whose nutritional status is vulnerable.

CONCLUSION

To construct solutions to extend the present agriculture/ horticulture activities to the territory of the fifteen villages will be a long term project. The multi discplinary specialists (suggested earlier in the text) would need to include representatives of the health sub-centres and the local Agro-nutrition community leaders. This would form a team which could involve both the users and providers of health care and should accomplish important changes in relation to:

- cultural acceptability and congruity between the users and givers of care
- improved availability of care
- improved accessibility of care

Thus having and wanting an available and desirable health care which moves across cultures would certainly help the Lujere to understand the basics of the nutritional needs of their children from birth to five years. The decision to understand the need and want to meet the need belongs to the Lujere people. For like all human beings the Lujere have to develop the 'self' and their individual and collective self-care abilities, thus becoming self-reliant for health maintenance and promotion - including the nutritional status and wellbeing of their children.

Therefore there is a need:

- to want to increase production of food
- to want alternative cultural attitudes related to infant undernutrition
- to want to understand other perceptions of causality of disease
- to want to remove incongruities between care givers and care receivers.

These are Lujere decisions - promoted and supported by their societies caregivers - indegenous and expatriate.

To do this would mean understanding what total human development is about. Thereby leading on to developing for themselves methods for preventing undernutrition related to foods and alleviating severe undernutrition.

For all the Lujere people to want the above would mean community involvement. Not just health sub-centre involvement - and being on the Agro-nutrition committee. This of course is a start but there is a community effort. Both the health sub-centre staff and the Agro-nutrition committee need to guide development so that other Lujere can develop new skills and be responsible for fulfilling their needs by their own actions.

Once the researcher has found or developed links it would be commendable to involve the Lujere in a commitment to total human development and together identify the nutritional needs of their infants and children and create for themselves a self supporting system.

Morley and Woodland (1976) suggest key points to the process of involving a commitment to human development by:

> *Awareness* of situations in which existing structures in the community are preventing the attainment of basic needs for many of its members.
>
> *Organized community action*. This will aim to promote total human development.
>
> *Self-reliance* of the people to the extent of their personal and local resources.
>
> *Increased participation* of the people in making the decision which will affect their lives. (p. 118)

And these keypoints act both as an ending to this study and as a recommendation for action in the Lujere context. Both for resolution of the issue of under-nutrition - Lujere children and for the development and continual growth of Lujere wellbeing.

APPENDICES

APPENDIX A

WEIGHT CHARTS FOR FIFTEEN VILLAGES

Each weight of every child is recorded according to age and is plotted on the appropriate village weight chart. The chart used for the composite village scattergrams are those attached to the centre of the baby books issued for each child who attends an Infant Welfare Clinic. The graph shows three percentile points. These allow the mother and nurse to distinguish the three categories of nutritional status discussed in this thesis. That is:

well nourished 80% - 100%
mildly undernourished 62%-79%
severely undernourished below 62%

These scattergrams set out the raw data for each child at each weighing, in fifteen villages. The charts in Appendix B have been developed from these and represent the averages of the scores of weights for each grouping of babies by months from birth to fifty nine months.

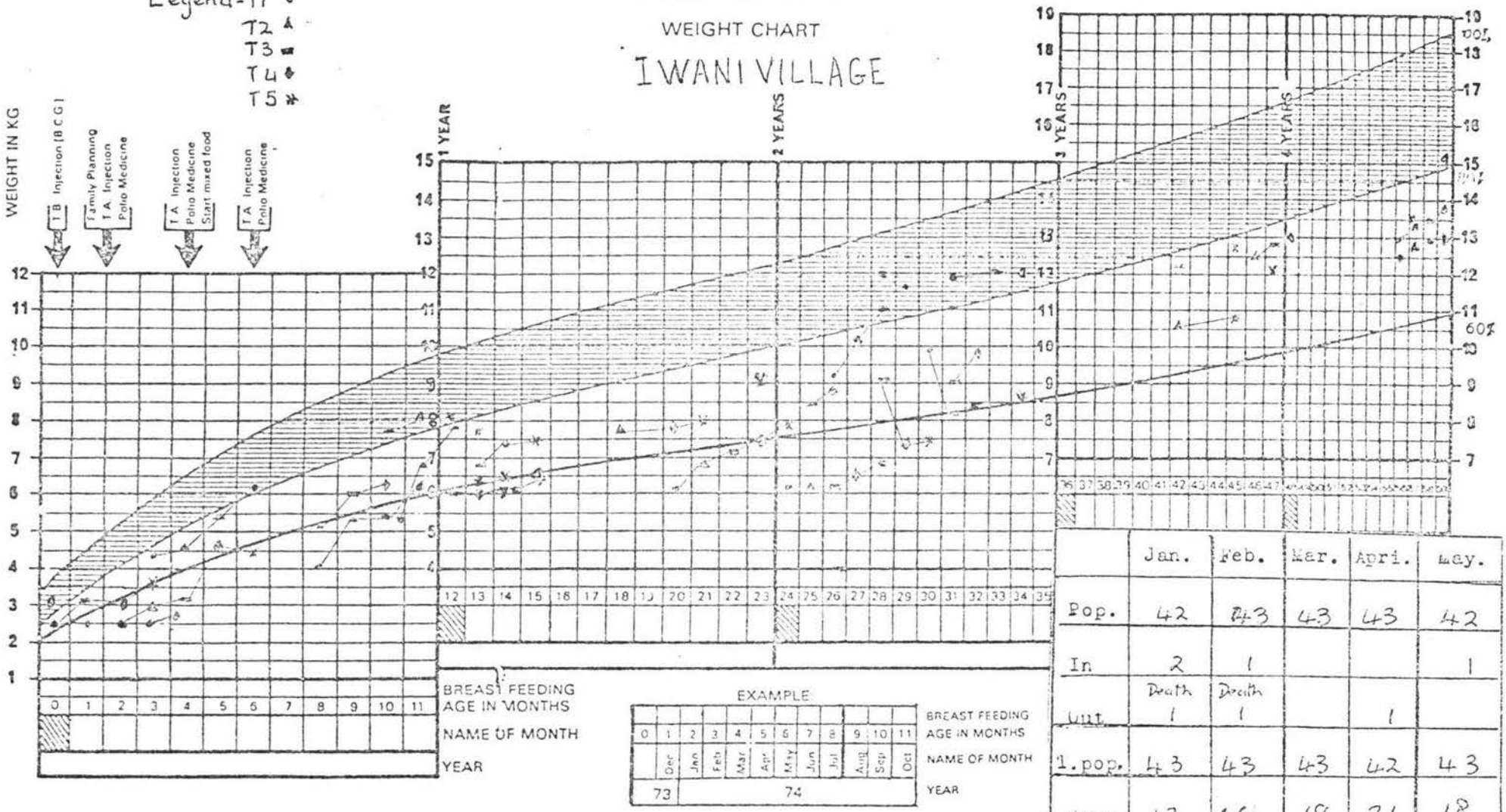
Figure AA1

SCATTERGRAM

WEIGHT CHART

IWANI VILLAGE

Legend-T1 ○
T2 △
T3 ▬
T4 ◆
T5 ✱



	Jan.	Feb.	Mar.	Apri.	May.
Pop.	42	43	43	43	42
In	2	1			1
Out	Death 1	Death 1		1	
1. pop.	43	43	43	42	43
Pres.	12	16	19	21	18
Abs.	31	27	24	21	25

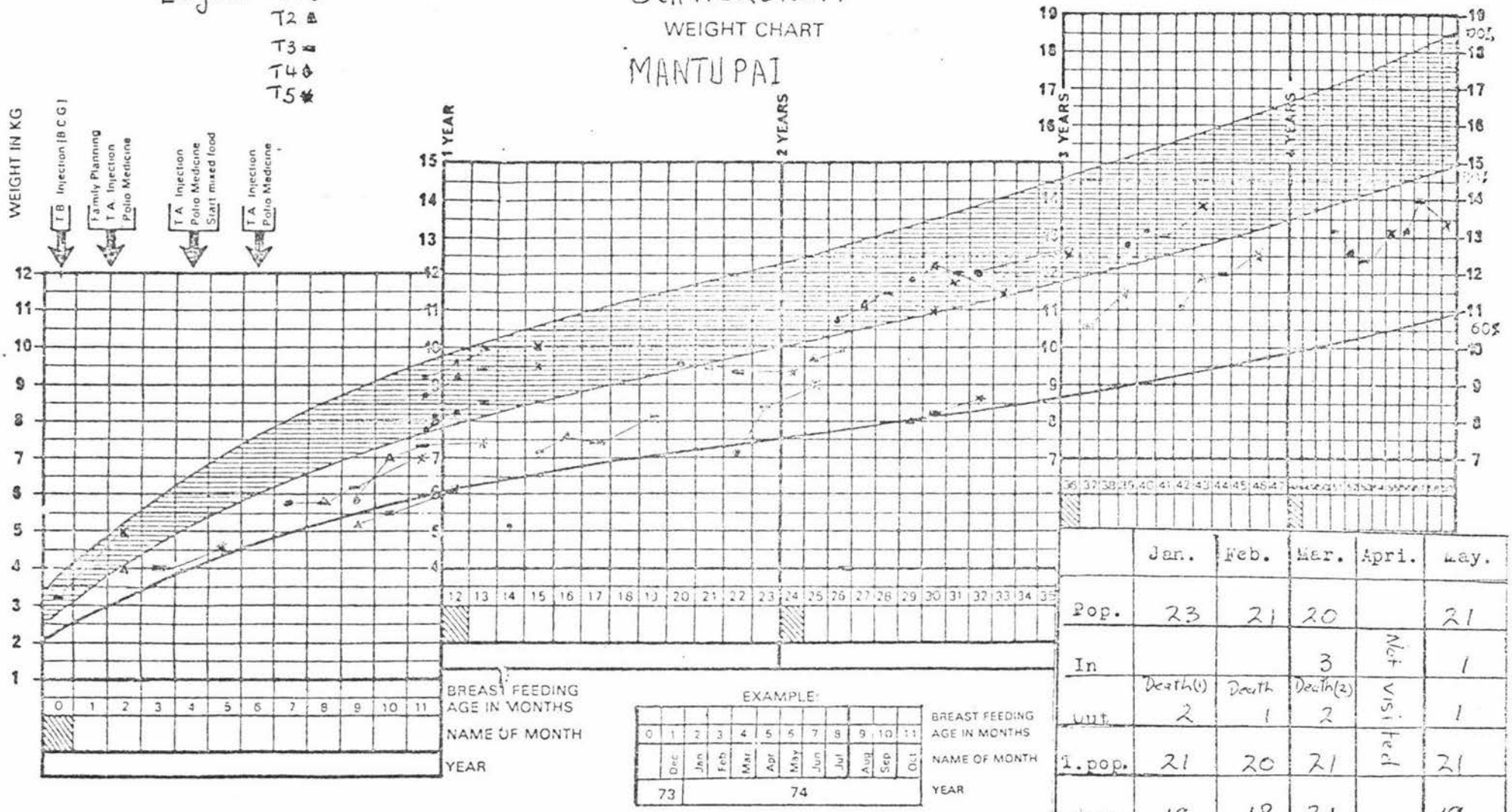
Figure AA2

Legend- T1 •
T2 ▲
T3 ■
T4 ◊
T5 ✱

SCATTERGRAM

WEIGHT CHART

MANTU PAI



	Jan.	Feb.	Mar.	Apri.	May.
Pop.	23	21	20		21
In			3	Not visited	1
Out	Death(1) 2	Death 1	Death(2) 2		1
1. pop.	21	20	21		21
Pres.	19	18	21		19
Abs	2	2	0		2

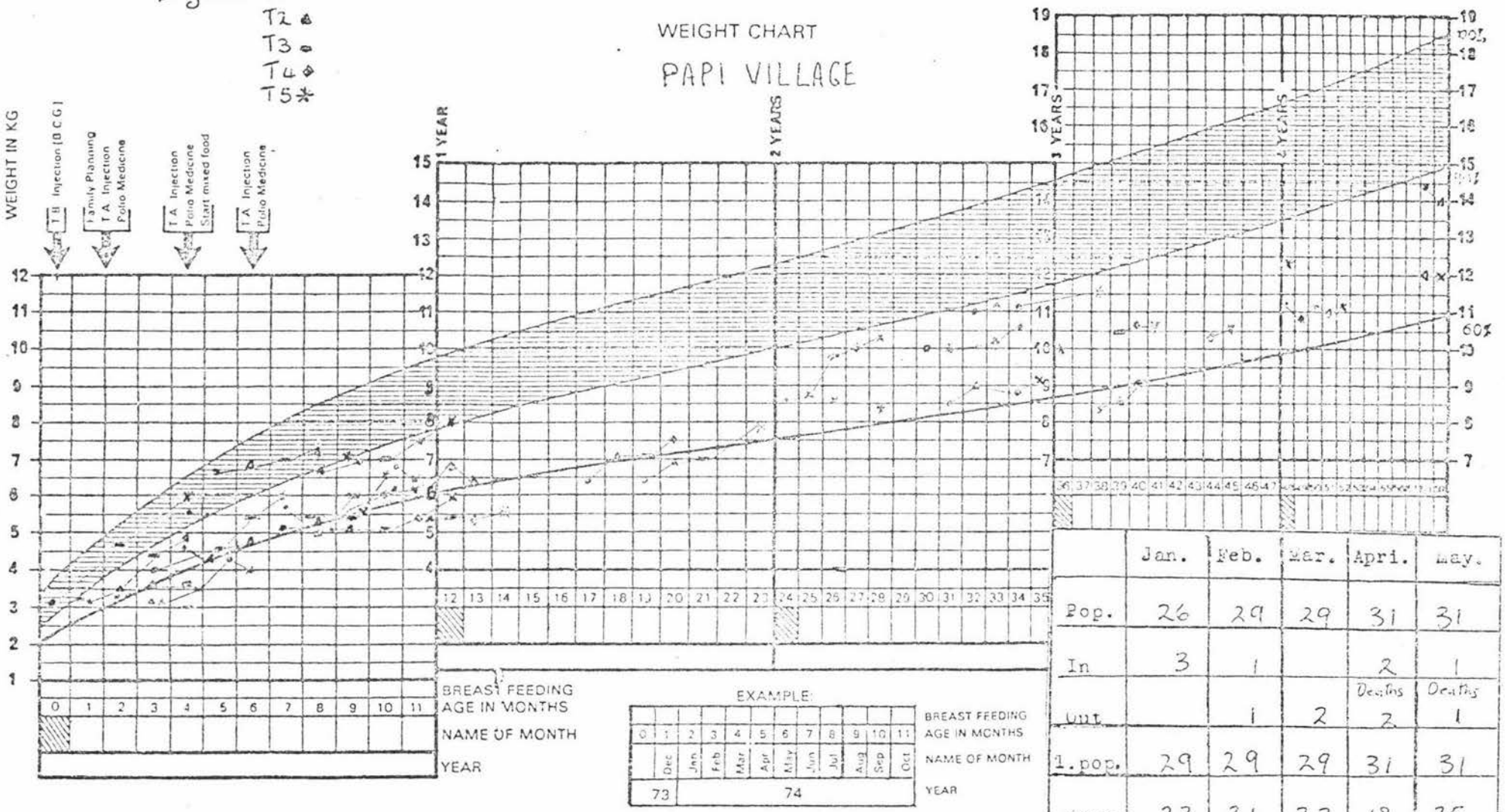
Figure AA5

Legend-T1 ○
T2 ▲
T3 ●
T4 ◆
T5 *

SCATTERGRAM

WEIGHT CHART

PAPI VILLAGE



EXAMPLE:

BREAST FEEDING AGE IN MONTHS	0	1	2	3	4	5	6	7	8	9	10	11
NAME OF MONTH		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
YEAR	73		74									

	Jan.	Feb.	Mar.	Apri.	May.
Pop.	26	29	29	31	31
In	3	1		2	1
Out		1	2	2 Deaths	1 Deaths
1. pop.	29	29	29	31	31
Pres.	22	21	22	18	25
Abs	7	8	9	13	6

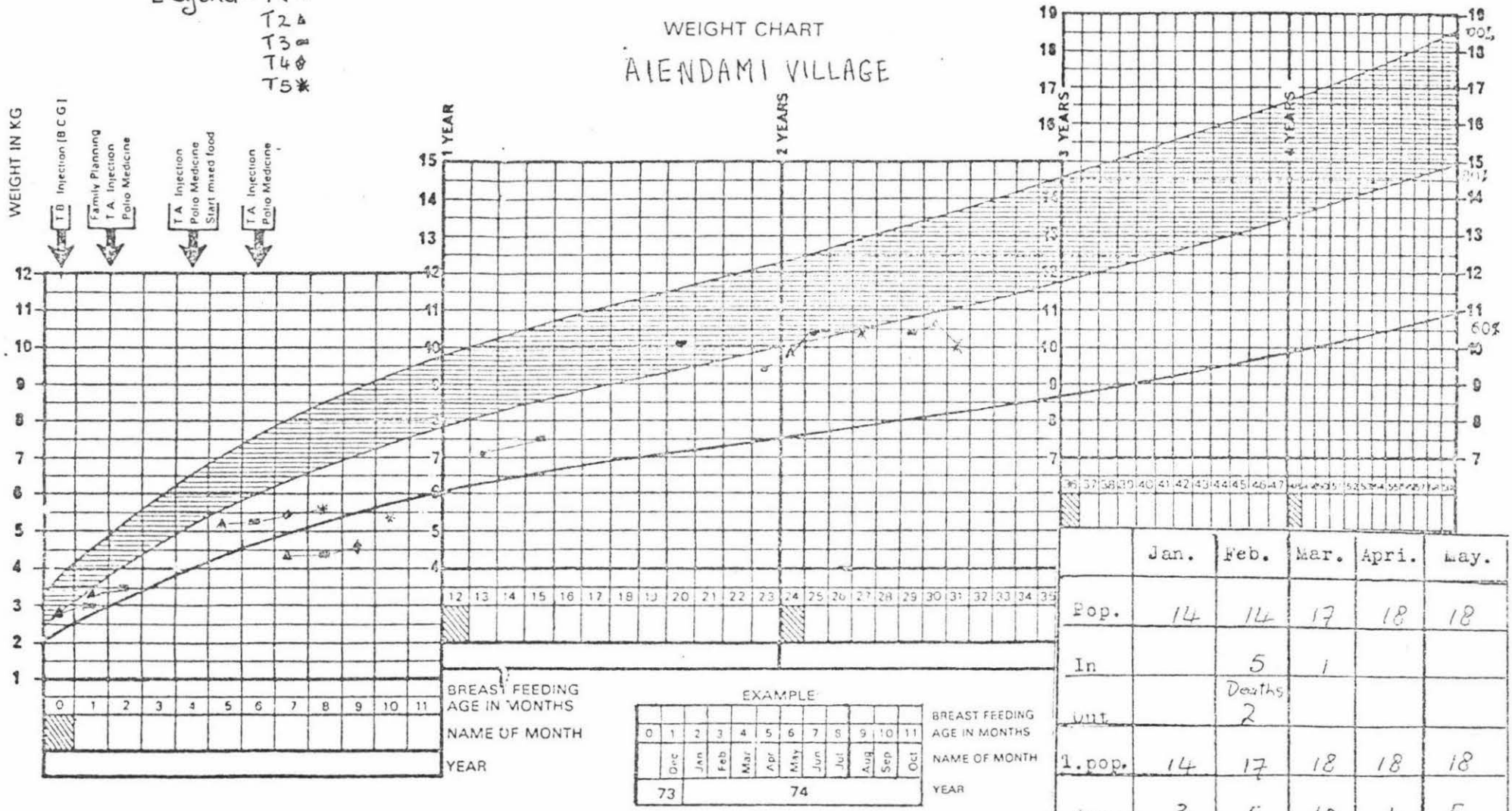
Figure AA4

SCATTERGRAM

WEIGHT CHART

AIENDAMI VILLAGE

Legend - T1 •
T2 △
T3 ▫
T4 ◊
T5 ✱



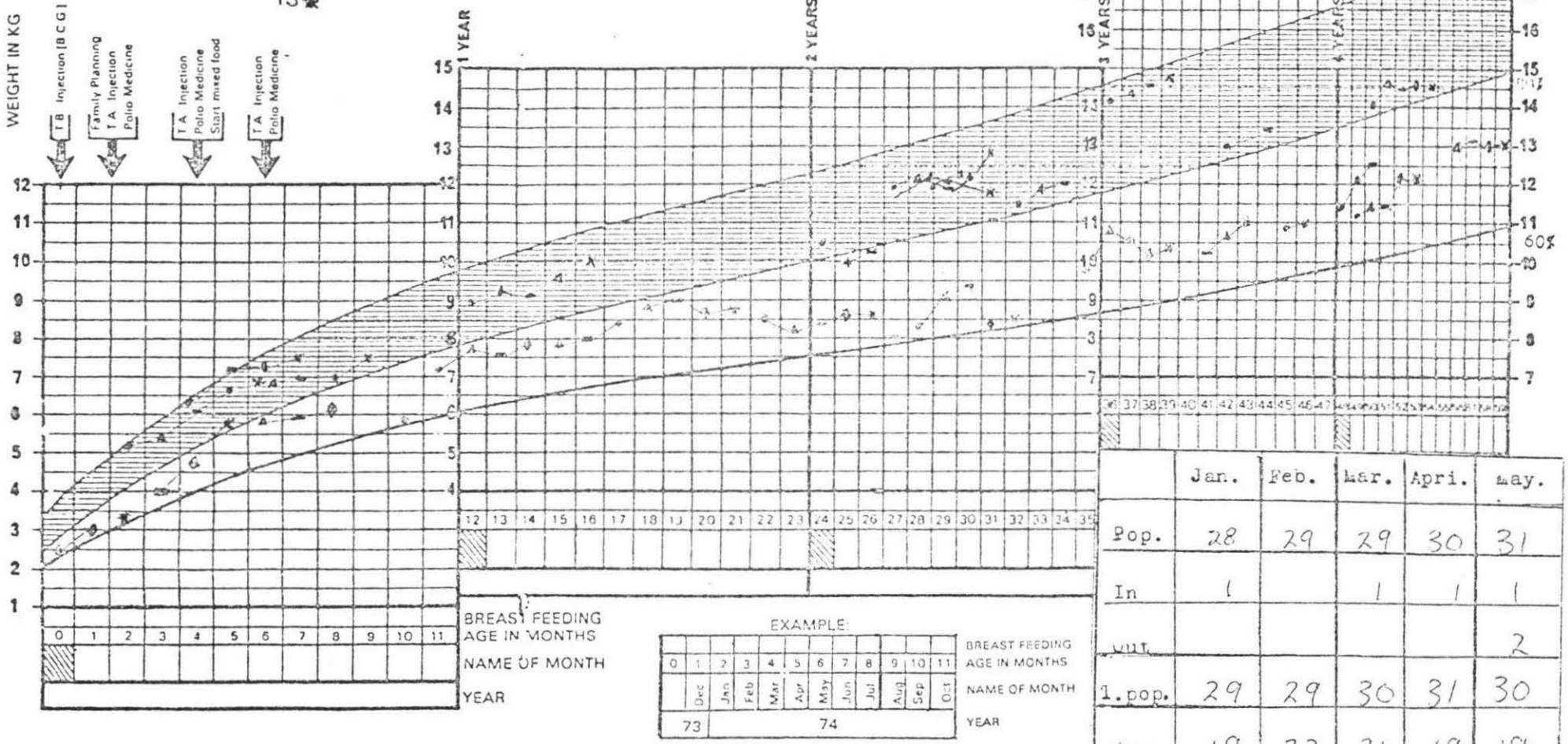
	Jan.	Feb.	Mar.	Apri.	May.
Pop.	14	14	17	18	18
In		5	1		
Out		Deaths 2			
T.pop.	14	17	18	18	18
Pres.	3	5	10	4	5
Abs.	11	12	8	14	13

Legend-T1 ○
T2 △
T3 —
T4 ◇
T5 ✱

SCATTERGRAM

WEIGHT CHART

WORIKORI VILLAGE



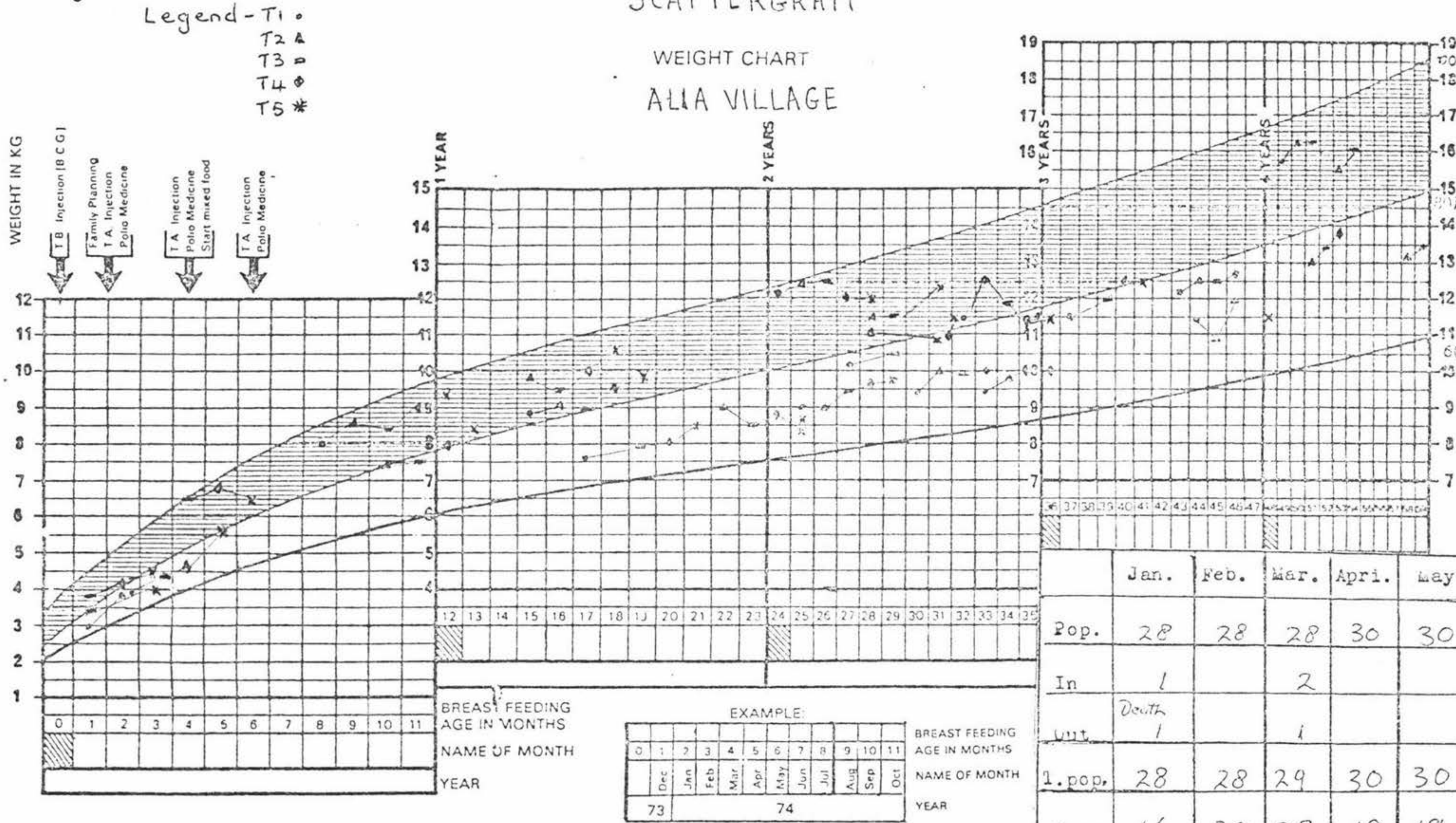
EXAMPLE:

BREAST FEEDING AGE IN MONTHS	0	1	2	3	4	5	6	7	8	9	10	11
NAME OF MONTH		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
YEAR	73		74									

	Jan.	Feb.	Mar.	Apri.	May.
Pop.	28	29	29	30	31
In	1		1	1	1
Out					2
1. pop.	29	29	30	31	30
Pres.	19	23	24	19	19
Abs	10	6	5	11	11

Figure ...

SCATTERGRAM



	Jan.	Feb.	Mar.	Apri.	May.
Pop.	28	28	28	30	30
In	1		2		
Out	Death 1		1		
1.pop.	28	28	29	30	30
Pres.	16	20	28	19	19
Abs	12	8	3	11	11

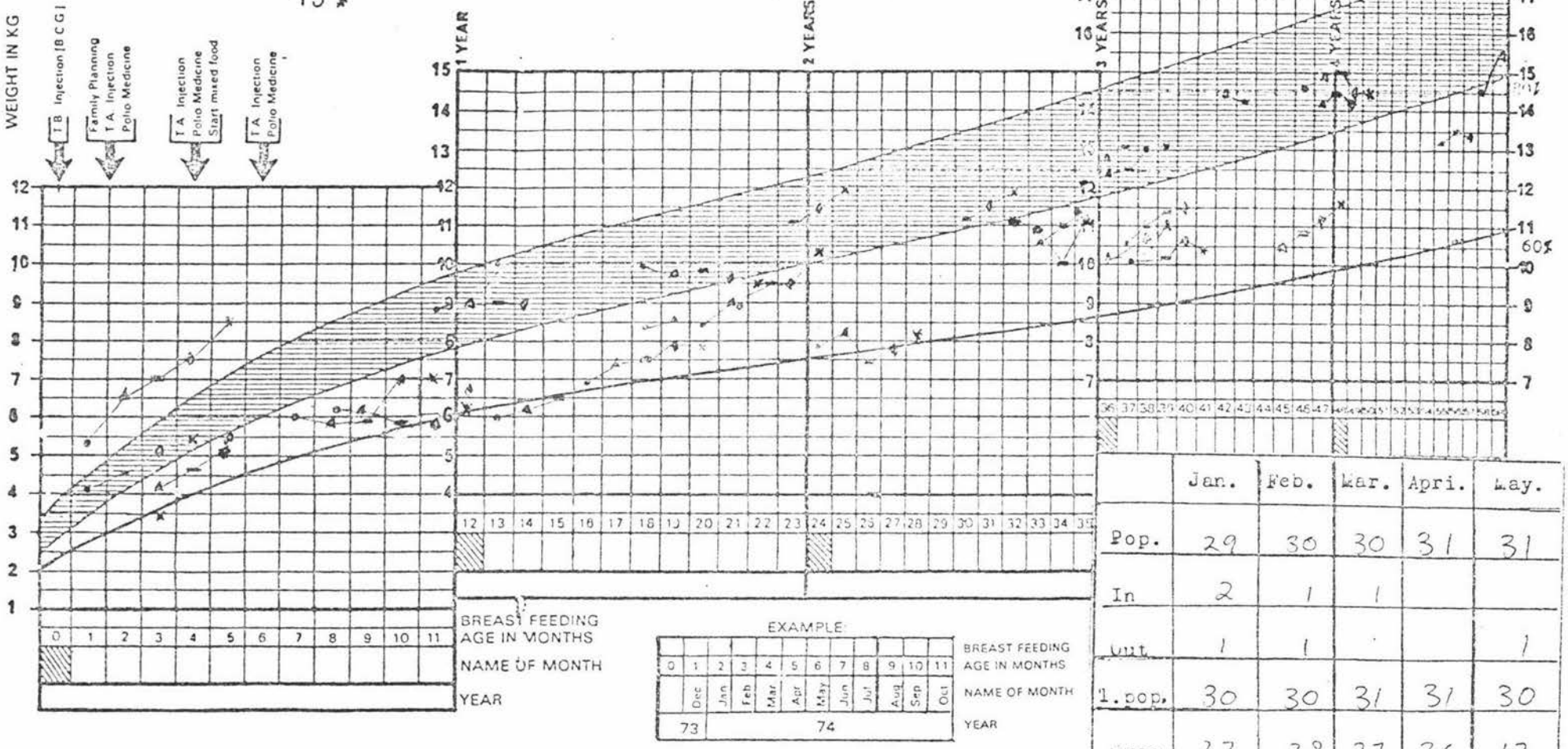
Figure AA7

SCATTERGRAM

WEIGHT CHART

YARU VILLAGE

Legend – T1 ○
T2 △
T3 ▬
T4 ◆
T5 ✱



EXAMPLE

0	1	2	3	4	5	6	7	8	9	10	11	BREAST FEEDING AGE IN MONTHS
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	NAME OF MONTH
73		74										YEAR

	Jan.	Feb.	Mar.	Apri.	May.
Pop.	29	30	30	31	31
In	2	1	1		
Out	1	1			1
1.pop.	30	30	31	31	30
Pres.	27	28	27	26	13
Abs.	3	2	4	5	17

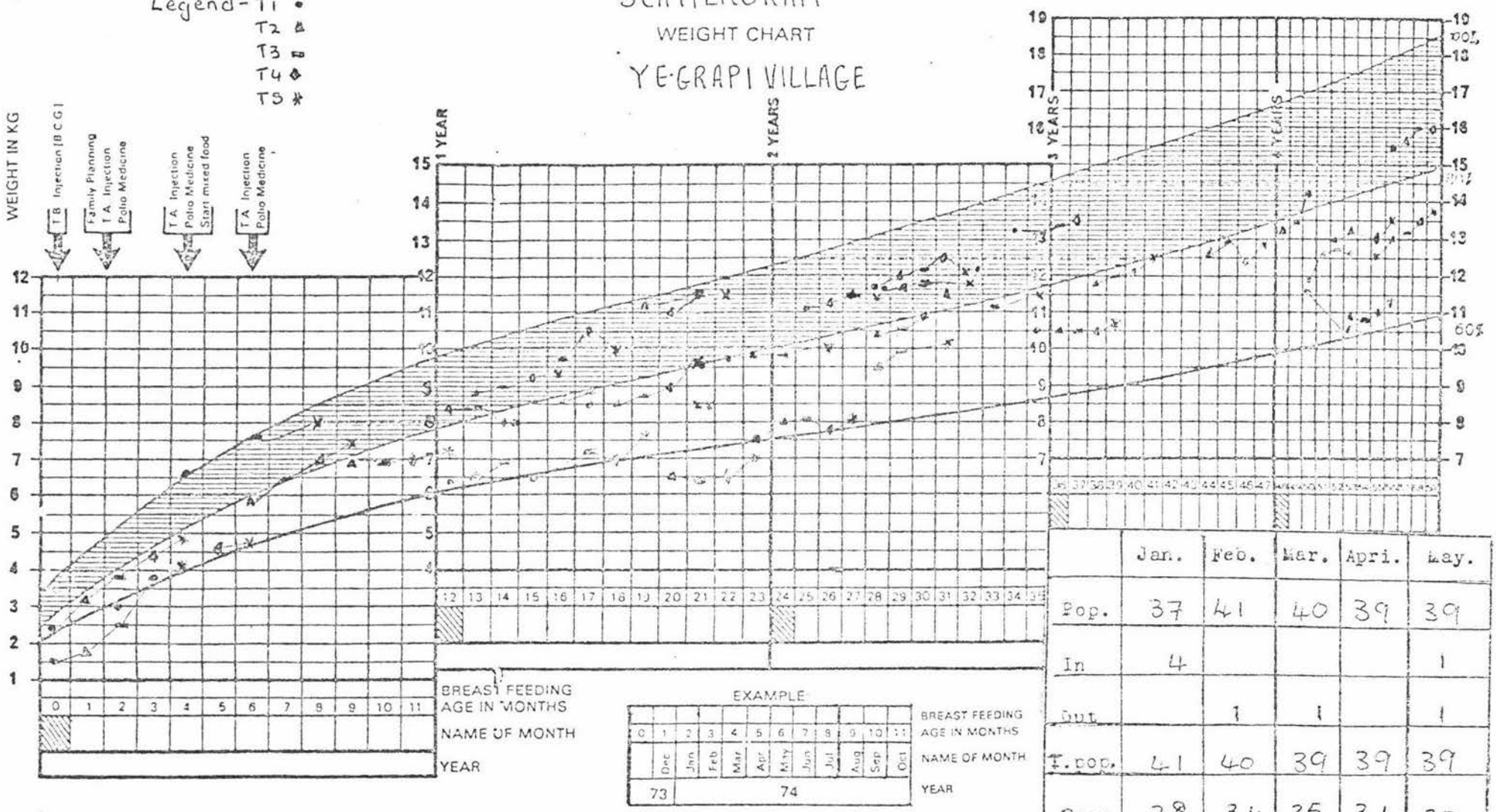
Figure AA8

SCATTERGRAM

WEIGHT CHART

YE-GRAPI VILLAGE

Legend- T1 •
T2 ▲
T3 ■
T4 ◆
T5 *



	Jan.	Feb.	Mar.	Apri.	May.
Pop.	37	41	40	39	39
In	4				1
Out		1	1		1
T.pop.	41	40	39	39	39
Pres.	28	34	35	31	30
Abs.	8	7	4	8	9

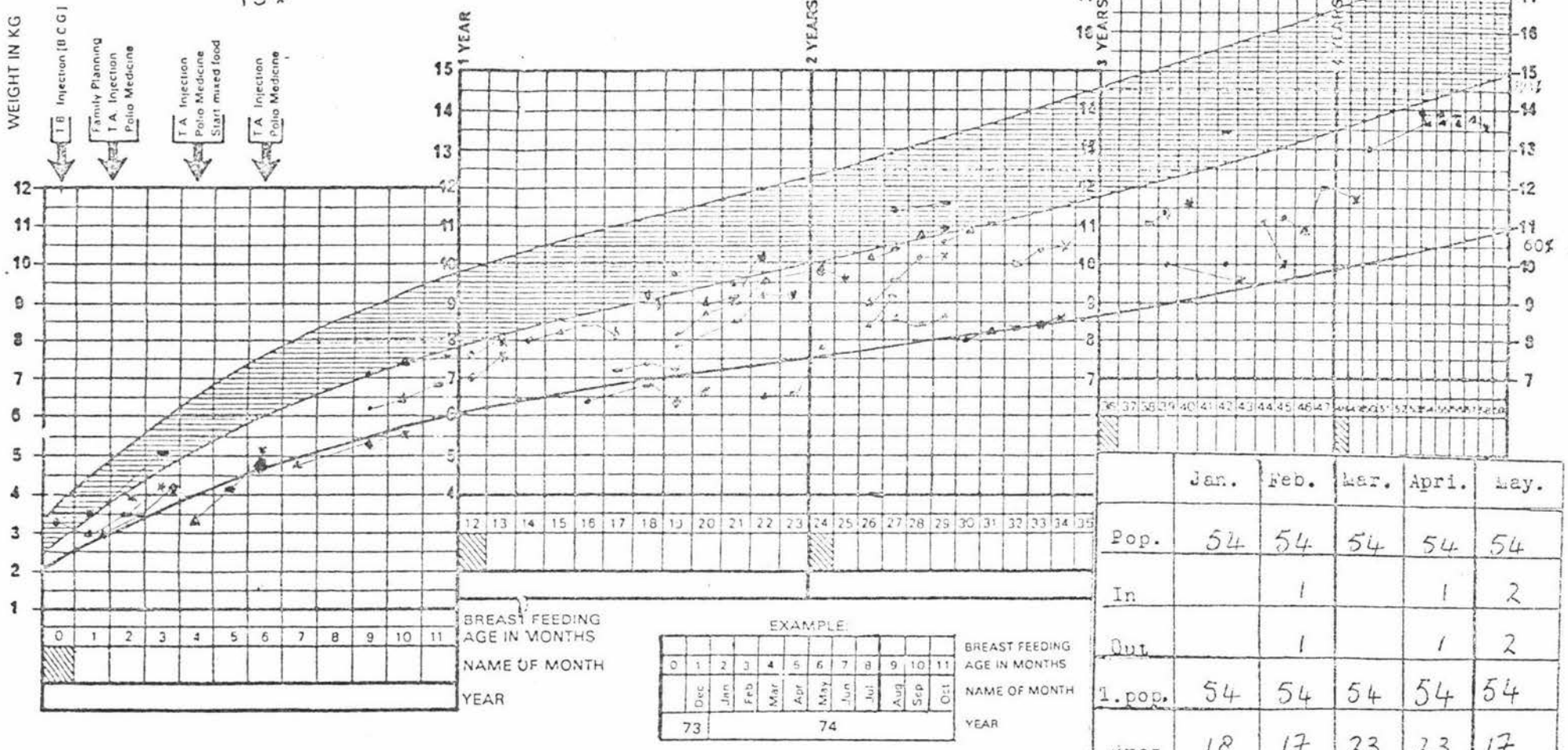
Figure AA3

SCATTERGRAM

WEIGHT CHART

GWIDAMI VILLAGE

Legend-T1 ○
T2 △
T3 —
T4 ●
T5 *



	Jan.	Feb.	Mar.	Apri.	May.
Pop.	54	54	54	54	54
In		1		1	2
Out		1		1	2
1.pop.	54	54	54	54	54
Pres.	18	17	23	23	17
Abs	36	37	29	31	37

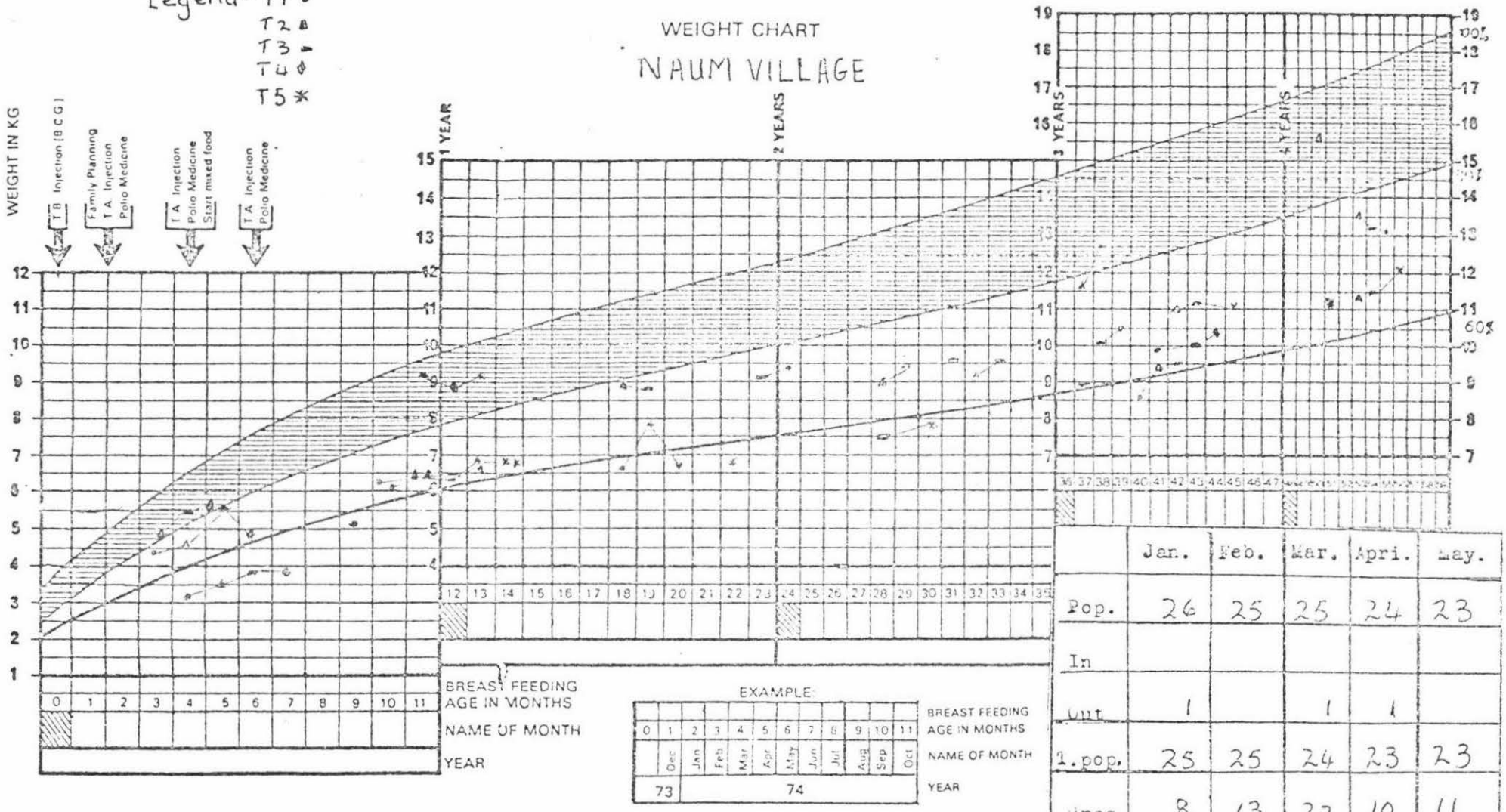
Figure AA10

SCATTERGRAM

WEIGHT CHART

NAUM VILLAGE

Legend- T1 •
T2 ▲
T3 –
T4 ∅
T5 ✱



EXAMPLE

BREAST FEEDING AGE IN MONTHS	0	1	2	3	4	5	6	7	8	9	10	11
NAME OF MONTH		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
YEAR	73		74									

	Jan.	Feb.	Mar.	Apri.	May.
Pop.	26	25	25	24	23
In					
Out	1		1	1	
T.pop.	25	25	24	23	23
Pres.	8	13	22	10	11
Abs	17	12	2	13	12

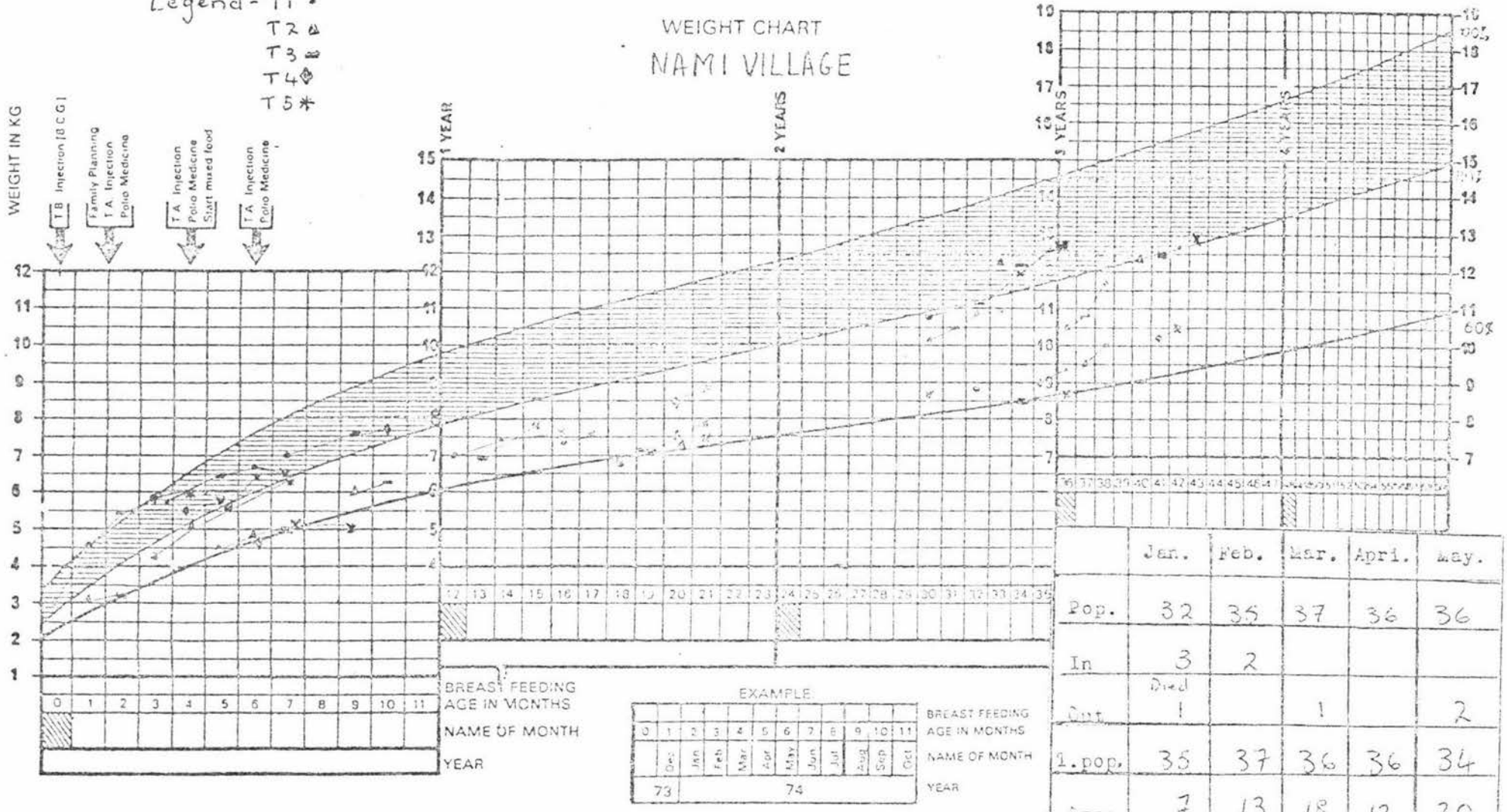
Figure AA11

SCATTERGRAM

WEIGHT CHART

NAMI VILLAGE

Legend - T1 •
T2 △
T3 ▭
T4 ◈
T5 ✳



	Jan.	Feb.	Mar.	Apri.	May.
Pop.	32	35	37	36	36
In	3	2			
Out	Died 1		1		2
1. pop.	35	37	36	36	34
Pres.	7	13	18	12	20
Abs	28	24	18	24	14

220

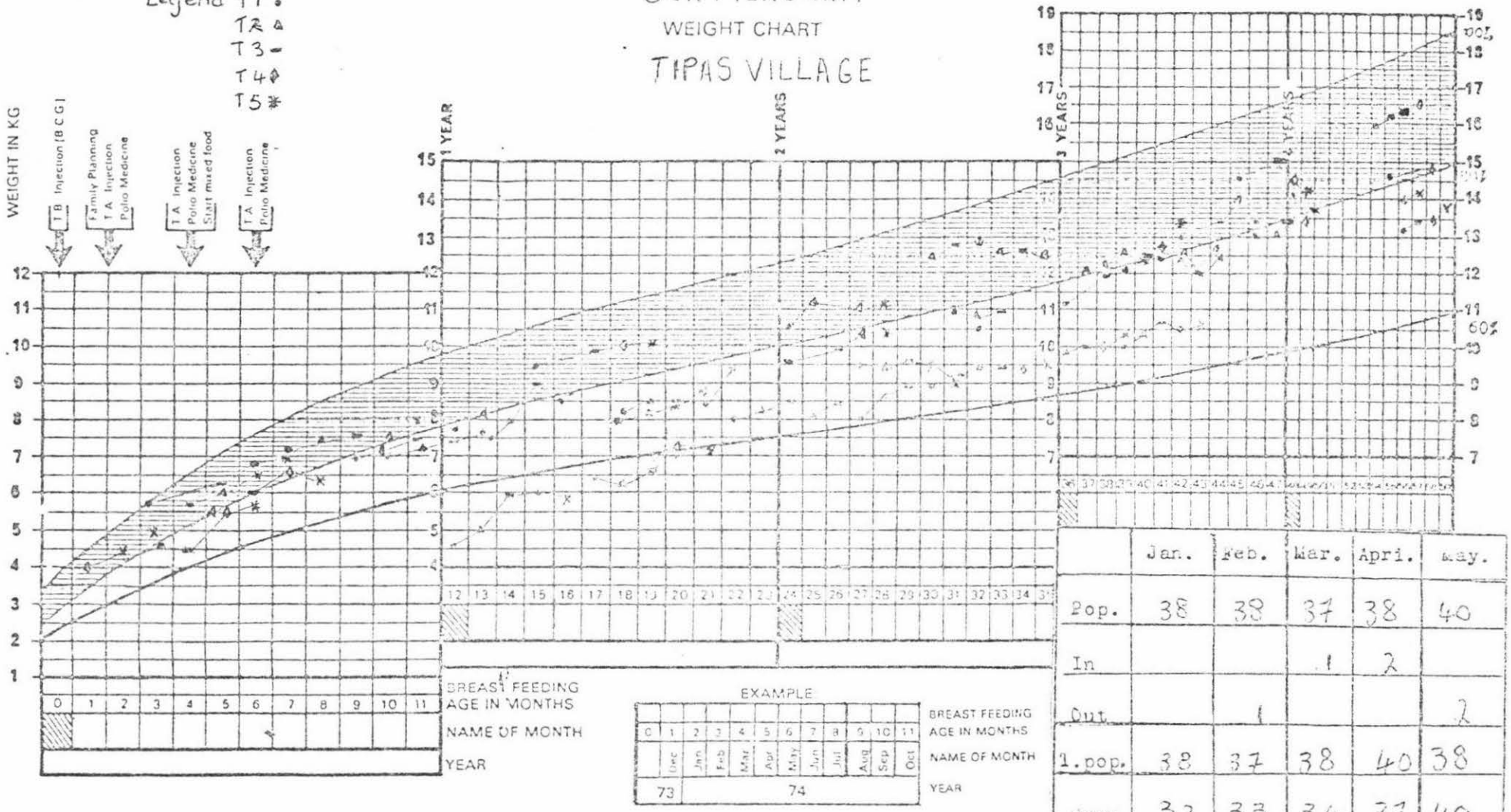
Figure AA12

SCATTERGRAM

WEIGHT CHART

TIPAS VILLAGE

Legend T1 •
T2 △
T3 –
T4 ◊
T5 *



	Jan.	Feb.	Mar.	Apri.	May.
Pop.	38	38	37	38	40
In			1	2	
Out		1			2
1. pop.	38	37	38	40	38
Pres.	32	33	36	37	40
Abs	6	4	2	3	8

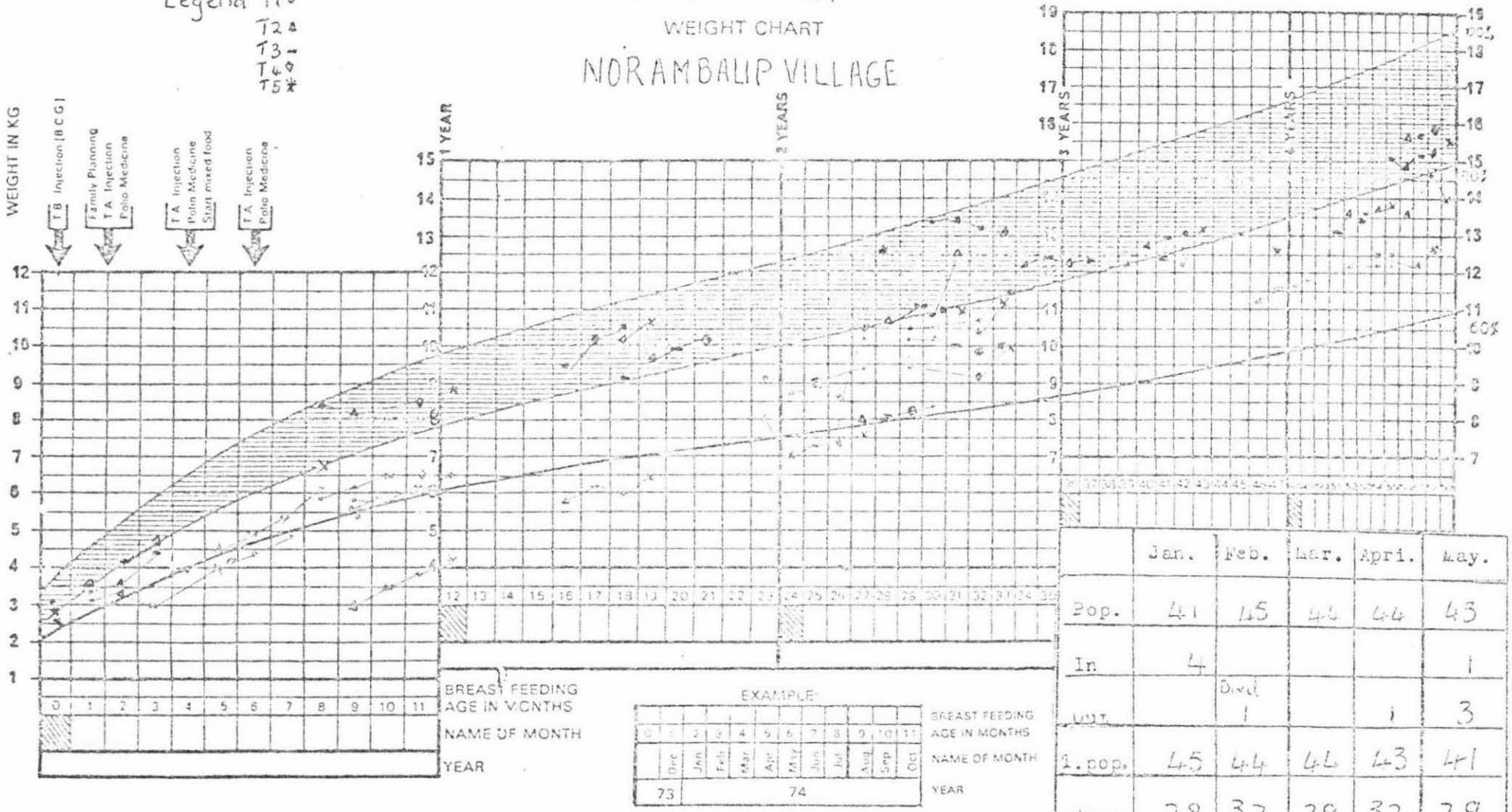
Figure AA13

Legend T1 ·
T2 Δ
T3 –
T4 ◊
T5 *

SCATTERGRAM

WEIGHT CHART

NORAMBALIP VILLAGE



	Jan.	Feb.	Mar.	Apri.	May.
Pop.	41	45	44	44	43
In	4				1
Out		Died 1		1	3
A. pop.	45	44	44	43	41
Pres.	28	32	29	32	29
Obs	17	13	16	12	13

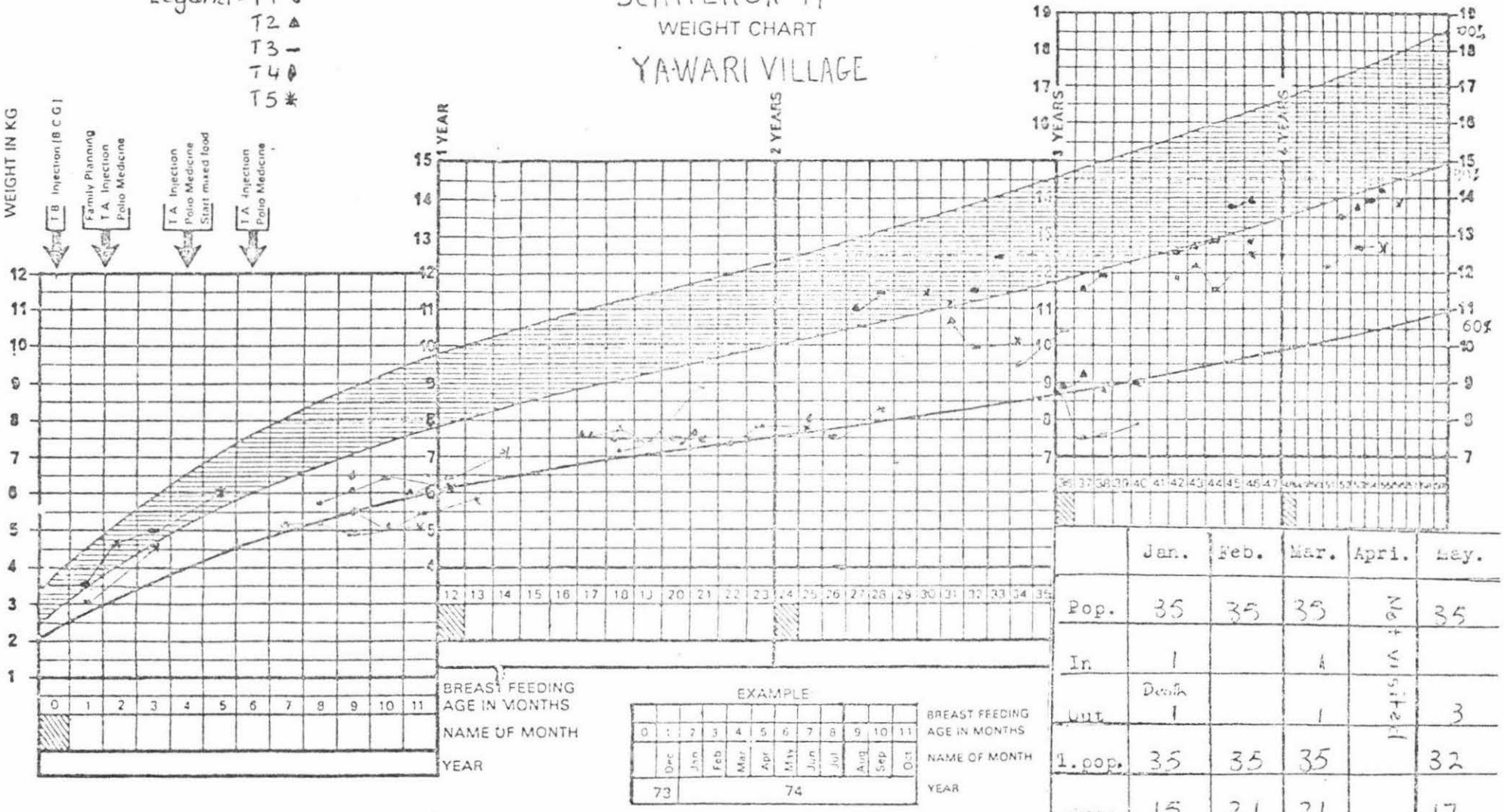
Figure AA14

Legend-T1 ○
T2 △
T3 —
T4 ◊
T5 *

SCATTERGR M

WEIGHT CHART

YAWARI VILLAGE

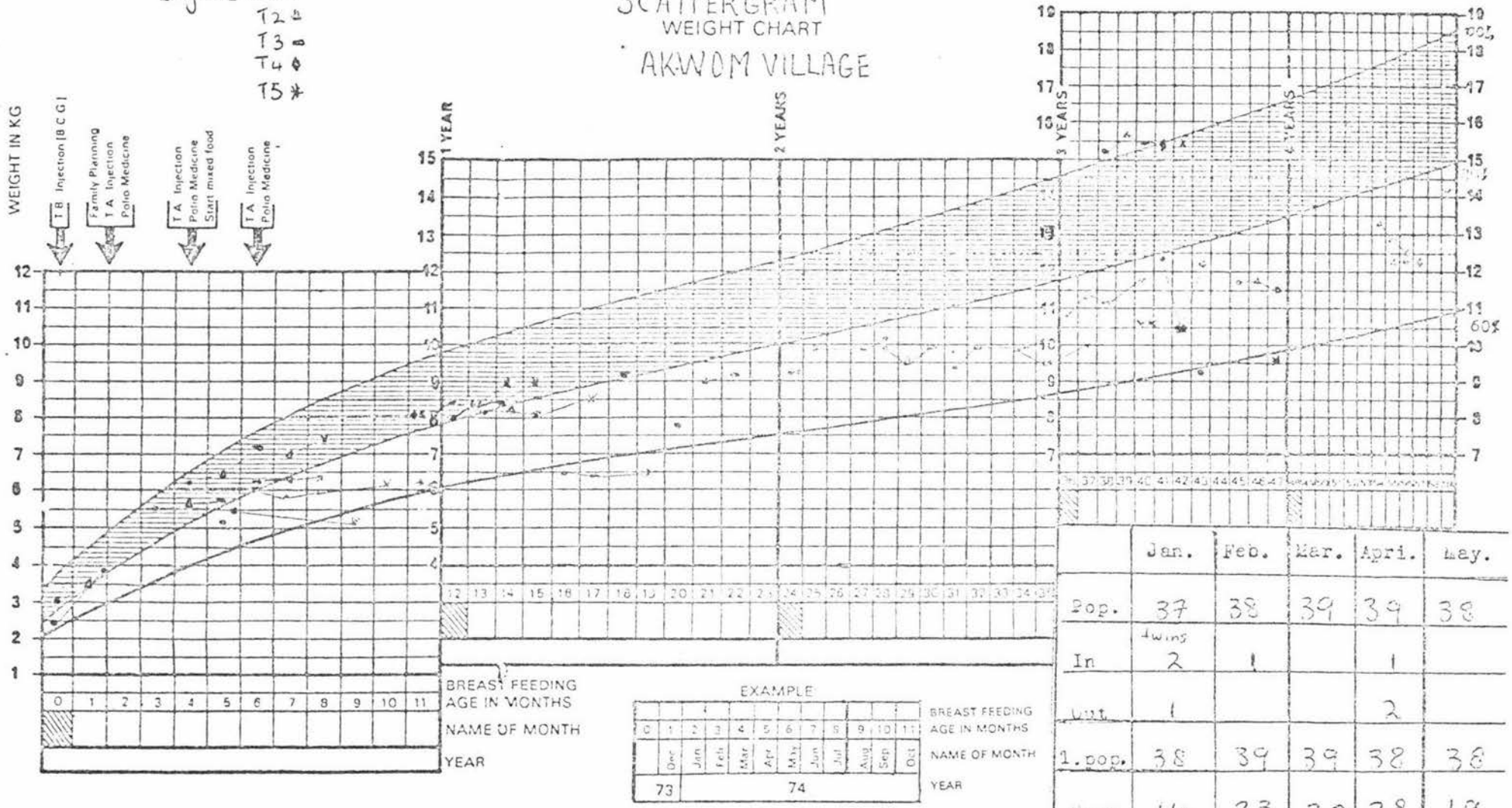


	Jan.	Feb.	Mar.	Apri.	May.
Pop.	35	35	35	No visit	35
In	1		1		
Out	Death 1		1		3
1. pop.	35	35	35		32
Pres.	15	21	21		17
Abs	20	14	14		14

Figure AA15

Legend-T1 •
T2 ▲
T3 ■
T4 ◆
T5 ✱

SCATTERGRAM
WEIGHT CHART
AKWOM VILLAGE



	Jan.	Feb.	Mar.	Apri.	May.
Pop.	37	38	39	39	38
In	2 (twins)	1		1	
Out	1			2	
1. pop.	38	39	39	38	38
Pres.	14	23	20	28	19
Abs	24	16	19	28	19

APPENDIX B

WEIGHT CURVES FOR FIFTEEN VILLAGES

These village weight curves are an extension of the fifteen scattergrams set out in Appendix A. As discussed the weights plotted for each age have been averaged and then blotted to form a curve for each village

Figure 6.1 (p has been compiled from these fifteen weight curves. The weight curve has been compiled by totalling each weight for each month and then averaging them out, and plotting them to form the weight curves.

Figure A 13.1

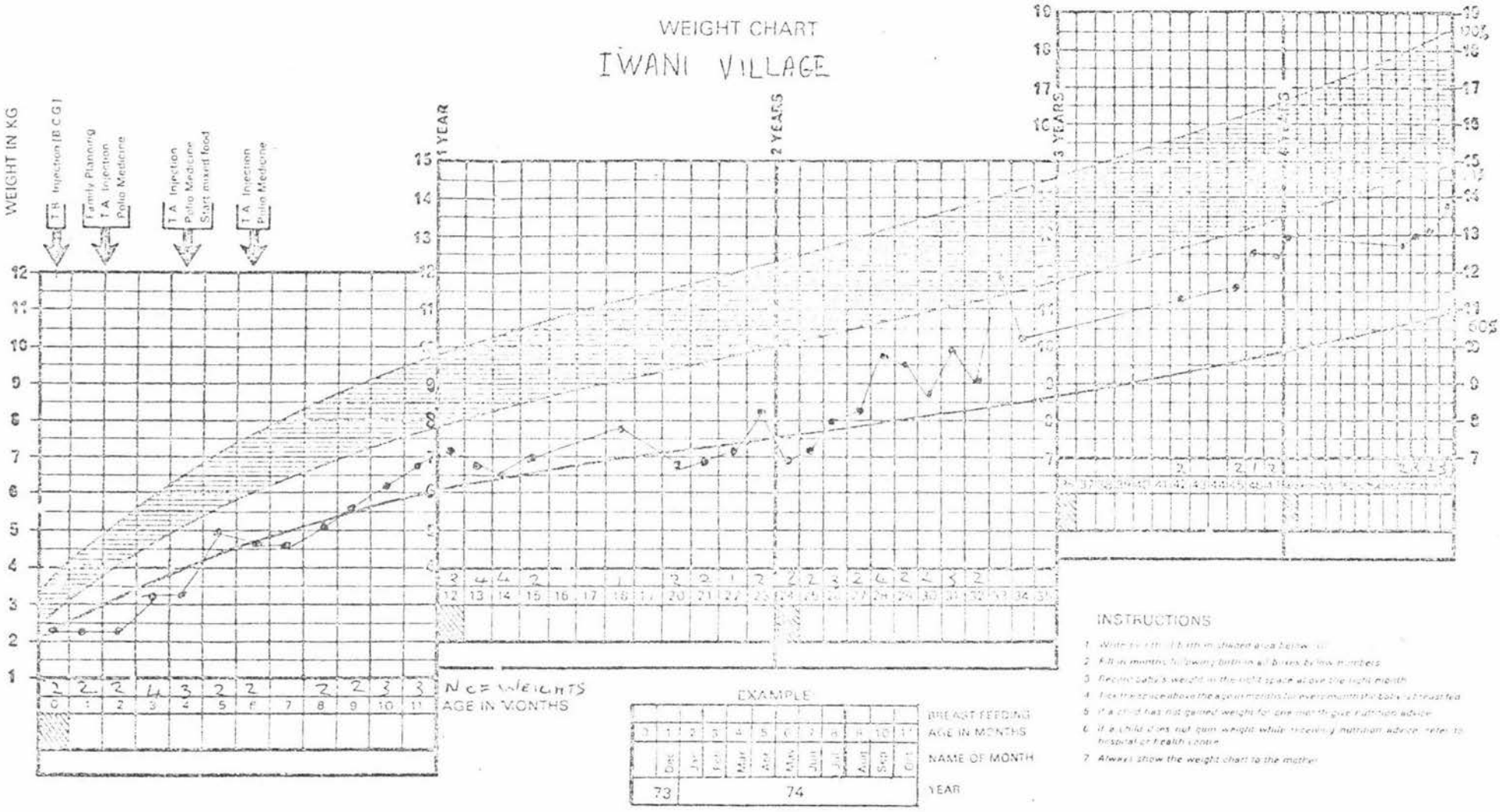

WEIGHT CHART
IWANI VILLAGE
WEIGHT IN KG
TB Injection (B C G)
Family Planning
T A Injection
Polio Medicine
T A Injection
Polio Medicine
Start mixed food
T A Injection
Polio Medicine
1 YEAR
2 YEARS
3 YEARS
N = WEIGHTS
AGE IN MONTHS
EXAMPLE
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
73
74
INSTRUCTIONS
1. Write your child's birth weight in shaded area below (1).
2. Fill in months following birth in all boxes below numbers.
3. Record baby's weight in the right space above the right month.
4. Use the space above the age in months for every month that baby is treated.
5. If a child has not gained weight for one month give nutrition advice.
6. If a child does not gain weight while receiving nutrition advice, refer to hospital or health centre.
7. Always show the weight chart to the mother.

Figure A B2

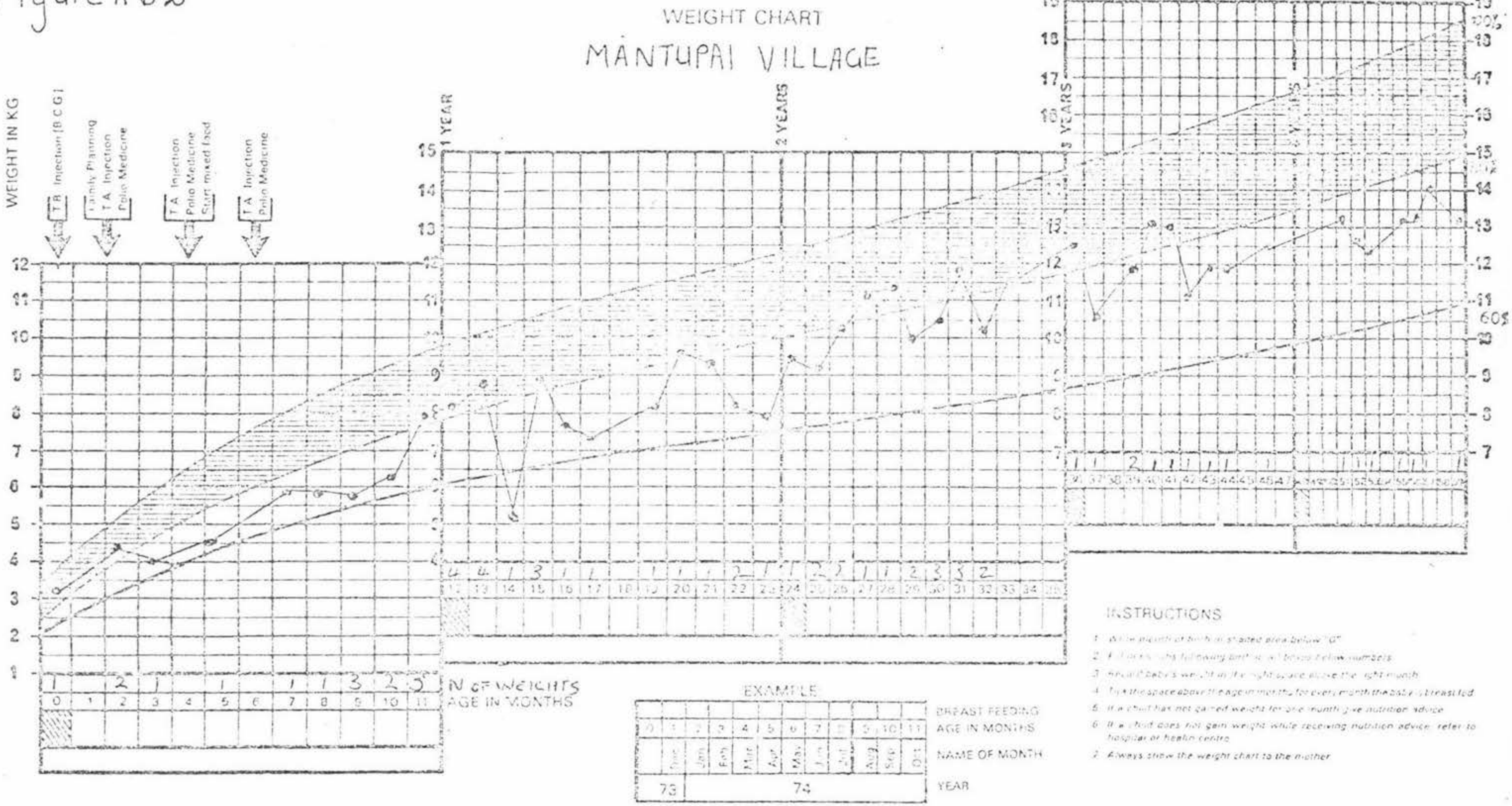

WEIGHT CHART
MANTUPAI VILLAGE
WEIGHT IN KG
T.B. Injection [B C G]
Family Planning
T.A. Injection
Polio Medicine
T.A. Injection
Polio Medicine
Start mixed food
T.A. Injection
Polio Medicine
1 YEAR
2 YEARS
3 YEARS
N OF WEIGHTS
AGE IN MONTHS
EXAMPLE
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
73
74
60%
INSTRUCTIONS
4 Tick the space above the age in months for every month the baby is breast fed
5 If a child has not gained weight for one month give nutrition advice
6 If a child does not gain weight while receiving nutrition advice, refer to hospital or health centre
7 Always show the weight chart to the mother

Figure AB3

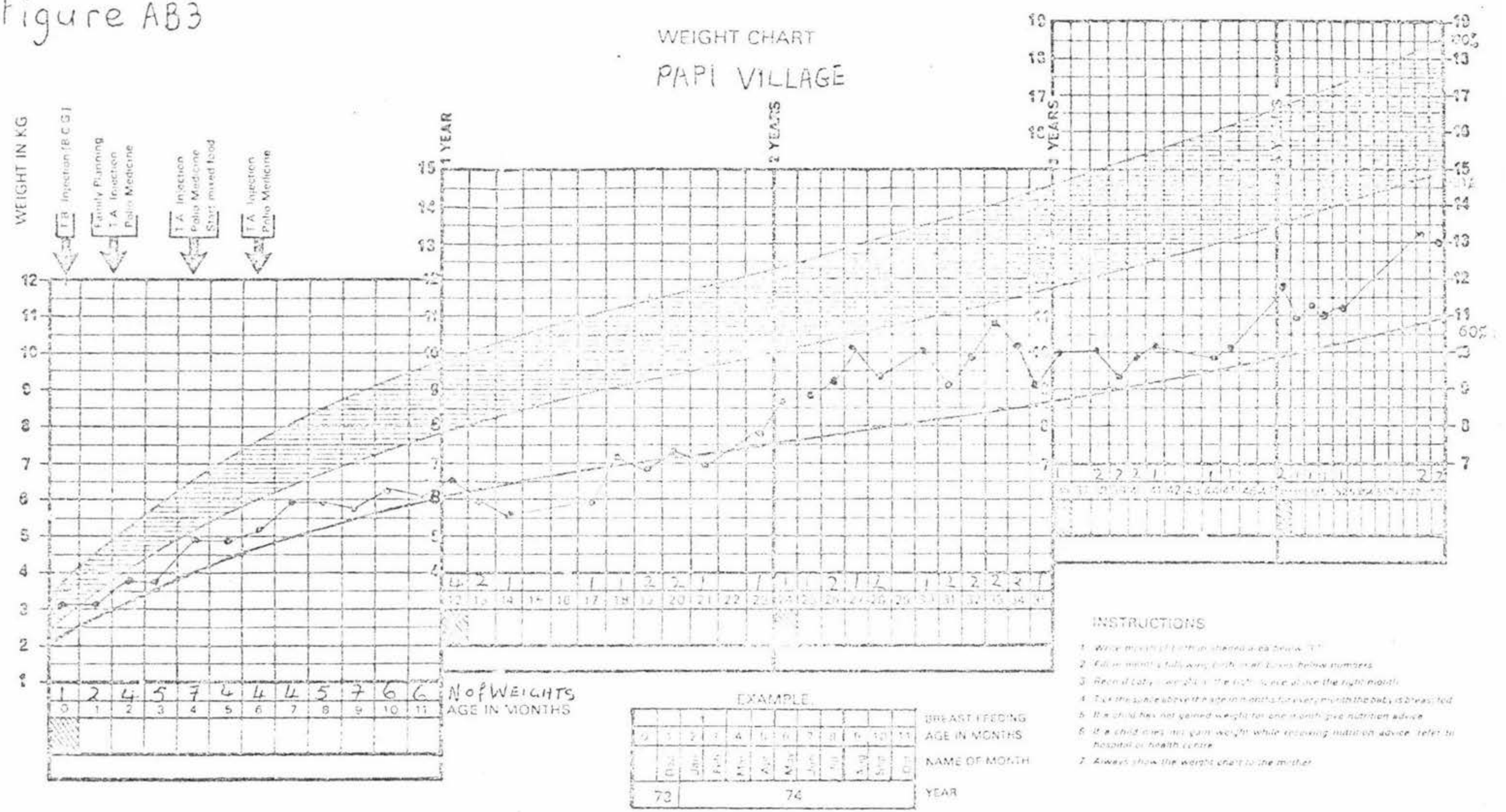

WEIGHT CHART
PAPI VILLAGE
WEIGHT IN KG
T.B. Injection (B.C.G.)
Family Planning
T.A. Injection
Polio Medicine
T.A. Injection
Polio Medicine
Start mixed food
T.A. Injection
Polio Medicine
1 YEAR
2 YEARS
3 YEARS
N of WEIGHTS
AGE IN MONTHS
60%
EXAMPLE
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
73
74
INSTRUCTIONS

Figure AB4

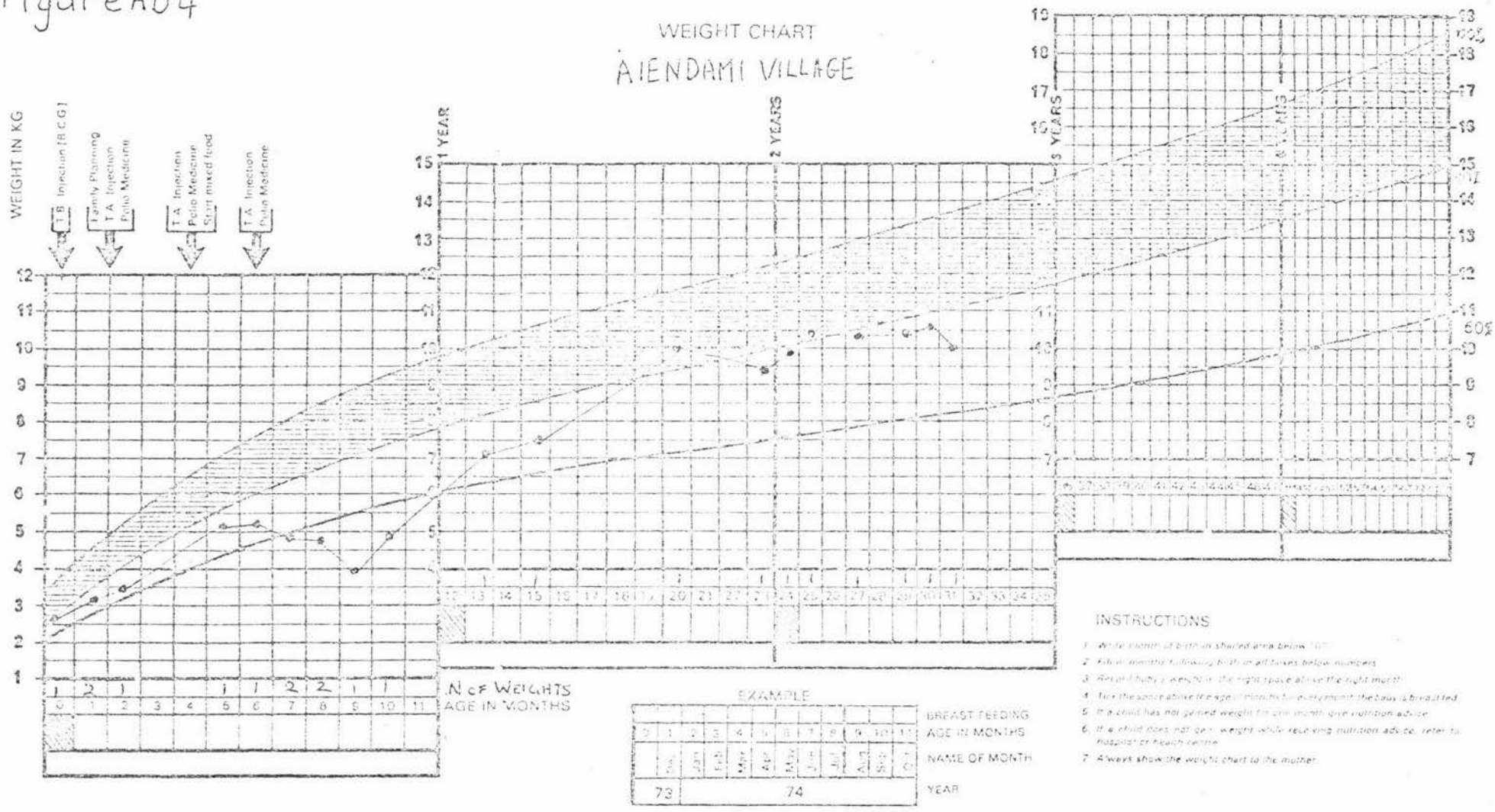

WEIGHT CHART
AIENDAMI VILLAGE
WEIGHT IN KG
TB Injection (B.C.G)
Family Planning
T.A. Injection
Polio Medicine
T.A. Injection
Polio Medicine
Start mixed feed
T.A. Injection
Polio Medicine
1 YEAR
2 YEARS
3 YEARS
60%
No of Weights
AGE IN MONTHS
INSTRUCTIONS
1. Write weight at birth in shaded area below 60%
2. Fill in months following birth in all boxes below numbers
3. Record baby's weight in the right space above the right month
4. Join the space above the age in months by a straight line as baby is breastfed
5. If a child has not gained weight for one month, give nutrition advice
6. If a child does not gain weight while receiving nutrition advice, refer to hospital or health centre
7. Always show the weight chart to the mother
EXAMPLE
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
73
74

Figure AB5

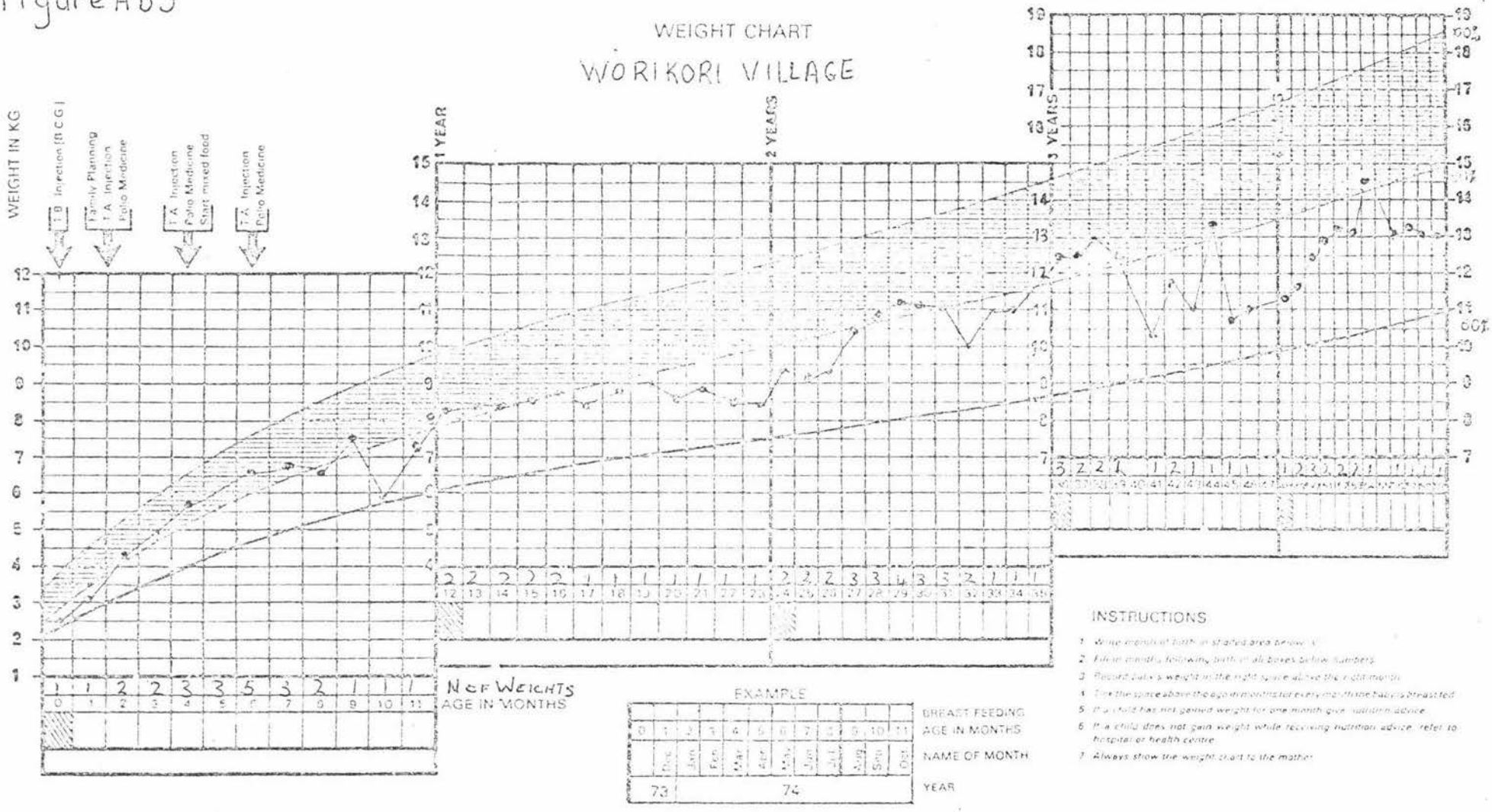

WEIGHT CHART
WORIKORI VILLAGE
WEIGHT IN KG
1 YEAR
2 YEARS
3 YEARS
1 B Injection (B C G)
Family Planning
T A Injection
Polio Medicine
T A Injection
Polio Medicine
Start mixed food
T A Injection
Polio Medicine
No of Weights
AGE IN MONTHS
EXAMPLE
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
73
74
INSTRUCTIONS
1 Write month of birth in shaded area below 0
2 After months following birth in all boxes below numbers
3 Record baby's weight in the right space above the relative month
4 Tick the space above the age in months first every month the baby is breastfed
5 If a child has not gained weight for one month give nutrition advice
6 If a child does not gain weight while receiving nutrition advice refer to hospital or health centre
7 Always show the weight chart to the mother

Figure AB6

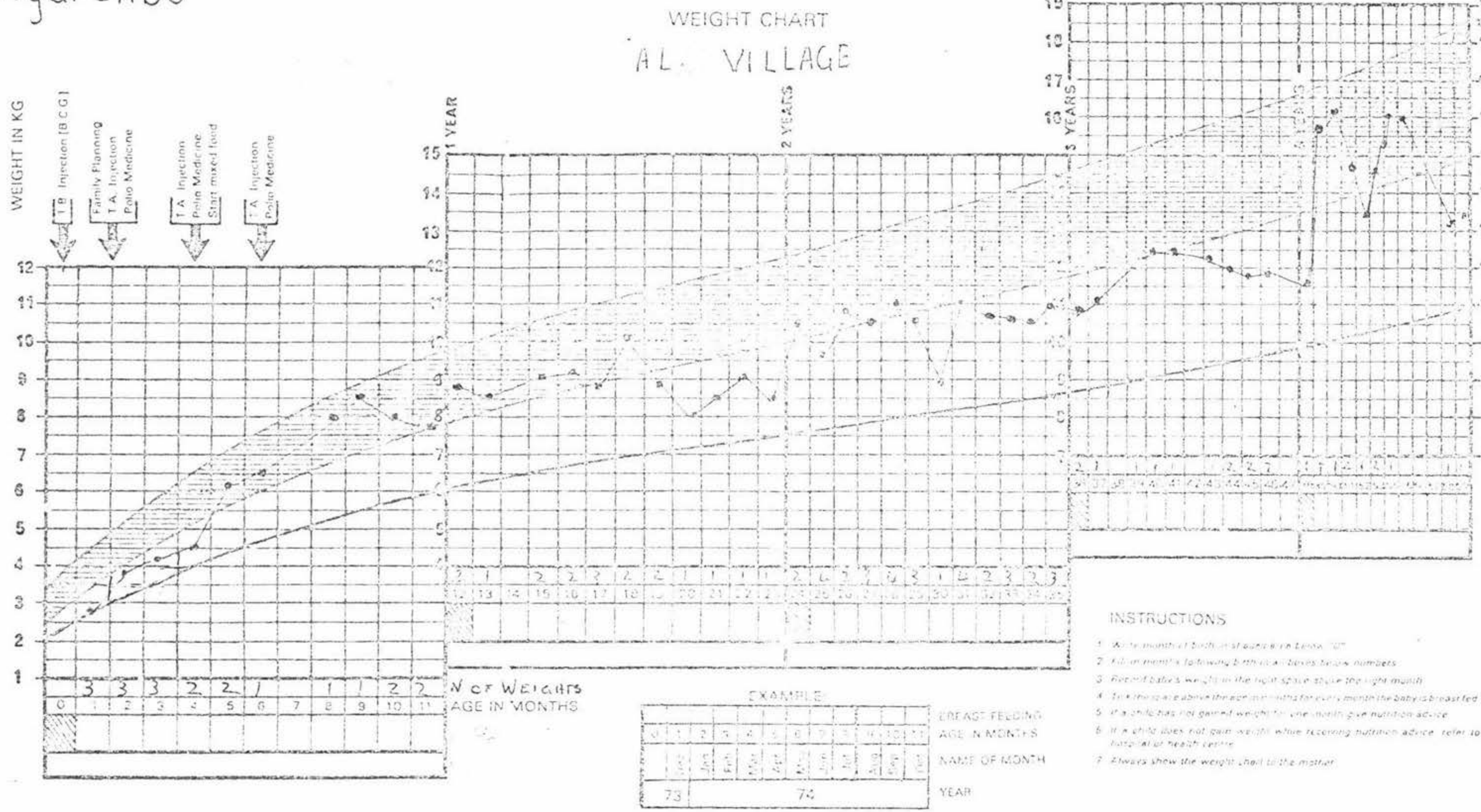

WEIGHT CHART
AL. VILLAGE
WEIGHT IN KG
T.B. Injection [B C G]
Family Planning
T.A. Injection
Polio Medicine
T.A. Injection
Polio Medicine
Start mixed food
T.A. Injection
Polio Medicine
1 YEAR
2 YEARS
3 YEARS
60%
N OF WEIGHTS
AGE IN MONTHS
EXAMPLE
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
73
74
INSTRUCTIONS
7 Always show the weight chart to the mother

Figure AB7

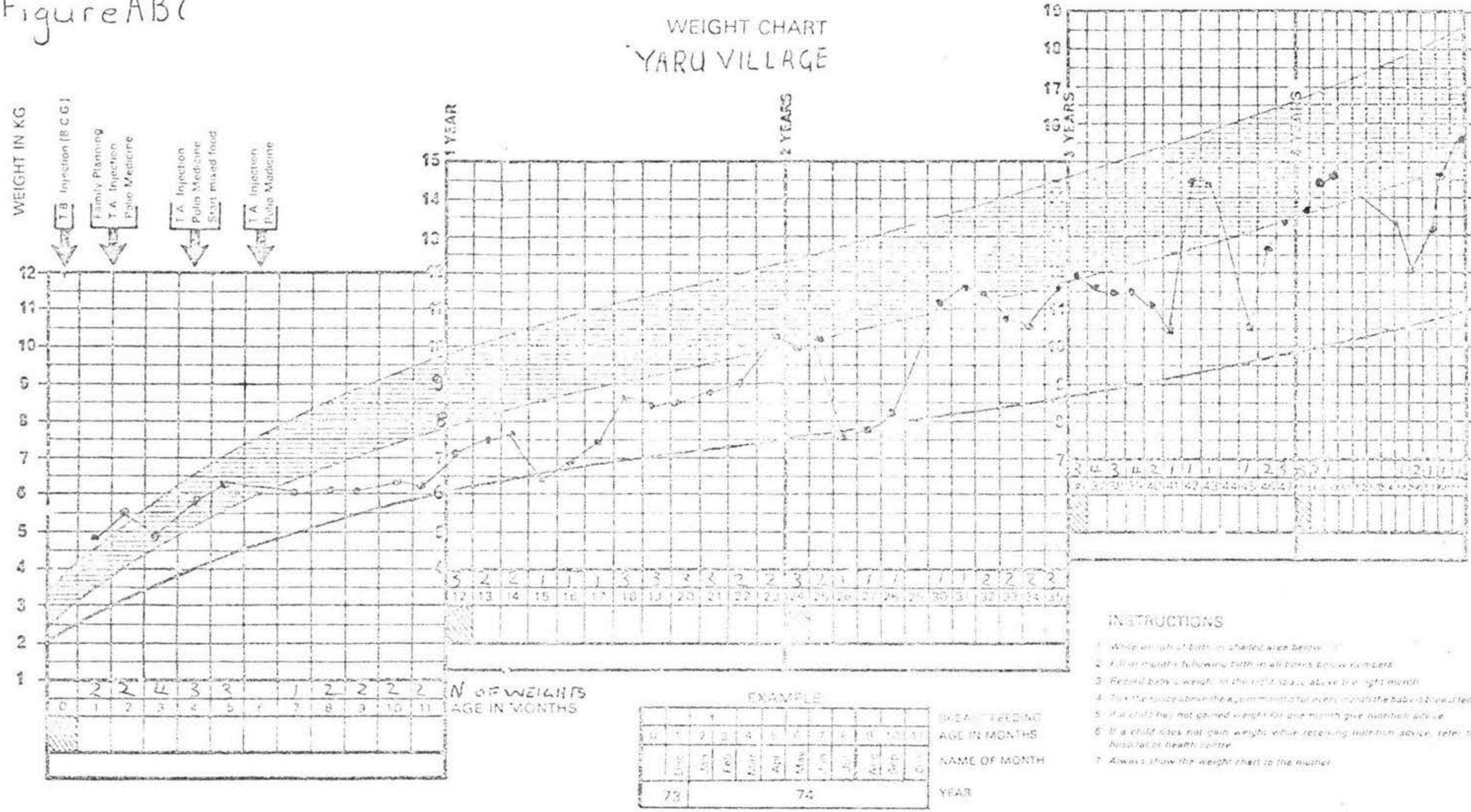

WEIGHT CHART
YARU VILLAGE
WEIGHT IN KG
TB Injection (B C G)
Family Planning
T A Injection
Polio Medicine
T A Injection
Polio Medicine
Start mixed food
T A Injection
Polio Medicine
1 YEAR
2 YEARS
3 YEARS
N OF WEIGHTS
AGE IN MONTHS
EXAMPLE
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
73
74
INSTRUCTIONS
3 Record baby's weight in the right space above the right month
5 If a child has not gained weight for one month give nutrition advice
6 If a child does not gain weight while receiving nutrition advice, refer to hospital or health centre
7 Always show the weight chart to the mother

Figure AB8

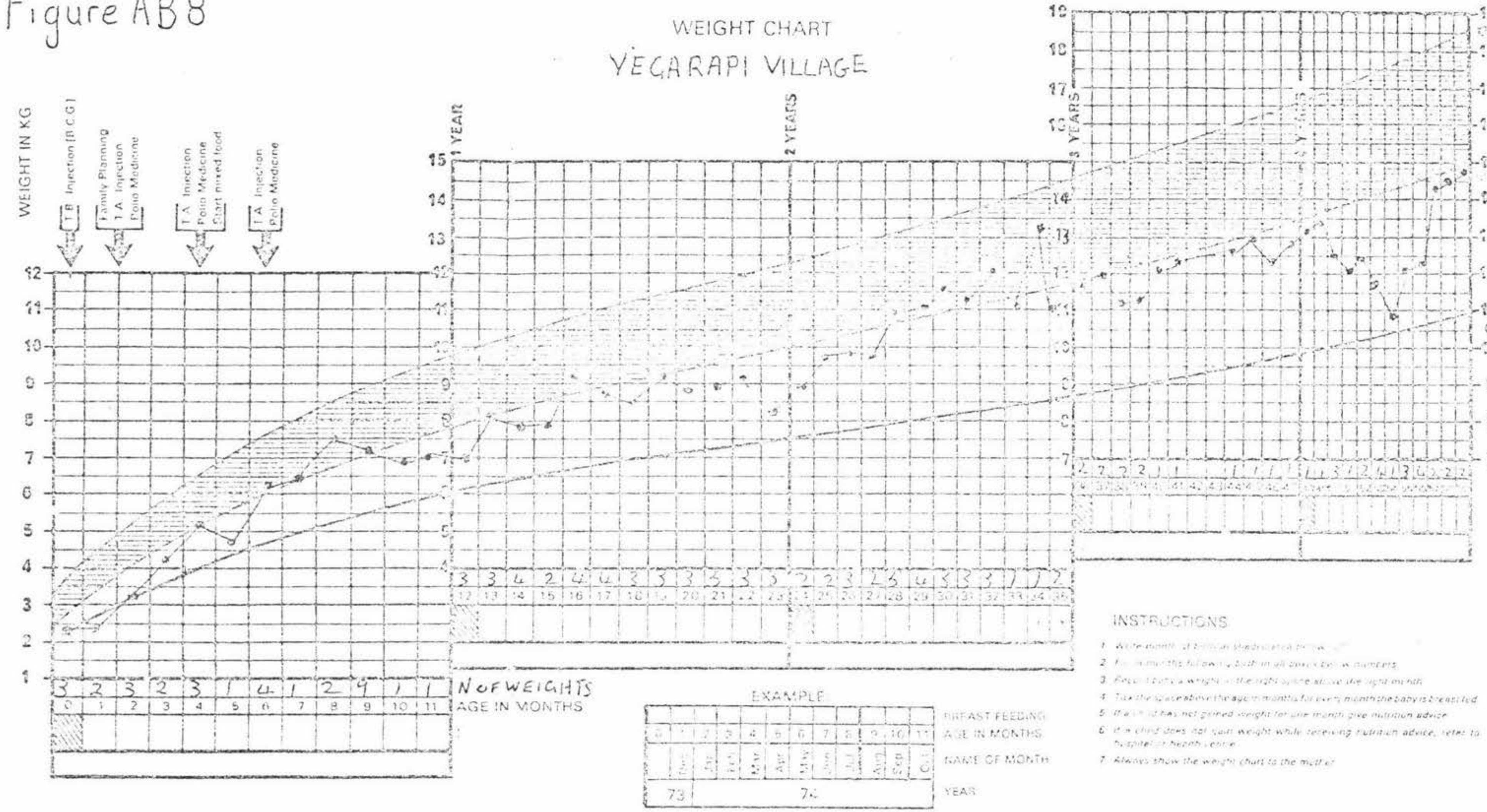

WEIGHT CHART
YEGARAPI VILLAGE
WEIGHT IN KG
T.B. Injection [B.C.G.]
Family Planning
T.A. Injection
Polio Medicine
T.A. Injection
Polio Medicine
Start mixed food
T.A. Injection
Polio Medicine
1 YEAR
2 YEARS
3 YEARS
N of WEIGHTS
AGE IN MONTHS
EXAMPLE
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
73
74
60%
INSTRUCTIONS
5 If a child has not gained weight for one month give nutrition advice
6 If a child does not gain weight while receiving nutrition advice, refer to hospital or health centre
7 Always show the weight chart to the mother

Figure AB9

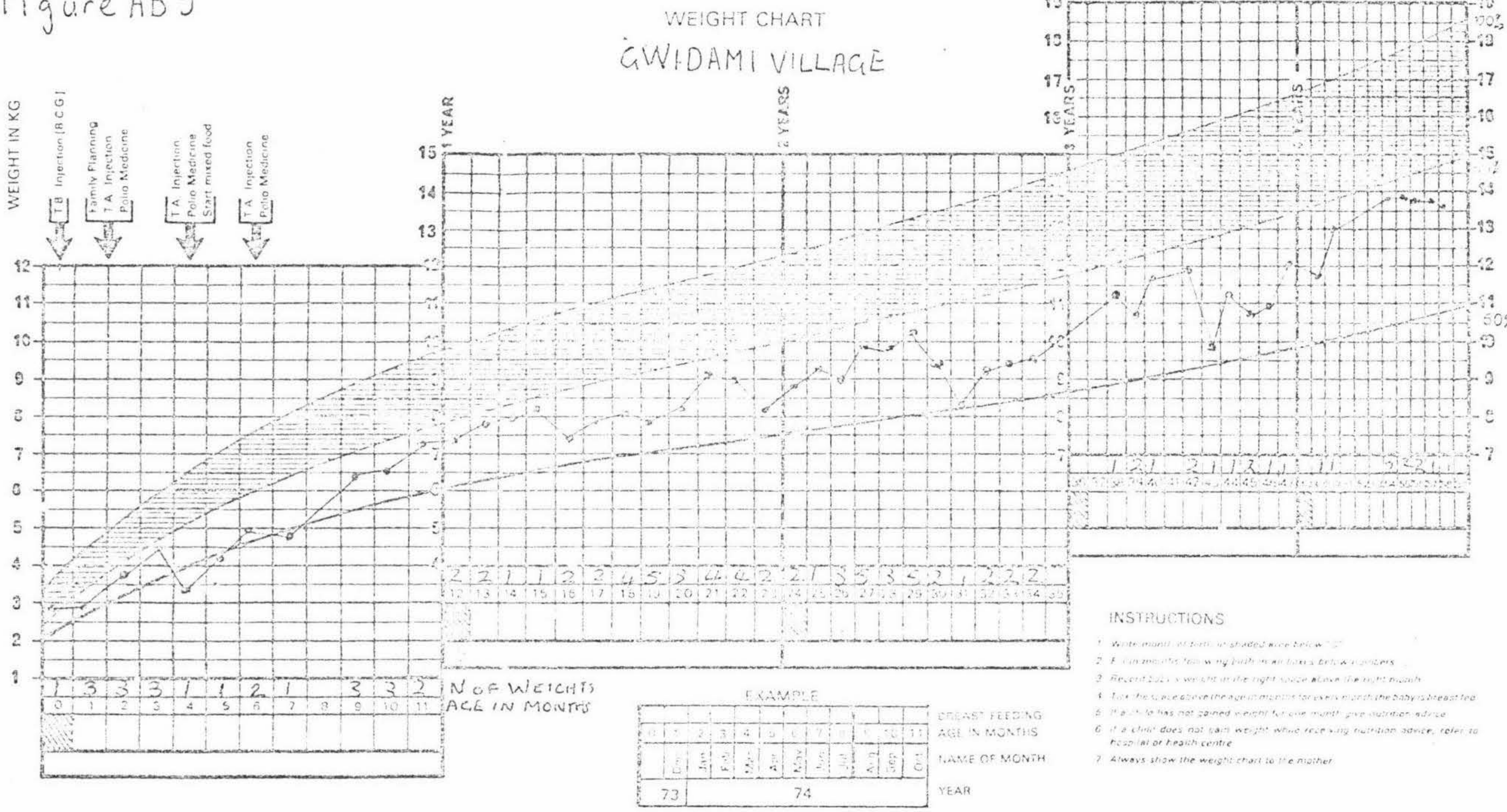

WEIGHT CHART
GWIDAMI VILLAGE
WEIGHT IN KG
TB Injection (B C G)
Family Planning
T A Injection
Polio Medicine
T A Injection
Polio Medicine
Start mixed food
T A Injection
Polio Medicine
1 YEAR
2 YEARS
3 YEARS
N of WEIGHTS
AGE IN MONTHS
50%
EXAMPLE
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
73
74
INSTRUCTIONS
7 Always show the weight chart to the mother

Figure AB10

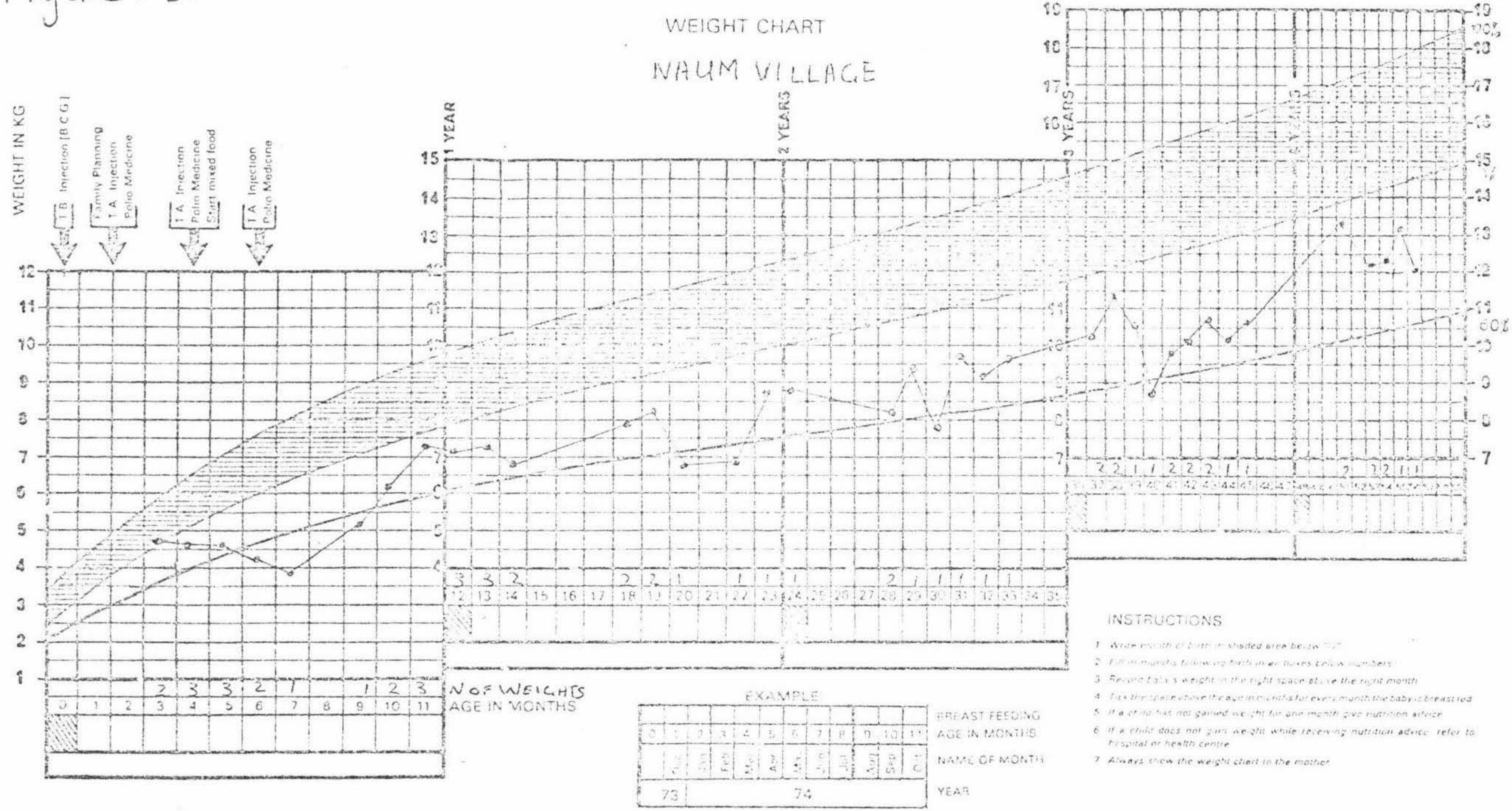

WEIGHT CHART
NAUM VILLAGE
WEIGHT IN KG
T.B. Injection [B C G]
Family Planning
T.A. Injection
Polio Medicine
T.A. Injection
Polio Medicine
Start mixed food
T.A. Injection
Polio Medicine
1 YEAR
2 YEARS
3 YEARS
No OF WEIGHTS
AGE IN MONTHS
EXAMPLE
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
73
74
INSTRUCTIONS
1 Write month of birth in shaded area below
2 Fill in months following birth in all boxes below numbers
3 Record baby's weight in the right space above the right month
4 Tick the space above the age in months for every month the baby is breastfed
5 If a child has not gained weight for one month give nutrition advice
6 If a child does not gain weight while receiving nutrition advice refer to hospital or health centre
7 Always show the weight chart to the mother

Figure AB11

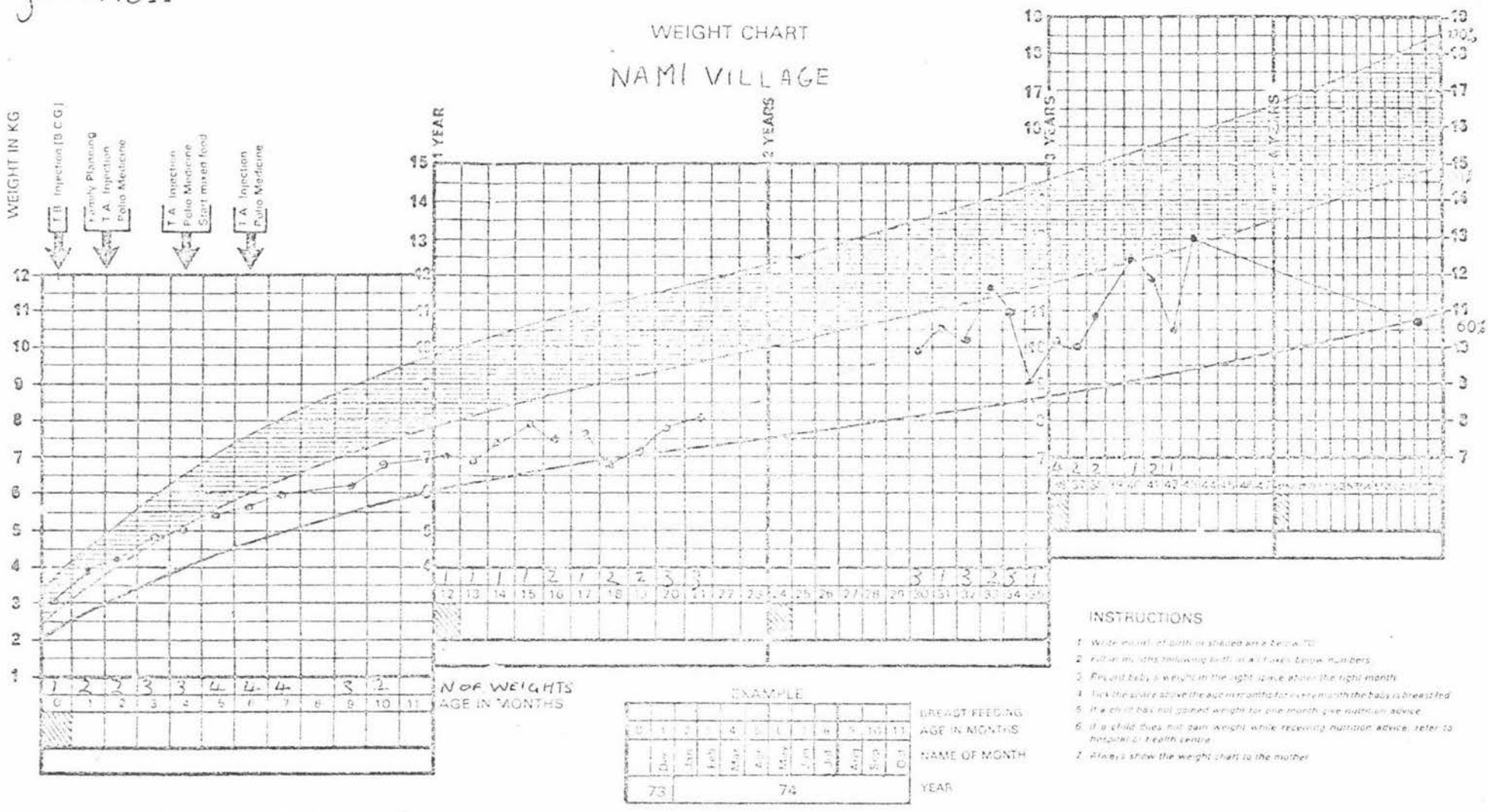

WEIGHT CHART
NAMI VILLAGE
WEIGHT IN KG
TB Injection (B C G)
Family Planning
T.A. Injection
Polio Medicine
T.A. Injection
Polio Medicine
Start mixed food
T.A. Injection
Polio Medicine
1 YEAR
2 YEARS
3 YEARS
4 YEARS
5 YEARS
N OF WEIGHTS
AGE IN MONTHS
EXAMPLE
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
73
74
INSTRUCTIONS
1. Write month of birth in shaded area below "0"
2. Fill in months following birth in all cases below numbers
3. Record baby's weight in the right space above the right month
4. Tick the square above the age in months for every month the baby is breastfed
5. If a child has not gained weight for one month, give nutrition advice
6. If a child does not gain weight while receiving nutrition advice, refer to hospital or health centre
7. Always show the weight chart to the mother

Figure AB12

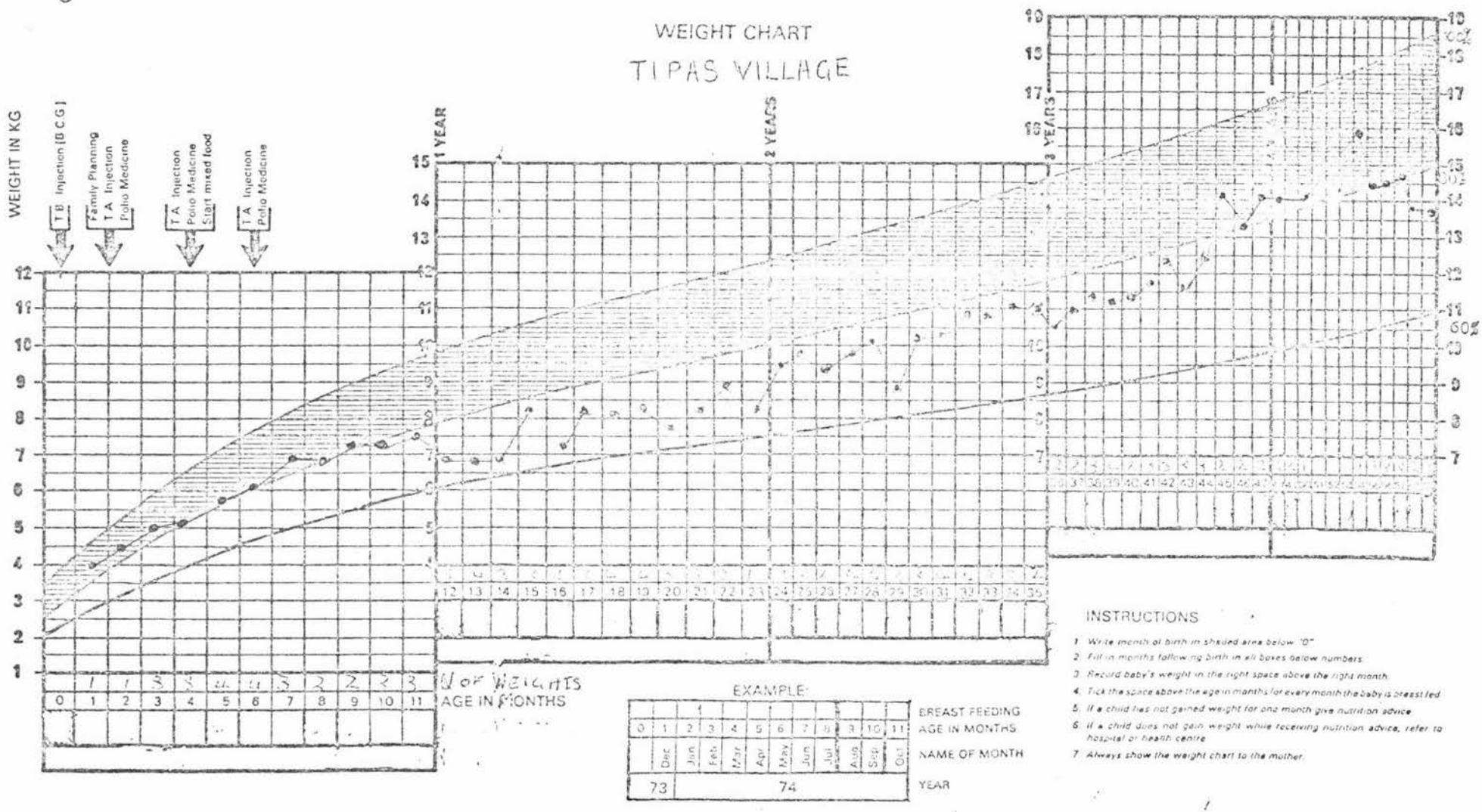

WEIGHT CHART
TIPAS VILLAGE
WEIGHT IN KG
TB Injection (B C G)
Family Planning
T.A. Injection
Polio Medicine
T.A. Injection
Polio Medicine
Start mixed food
T.A. Injection
Polio Medicine
1 YEAR
2 YEARS
3 YEARS
60%
No of Weights
AGE IN MONTHS
EXAMPLE
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
73
74
INSTRUCTIONS
1. Write month of birth in shaded area below "0"
2. Fill in months following birth in all boxes below numbers.
3. Record baby's weight in the right space above the right month.
4. Tick the space above the age in months for every month the baby is breast fed.
5. If a child has not gained weight for one month give nutrition advice.
6. If a child does not gain weight while receiving nutrition advice, refer to hospital or health centre.
7. Always show the weight chart to the mother.

Figure AB13

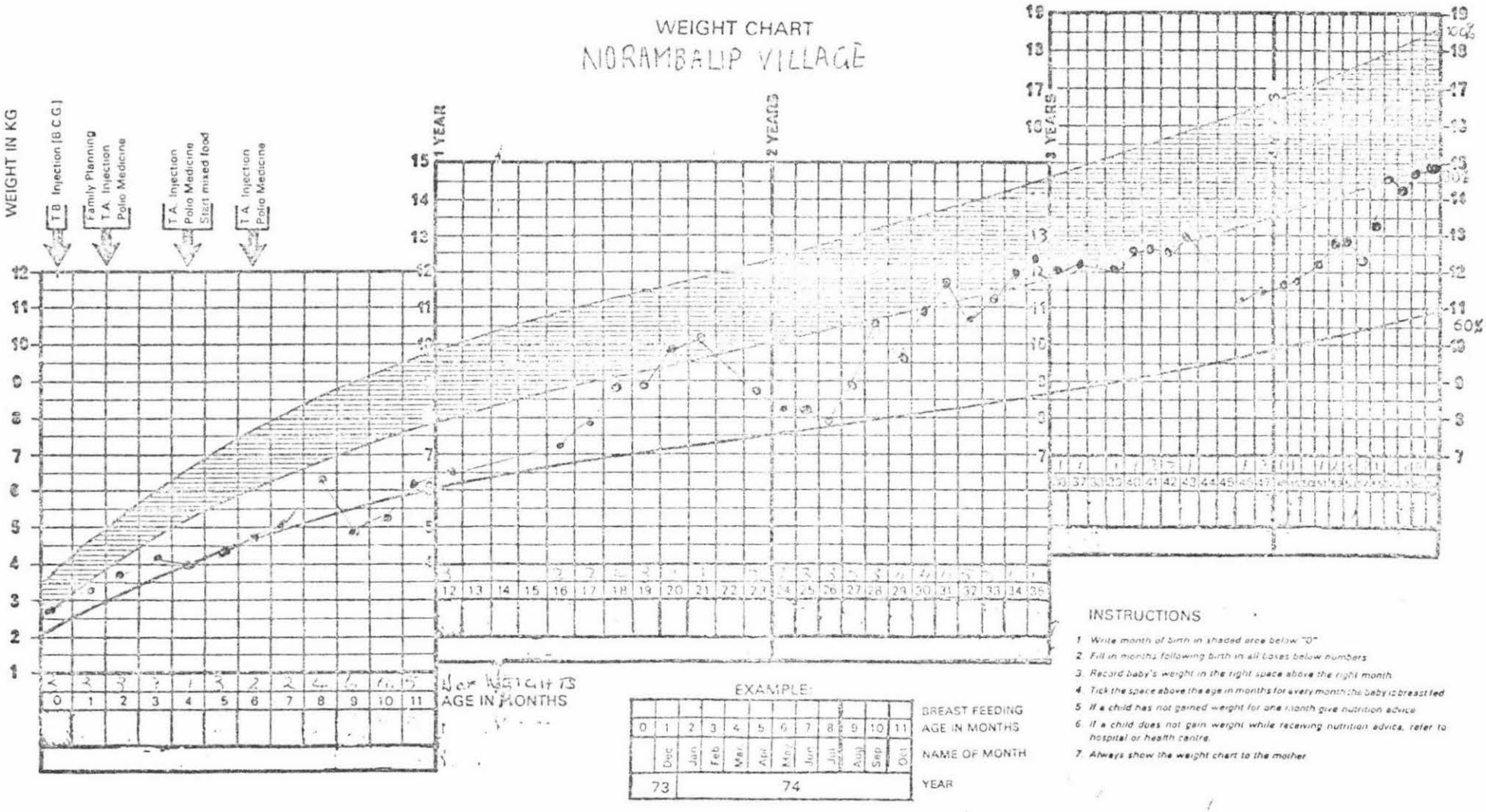

WEIGHT CHART
NORAMBALIP VILLAGE
WEIGHT IN KG
TB Injection (B.C.G.)
Family Planning
T.A. Injection
Polio Medicine
T.A. Injection
Polio Medicine
Start mixed food
T.A. Injection
Polio Medicine
1 YEAR
2 YEARS
3 YEARS
60%
AGE IN MONTHS
EXAMPLE:
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
73
74
INSTRUCTIONS
1. Write month of birth in shaded area below "0"
2. Fill in months following birth in all boxes below numbers
3. Record baby's weight in the right space above the right month
4. Tick the space above the age in months for every month the baby is breast fed
5. If a child has not gained weight for one month give nutrition advice
6. If a child does not gain weight while receiving nutrition advice, refer to hospital or health centre.
7. Always show the weight chart to the mother

Figure AB14

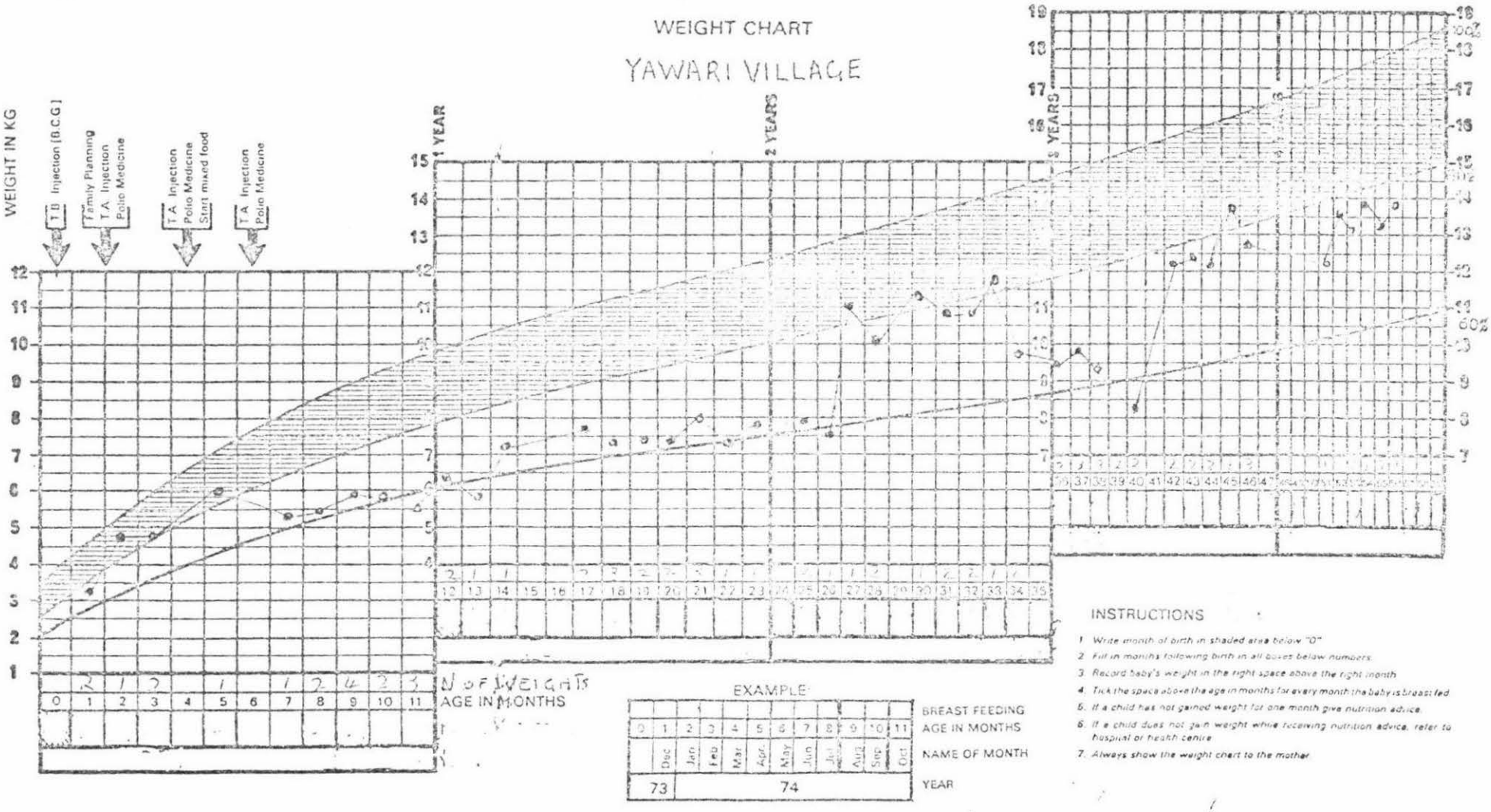
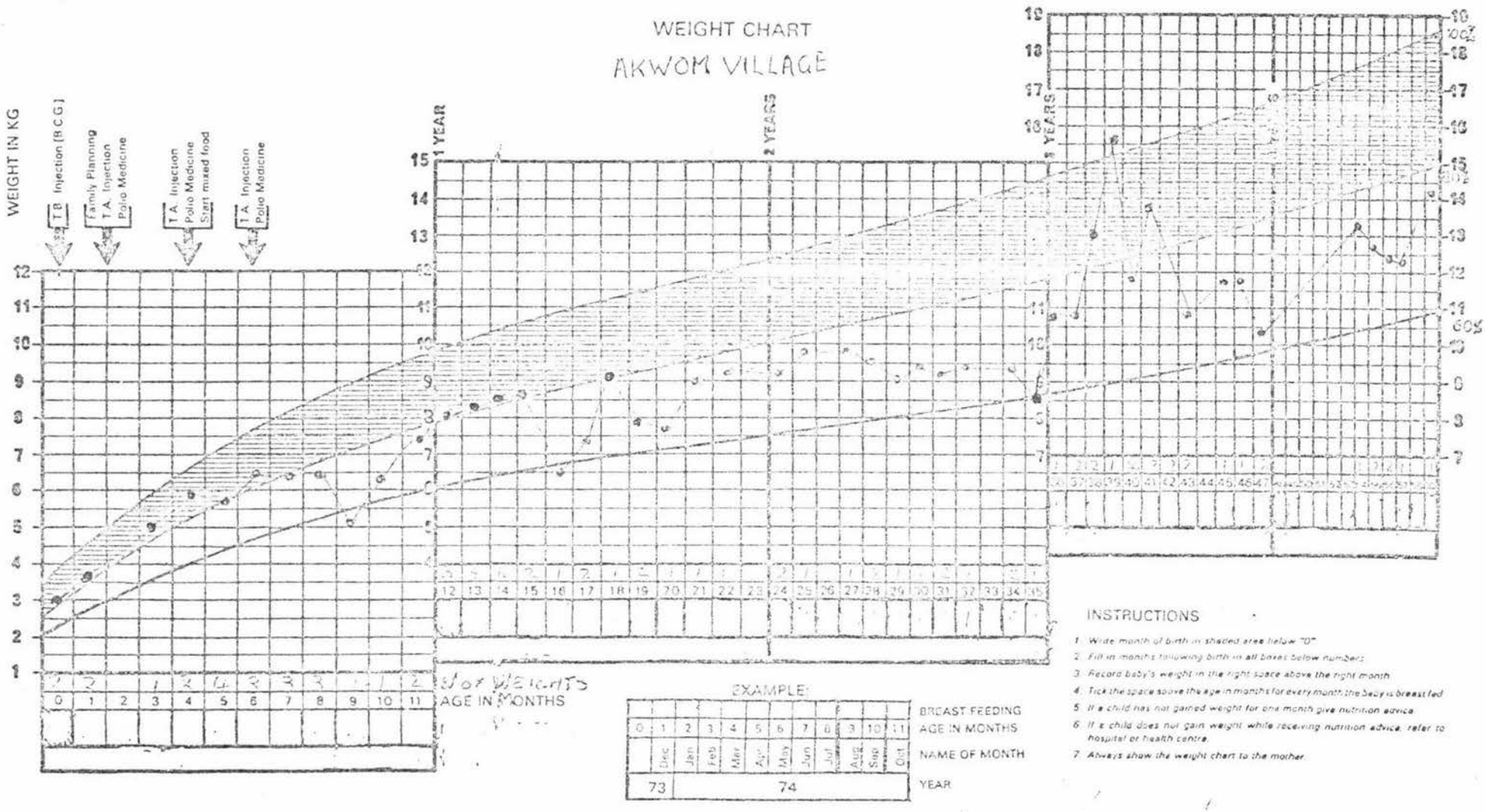

WEIGHT CHART
YAWARI VILLAGE
WEIGHT IN KG
T.B Injection (B.C.G.)
Family Planning
T.A. Injection
Polio Medicine
T.A. Injection
Polio Medicine
Start mixed food
T.A. Injection
Polio Medicine
1 YEAR
2 YEARS
3 YEARS
60%
NO OF WEIGHTS
AGE IN MONTHS
EXAMPLE:
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
73
74
INSTRUCTIONS
1. Write month of birth in shaded area below "0"
2. Fill in months following birth in all boxes below numbers.
3. Record baby's weight in the right space above the right month.
4. Tick the space above the age in months for every month the baby is breast fed.
5. If a child has not gained weight for one month give nutrition advice.
6. If a child does not gain weight while receiving nutrition advice, refer to hospital or health centre.
7. Always show the weight chart to the mother.

Figure AB15


WEIGHT CHART
AKWOM VILLAGE
WEIGHT IN KG
TB Injection (B.C.G.)
Family Planning
T.A. Injection
Polio Medicine
T.A. Injection
Polio Medicine
Start mixed food
T.A. Injection
Polio Medicine
1 YEAR
2 YEARS
3 YEARS
AGE IN MONTHS
EXAMPLE:
BREAST FEEDING
AGE IN MONTHS
NAME OF MONTH
YEAR
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
73
74
INSTRUCTIONS
1. Write month of birth in shaded area below "0".
2. Fill in month's following birth in all boxes below numbers.
3. Record baby's weight in the right space above the right month.
4. Tick the space above the age in months for every month the baby is breast fed.
5. If a child has not gained weight for one month give nutrition advice.
6. If a child does not gain weight while receiving nutrition advice, refer to hospital or health centre.
7. Always show the weight chart to the mother.

APPENDIX C

FREQUENCY DISTRIBUTION TABLES ON INFANTS' WEIGHTS ACCORDING TO THE NUMBER OF VISITS TO CLINIC

In this appendix are the frequency distribution tables of weight for age for infants and children who attended clinic three times or less.

TABLE AC1 : WELL NOURISHED INFANTS:
FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 36)
(No. of visits = 3)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Mantupai	11	7.7	8.3	8.6		
	26	10.9	11.2	11.8		
Papi	0	3.2		4.7		6.1
Worikori	32	11.6	11.9	12.0		
	27	11.8	12.3	12.0		
	29			11.9	12.2	12.9
Alai	1			3.8	4.2	4.5
	4			6.5	6.8	6.5
	28		11.5	11.5		12.4
	49	15.7	16.2	16.2		
Yaru	13	6.0	6.2	7.0		
	23			1.9	11.5	11.9
	30			11.2	11.6	11.9
	46		14.3	14.4	14.3	
Yegarapi	4	6.6		7.5		8.0
	16			9.7	10.5	10.0
	34	13.2		13.3	13.5	1.0
Naum	3		4.8	5.4	6.1	
	11			9.2	8.9	9.2
Nami	7	7.0		7.6	7.8	
	30	10.8		11.2		12.0
	33		12.3	12.2		12.7
	40		12.4	12.5		13.0
Norambalip	9	5.8	5.7	6.2		
	16			9.4	10.2	10.5
	40		12.7	12.9	13.0	
	56		15.8	15.8	15.9	
Tipas	4			5.7	6.0	6.6
	30		12.5	12.7	12.9	
	33		12.6	12.7	12.6	
	42	13.1		13.4	14.0	
Yawari	27		11.0	11.4		11.5
	31	11.2	11.6	12.4		
Akwom	3	5.5	5.6	5.7		
	4	6.2	6.5	7.3		
	11		8.2	8.0		9.0

TABLE AC2: WELL NOURISHED INFANTS:
FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 26)
(No. of visits = 2)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Iwani	10		7.8	8.1		
	28		11.9	11.6		
	33		12.0	12.0		
Mantupai	0		3.2		5.0	
	32	11.9				12.5
Worikori	29	11.8	12.2			
	42	13.0	13.4			
Alai	28	11.5				11.4
	31				11.0	11.5
	53	15.5	16.0			
Yaru	42	14.4	14.2			
	58	14.5	15.5			
Yegarapi	19	11.2			11.5	
	29	11.0	11.5			
	31	11.5	12.2			
Gwidami	1	3.5	5.0			
	27	11.4	11.6			
Naum	36	11.7	12.7			
Nami	4			5.5	5.8	
	5			5.6	6.5	
Norambalip	18			10.2	10.8	
	30	11.9	12.5			
Tipas	1			4.0	4.5	
	55	14.6		14.8		
Akwom	0	3.0	3.5			
	7				7.0	7.4

TABLE AC3: WELL NOURISHED INFANTS: FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 17) (No. of visits = 1)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Iwani	0				3.2	
	12					8.1
	31				11.9	
	59				15.0	
Papi	4	5.6				
Aiendami	20			10.0		
Worikori	6		6.9			
Alai	35				11.5	
Yegarapi	0					3.5
Gwindami	18				9.2	
	42			13.4		
Naum	51		15.6			
Norambalip	0					2.8
	28					12.6
Tipas	3					5.0
	16	8.7				
	48				14.1	

TABLE AC4: MILDLY UNDERNOURISHED INFANTS (0-23 months) FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 24) (N of visits = 3)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Iwani	8		5.2	6.0	6.3	
	10	5.4	6.8	7.8		
	13			6.8	7.4	7.5
	18		7.7		7.8	8.0
Mantupai	2		4.0	4.0		4.5
	22		7.2	8.4		9.0
Papi	7	5.8	5.0	6.0		
Worikori	3			4.0	4.8	5.8
	6		5.8	5.9	6.2	
	15		7.8	8.0	8.4	
Alai	1			3.4	3.8	4.0
Yaru	3		4.2	4.7	5.1	
	9	6.2	6.2	6.4		
Yegarapi	12		8.4	8.4	8.0	
Gwidami	1		3.0	3.5	4.2	
	17			7.2	7.4	7.2
	21	8.4			8.8	8.6
Nami	3	4.3	5.1			6.4
	12	7.0		7.4		7.6
Norambalip	1	3.4	3.6	4.4		
	23	9.1		9.1		9.4
Tipas	9	6.9	7.2	7.4		
	22	8.0	8.3	8.5		
Akwom	6			6.2	6.2	6.3

TABLE AC5: MILDLY UNDERNOURISHED INFANTS (25-59 months) FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 43) (N of visits = 3)

	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Iwani	26	9.3	10.2	11.0		
	28			9.1	7.4	7.5
	46		12.5	12.8	13.0	
Mantupai	56		13.2	14.0		13.4
Papi	39			10.5	10.6	10.6
	44	10.2			10.4	10.6
Arendami	29			10.4	10.6	10.6
Worikori	24	10.5	10.0	10.3		
	41			10.2	10.6	11.0
	48	11.4	12.2	12.5		
Alai	44	11.4	10.9	11.9		
	51		13.0	13.4	13.8	
Yaru	33		10.6	11.0	11.3	
	36		10.2		10.3	11.1
	55		13.2	13.5	13.4	
Yegarapi	28		10.4	10.6	10.9	
	28		9.5	9.9		10.1
	48		13.2	13.4	14.2	
Gwindami	27		8.6	8.4	8.6	
	32			10.0	10.4	10.5
	38			11.1	11.4	11.6
Naum	41	9.9		10.0	10.4	
	42		11.0	11.2		11.1
	53		11.4	11.5		12.1
	53		13.5	13.2	13.1	
Nami	36		10.5	10.8	11.7	
Norambalip	29	9.4			9.2	10.0
	51			13.1	13.6	13.4
	52		12.2		12.2	12.2
	53			13.6	13.7	13.8
	54	12.5			12.2	12.7
Tipas	31	10.9	10.8	10.9		
	42		12.4	12.0	12.8	
Yawari	25		8.0	7.5		8.8
	31		10.7	9.9		10.1
	51	12.2		12.7		12.7
Akwom	25	9.9		9.8	10.2	
	31		9.4	9.9		9.9
	34		9.4	9.0		9.5
	41		12.4	10.5	12.2	
	45	11.7	11.7	11.5		
	54		13.3	12.8	12.5	
	55		12.3	12.3	12.3	

TABLE AC6: MILDLY UNDERNOURISHED INFANTS (0-23 months)
FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 17)
(N of visits = 2)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Aiendami	0		2.8	3.0		
	1		3.4	3.5		
	13	7.1		7.5		
Yaru	18	8.4	8.6			
Yegarapi	16		8.5	8.8		
Naum	18		8.9	8.8		
	23			9.2	9.4	
Nami	9		6.0	6.3		
	11		3.5	4.0		
	13			6.9		7.8
	16				7.4	7.6
	20				8.5	8.9
Tipas	12	7.8	8.2			
Yawari	1			3.10		4.6
Akwom	0				2.4	3.9
	18			9.2	9.2	
	21		9.0	9.2		

TABLE AC7: MILDLY UNDERNOURISHED INFANTS (24-59 months)
FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 35)
(N of visits = 2)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Iwani	25			8.4	8.8	
	31			9.0	9.8	
	42		10.6			10.8
Nantupai	25		9.7	9.9		
	37			10.6		11.6
Papi	32	11.0	11.2			
	34	11.2				11.1
	58				12.0	12.0
	58	14.4	14.0			
Worikori	45				10.9	11.0
Alai	27	10.2		10.5		
	58		13.2	13.4		
Yegarapi	33			11.1		11.5
Gwidami	26		8.4	9.2		
	26		10.2	10.4		
	28		10.8	10.9		
	29	10.6	10.9			
	44				11.1	10.0
	50	13.0				13.8
	54		13.8	13.9		
	56	13.7	13.8			
Naum	28		9.0	9.4		
	32		9.2	9.6		
	38			10.1	10.5	
Nami	37		9.5	1.0	9.0	9.4
	41				10.3	10.5
Norambalip	29	10.5			10.7	
	30		11.0			11.2
	32	10.4	11.4			
Tipas	25		8.1	8.4		
	56				14.0	14.2
Yawari	34	9.5		10.4		
	37		11.6	11.9		
	45	13.8	13.9			

TABLE AC8: MILDLY UNDERNOURISHED INFANTS (0-23 months)
FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 14)
(N of visits = 1)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Iwani	13					7.8
	23					8.6
Yaru	5	5.5				
	21	8.9				
Yegarapi	14	8.0				8.5
Gwidami	2					4.0
	6					5.2
	18				9.0	
Norambalip	0					2.6
	8					6.8
Yawari	9	6.5				
Akwom	5	5.2				
	11					6.2
	20	7.8				

TABLE AC9: MILDLY UNDERNOURISHED INFANTS (24-59 months)
FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 26)
(N of visits = 1)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Iwani	34					8.6
	42					12.2
	45					12.8
	47					12.2
	57					13.5
Papi	26					8.6
	28					8.4
	36					10.0
	48					12.4
Alai	25					8.6
	40					11.5
Yaru	56	10.7				
Yegarapi	21					8.5
Gwidami	42	10.0				
Naum	31			9.6		
	51					11.2
Nami	30					8.6
	32	8.8				
Norambalip	47					12.6
Tipas	32	10.5				
	46					13.1
Yawari	55	14.2				
Akwom	24				9.2	
	40					10.6
	59					14.2

TABLE AC10: SEVERELY UNDERNOURISHED INFANTS
FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 19)
(N of visits = 3)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Iwani	12			6.0	6.0	6.2
	30	9.9	8.2	8.4		
Mantupai	9		5.2	5.5		6.2
	29		8.0	8.3		8.6
Papi	2	3.4	3.6	3.6		
	3	4.0		4.6	4.7	
	8			5.4	5.5	6.6
Aiendami	7*		4.4	4.4	4.6	
Yegarapi	12	6.4	6.5	6.9		
Gwidami	4*		3.4	4.2	4.8	
	7		4.8		5.4	5.6
	22*		6.5	6.6	7.8	
Naum	18	6.6	7.9	6.6		
	40	8.6	9.4	9.5		
Norambalip	5			4.2	4.4	4.9
Yawari	1		6.0	6.4		7.2
	22		7.4	7.8		7.8
	36*	8.9	9.2	8.8		
Akwom	16		6.5	6.4		6.5

* receiving supplementary feeding at the Health sub-centre

TABLE AC11: SEVERELY UNDERNOURISHED INFANTS
FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 13)
(N of visits = 2)

Villages	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Iwani	3*	2.5	2.6 (deceased)			
	13				6.4	6.5
	14				6.2	6.5
Worikori	0				2.5	3.0
Yegarapi	5				4.6	4.7
	50	11.6			10.5	
Naum	28			7.5		7.9
Nami	1*		3.1	3.2		
	6				4.7	5.1
	34			8.5		8.6
Yawari	18	7.2		7.5		
	20*		7.4	7.6		
Akwom	5	5.5				5.2

* Supplementary feeding at Health sub-centre

TABLE AC12 SEVERELY UNDERNOURISHED INFANTS
FREQUENCY DISTRIBUTION OF WEIGHTS IN KILOGRAMMES (N = 22)
(N of visits = 1)

Village	Age in months at first visit	T1 kgs.	T2 kgs.	T3 kgs.	T4 kgs.	T5 kgs.
Iwani	1	2.5				
Mantupai	14*	5.2	(deceased)			
Papi	1			3.2		
	2	3.4				
	3		3.2			
Aiendami	10*					5.4
Worikori	2					3.4
	10	5.8				
	27	8.0				
Yaru	3					3.5
	56	10.7				
Yegarapi	2	3.0				
Naum	6			4.0		
	9	5.2				
	22					6.9
	37			8.9		
Nami	58					10.6
Norambalip	9	5.4				
Yawari	40	9.0				
Akwom	11					6.1
	43	9.3				
	47					9.6

* received supplementary feeding at Health sub-centre

APPENDIX D

A SUMMARY OF TREATMENT OF UNDERNUTRITION

This summary is an extract from a text book of standard treatments for the common illnesses of children in Papua New Guinea. This text is used in the training of health extension officers who are trained to administer health centres. Each Health Centre and Health Sub-centre in the West Sepik Province is issued with a copy. The intention is for the staff of these centres to use the text as a reference book when attending to sick children.

The malnutrition summary used was referred to when under-nourished infants were diagnosed and treated at the health sub-centre. There is reference to this text in Chapter six and seven.

STANDARD TREATMENT FOR COMMON ILLNESS OF CHILDREN
PAPUA NEW GUINEA
Third Edition, Marquell Press Goroko 1981 (pp 28-33)

MALNUTRITION SUMMARY

Moderate Malnutrition

Weight 60-80% without oedema (Harvard mean) treat as out patient

educate parents - to give three meals a day
- to give extra dripping (tin gris)
- peanuts, wing beans or fish

Admit only if or
- other illness is present
- or no improvement after three months

Severe Malnutrition

Weight below 60% or if there is oedema (Harvard mean)
Admit

1. treat infection and anaemia
2. fatten the child
   - if he will eat give him food
   - if he will not eat give him M.O.F. (milk oil formula)
3. dietary education
4. family planning
5. drugs - fentavite
   folic acid
   mebendozole
   anti malarials
   Vitamin A

The Four Nutrition Messages

1. Start giving solids as well as breast milk when your child is four months old. If you do not know his age start when he gets his first tooth.

2. Feed your children solid food at least three times a day.

3. Feed your children cooked and ground up peanuts, beans or fish every day.

4. Feed your children a spoonful of dripping (tin gris) three times a day.

5. Ask if the mother would like some family planning. If so, arrange this for her.

6. See the child regularly to check progress.

IF THERE IS NOT WEIGHT GAIN AFTER THREE MONTHS

- suggest admission to hospital or health centre

- if the mother refuses admission, then give her a bottle of cod liver oil and tell her to add a large spoonful of oil to one meal a day.

Malnutrition In Patient Treatment

Admit - children with moderate malnutrition (weight 60-80% and no oedema) and not improving after three months of out patient treatment

- children with severe malnutrition (weight under 60% OR there is oedema)

1. Treat Infection and Anaemia

Examine carefully and treat any infection which may be present examples

- tuberculosis
- pneumonia
- worm infections of the bowel
- scabies

2. Fatten the Child

a. Weight at least once a week and record the weight

b. If the child will eat
- give plenty of food
- three big meals each day
- snacks between meals
- food should be locally available
- add a large spoonful of dripping (tin gris) margarine or vegetable oil to each meal.

c. If the mother does not have enough breast milk give chlorpromozine (largactil) one 25mg three times a day to the mother for one-two weeks.
Encourage her to breast feed the baby many times a day.

d. If the child refuses to EAT enough food give M.O.F. six times a day

- suggested amounts-infant weighing 3-5kg 120mls
  6-9kg 240ml
  10-14kg 300mls

- Formula recipe - one 500ml measuring cup of milk powder
  - four 50ml measuring cups of cold previously boiled water
  - 50mls of vegetable oil

Give M.O.F. by cup and spoon or by nasal-gastro tube

If the child keeps pulling out the nasal-gastro tube splint the elbows

When the child is drinking well gradually replace M.O.F. with food

If the child has SEVERE diarrhoea do NOT give M.O.F.

- treat for severe diarrhoea (refer p17)
- give metronidazole (Flaggl) if diarrhoea for more than two weeks
- gradually introduce M.O.F. when diarrhoea has stopped
- test stool for sugar (refer page 20)

3. Dietary education

- try to find out why this child is malnourished. talk to the mother about how THIS problem can be overcome

- whenever possible, the mother should help prepare local foods for the child while he is still in hospital

- the mother should be taught how much food the child needs and how to mix food from the three food groups

- encourage the mother to grow peanuts and wing beans and to give the child a spoonful of dripping (tin gris), three times a day

- the mother and father should learn that all children need at least three meals a day

- show the mother how her child is progressing on the chart weight

4. Family Planning

If one child in the family is already malnourished and the mother has another baby then there will be less food for each child. Discuss with the mother (and if possible the father) the benefits of family planning.

For family planning tell them about

condoms
the pill
the injection
the loop
the evaluation method

For preventing further children - tubal ligation.

If they wish to accept a method, then arrange this for them.

Drugs

a. Vitamin multiple liquid 10 drops daily
b. Folic acid 1 tablet daily
c. Mebendozole twice a day for three days
   3-9kgs $\frac{1}{2}$ tablet
   10kg or more 1 tablet

   If you do not have mebendozole give Pyrantol (refer p2)
d. Malaria prophylaxis each week (refer p 27)
e. If the eyes are dry give Vitamin A concentrated solution 100,000 units 1ml oral daily for three days.

Investigation

1. Weigh at least once a week and record the weight.

If possible investigate

2. haemoglobin
3. blood slide for malaria
4. stool for ova, cysts and parasites
5. Urine for protein, if the child has oedema
6. stool for sugar if watery diarrhoea (refer p20)

If tuberculosis

7. Mantoux
8. chest Xray
9. gastric aspiration for A F B
10. investigation of contacts for tuberculosis

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