Working Paper Series No. 81

HEALTH INPUTS AND IMPACTS: A Case Study on the Mediating Role of Mother's Characteristics and Practices on Health of Children in Indonesia

Liesbeth Heering
May 1990

Extended version of a paper submitted to the General Conference of the 'International Union for Scientific Study of Population' (IUSSP), which was held 17-27 September 1989 in New Delhi, India. The 'Nederlandse Vereniging voor Demografie' (NVD) intends to publish the Dutch contributions to this conference as a book.

Table of Contents

HEALTH INPUTS AND IMPACTS;
A CASE STUDY ON THE MEDIATING ROLE OF MOTHER'S CHARACTERISTICS AND PRACTICES ON HEALTH OF CHILDREN IN INDONESIA.

1. Introduction

Child Survival is the priority issue in almost every primary health care (PHC) programme in third world countries. There is a simple reason for this; on a global scale about 14 million children under five year of age die each year. There are only a few direct 'causes' for the majority of these deaths: diarrhoea (5 million), malaria (3 million), measles and respiratory infections (2 million) (UNICEF, 1987). An infant or child's death usually does not have a concrete cause, but is the result of a long series of minor biological insults which cumulatively retard growth, lead to loss of body weight, and progressively wear down the resistance of the individual. Ultimately a minor illness, like diarrhoea, results in death. Not a single cause but the perpetuating cycle of infections and nutritional deficiences, the so called Malnutrition - Infections (MI) syndrome, is the underlying bio-medical problem.

The majority of efforts for child survival in primary health care (PHC) programmes is directed towards combatting the MI syndrome and is targetted at the mother and the child. The mother's health and her health behaviour towards her children are considered key determinants in this process. Although these programmes are succesful in a number of countries, it is difficult to explain the demographic effects of the interventions because the pathways through which PHC measures together with socio-cultural and biological factors affect infant and child health are largely unknown (Van Norren, 1988: 2). Van Norren and Van Vianen introduced an intermediate variables model for studying the effects of PHC interventions on the MI-syndrome. This multilevel model lays out a structure with which these 'pathways' may be systematically studied. (Van Norren and Van Vianen, 1986, and Van Norren, 1988).

An empirical study on health interventions for mother and child and health results of infants and children under five was undertaken in the Special Province Yogyakarta, Indonesia in 1986. The multilevel model of Van Norren and Van Vianen served as a frame of reference. It was adapted and operationalised for the investigation of a few causal pathways (Heering, 1988). The study had two broad objectives:

First, to investigate the design and implementation of the mother and child health (MCH) programmes in a suburban and a rural area, and the application of health inputs of these programmes in a sample of households.

Second, to analyse the role of the mother in health of her children. More precisely, it seeks to explore the influence of mother's education and residence (urban or rural) on health and nutrition behaviour and health results (that is nutritional status of her 'underfive' children).

This paper is confined to the analysis of the role of the mother in health of her children and argues that insight in health behaviour of the mother, and the influence of health programmes on this behaviour, is crucial for both an understanding of this 'role', and the effectiveness of the interventions.

In the demographic literature about the important role of the mother in determining the survival chances of her children there is an abundance of studies which establish the statistical relationship between characteristics of the mother and the health result of the child (Caldwell a.o., 1981, Hobcraft a.o, 1984; UN, 1985). Educational level of the mother and residence are important determinants in this relationship. This type of analysis, however, can not give us insight in health and nutrition practices of the mother, that is behavioural mechanisms, that lead to the differences in results. In general these mechanisms are assumed; e.g. a higher education level leads to a better understanding and use of health and nutrition advice, provided by a health programme. Micro level research offers the possibility to look into behaviour of mothers and the differences between mothers with different characteristics. This study is an attempt to gain some insight in health behaviour of mothers in different conditions towards their children, and how inputs from health programmes are used and influence behaviour.

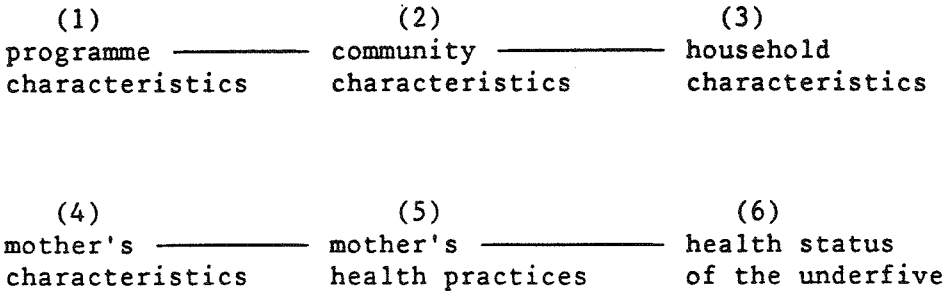
The paper will start with introducing the analytical framework and causal pathways of the study, followed by a short overview of the health interventions for mother and child, MCH, in Indonesia. Then a section on the socio-economic conditions in the areas of study area, the sampling procedure and sample size follows, which set the context and limitations of the research. The core of the paper deals with the practices of mothers of the survey concerning health and nutrition, the differences in health and nutrition practices by residential status and educational level, and finally the effects of health practices and education and residence on the nutritional status of underfives.

2. Analytical Framework

Inspired by the analytical framework of Van Norren and Van Vianen, a similar structure was designed for this case study. The analytical framework has two purposes; Firstly, it provides a structure in which the different levels health programme, community, household, mother and underfive child, are connected in an overall frame. Secondly, it visualises the reasoning of the analysis as to how PHC measures ultimately affect health practices and health status.

The framework consists of six levels, which contain programme, socio-cultural and biological factors linked to each other by intermediate variables. Intermediate variables function as a hinge between the behavioural and biological variables and are both behavioural and biological in kind. Mother's health practices are the intermediate variables being behavioural actions that have a direct biological impact on the health of children. Figure 1 shows the six levels of the framework, without the variables in each level.

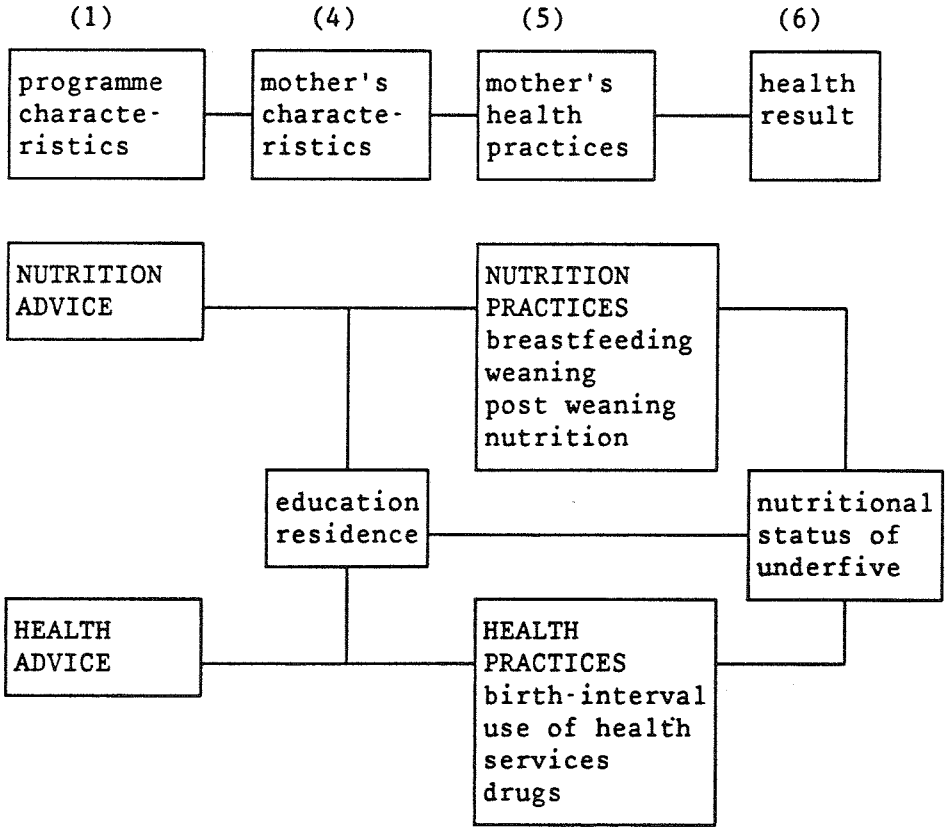
Figure 1: Levels of the analytical framework.



The way in which health programme inputs have an effect on health conditions is influenced by characteristics at various levels: community, household and individual characteristics.

The analysis in this paper will deal with part of the health programme characteristics (1), but concentrates on mother's characteristics (4) and health practices (5) and the effects of all these on the nutritional status of underfives (6). The analytical framework for the analysis in this paper is therefore a curtailed version of the original one (see Heering, 1988: 32,33) and may be visualised as follows:

Figure 2: The analytical framework



3. Health Programmes for Children Underfive in Indonesia

Indonesian infant and child mortality rates are decreasing, but are still well above the level of its neighbours Malaysia and Thailand. With an estimated under-five mortality rate (U5MR) of 126 per 1000, and an infant mortality rate (IMR) of 80 per 1000 live births it ranks as a high mortality country in the categories of UNICEF (UNICEF, 1987) (see glossary for the definition of U5MR and IMR). The general description in the introduction of mortality causes, morbidity patterns and the MI-syndrome applies to the Indonesian situation. Approximately one-third to one-half of the Indonesian underfives suffer from malnutrition (UNICEF, 1984: 13). Diarrhoea accounts for 24 % of infant deaths and 30 % of underfive deaths. An estimated 38 % of infant deaths are caused by five diseases that can be prevented by immunization (Glen Williams, 1986: 12). The four major nutrition problems in Indonesia are protein-energy-malnutrition (PEM), iron, vitamin-A and iodine deficiences. They have serious health consequences, particularly for young children and pregnant and lactating mothers.

Child survival is the priority of the primary health care programmes in Indonesia. The mother and child health (MCH) programmes resemble the UNICEF approach. Of these programmes the 'Family Nutrition Improvement Programme' or 'Usaha Perbaikan Gizi Keluarga' (UPGK) is the most broadly based programme, which uses an educational strategy to provide mothers with knowledge necessary to monitor and improve the nutritional status of their families. UPGK's target groups are: infants and children aged one to five, pregnant and lactating mothers. The centrepiece of the UPGK programme is the growth-chart which is used for plotting the child's weight every month. Instead of institutionalising the programme in clinics a mothers meeting at neighbourhood level is used as the weighing point. While educational messages concerning health and nutrition should bring about behavioural changes, low cost health improving technologies are supplied by the integrated health post to support the underfives during their difficult years. The through UNICEF promoted GOBI-FF package - Growth monitoring, Oral Rehydration, Breastfeeding, Immunization, Food supplements and Family spacing - is the core of the health promotion cq. interventions.

In 1984 the Indonesian Government decided to integrate the delivery of five key MCH programmes in the integrated health post the so-called 'Posyandu'. The integrated health post combines the role of a weighing post with four other services to protect and promote the health of mothers and young children: immunization, mother-and-child care, diarrhoeal disease control and family planning. The integrated health post is a midway point where activities of the community health workers meet with professional support provided by the staff of the community health center. Every month there is a session in every neigbourhood. There the child will be weighed, immunized and given a medical examination, if needed, by a health center nurse. Meanwhile the mother can collect her supplies of contraceptives or has a prenatal examination by a qualified midwife, and receives iron-supplement tablets. The integrated health post undoubtedly makes health care more accesible to the groups whose health is most at risk. The community health center staff spends more time working in the community than before. Instead of awaiting their patients in the health center, they are being drawn into the community, where they come into regular contact with a large number of mothers and young children.

3.1 Health and Nutrition Advice

The community health workers are the most important persons in passing information to the mothers. Simply weighing children every month is of limited value unless accompanied by advice. In addition to advice the community health workers prepare a meal for the children. This meal serves two purposes: it motivates attendance, and it is a nutrition example of a cheap, nutritious and protein-rich meal. The community health workers are trained to give advice on the following nutrition issues: breastfeeding, weaning, post-weaning nutrition, frequency of feeding, feeding in times of diarrhoea and other illnesses of the child.

The community health worker is the one who interprets growth charts and counsels mothers on health and nutrition at the weighing post or Posyandu. The community health worker should be able to recognize a child with faltering growth and refer it to the health center.

It is clear that in practice the feasibility of all these activities is dependent on the amount and dedication of the community health workers. In the suburban area many weighing posts had to cover more than 100 underfives with only a few community health workers. In the rural area the weighing posts monitored about 30 underfives. When 100 or more mothers have to crowd into a room or onto a verandah for a weighing session, personal and group communications are extremely difficult to effect. Waiting times add up to two or three hours and community health workers are under pressure to "process" the children quickly. Individual counselling of mothers is impossible.

4. Socio-economic Context of the Areas of Study

The research took place in two villages, Condongcatur and Banyuroto. Condongcatur was chosen for its suburban character. The village (kelurahan) Condongcatur is located at 6-10 km. northeast of the town Yogyakarta. The part closests to the town has become suburban because of an influx of civil servants into a government housing project and middle class into private houses. The northern part of town is still predominantly rural. The population numbered almost 24.000 people in 1986, living in an area of 9.5 km^2. The population density is therefore high: 2500 persons per km^2.

Slightly more than half of the jobs of the villagers, 52 %, are classified as civil service occupations. Only 17 % of the population earns a living in agriculture. Of all the farmer families 70 % own land and 30 % are landless farmers working on other people's property. Fifteen percent of the labour force works in trade. Crafts and industry (5 %), and services (4 %) are of minor importance. The major growth in the number of jobs in the last year is found in the service sector and the government sector (Annual Report Condongcatur, may 1986: 3, 4).

According to the economic section of the village council, the per capita income rose with 32 %, to a about $ 75 per month, in the last year (1985). The report claims that the improvements are due to the rise in rice production (improvements in fertilizers and seeds), the expansion of the service sector, the extension of the civil service and the implementation of government-funded projects. The figures do not give us insight in the distribution of income but conditions are improving and the economy is

becoming more diverse.

The village has its own Community Health Center within the reach of everyone. Private practices, clinics and hospitals in Yogyakarta town are within reach.

Banyuroto, a rural village, situated in the dry hills of the subdistrict Nanggulan and part of the district Kulon Progo was chosen as the second research location. Banyuroto is situated about 30 km. west of Yogyakarta town. The village is poor, and isolated but there is reasonable access to and comparable quality of the community health centers. (If these health facilities had been very difficult to reach a reasonable comparison of health behaviour would have been biased by the availability of health services). The size of the village area Banyuroto is roughly 7.4 km^2. Less than 4 thousand people (3630) live in eight hamlets. The population density is 480 persons per km^2, the lowest of the subdistrict Nanggulan, which has a density of 777 persons per km^2.

The subdistrict Nanggulan, an area of 36.4 km^2, with a population of 29.000 people in six villages consists of 60 % hilly calcareous rock that is difficult to cultivate. The remaining 40 % of the area is not very fertile. Seventy-five per cent of its working population is classified as farmers. Fifty per cent of the farmers are landless. About 7 % of the labour force works in the civil service. An estimated 50 % of the subdistrict population finished primary school, but 31 % never went to school or did not finish school (Annual Report UPGK of the subdistrict Nanggulan, 1986). As a comparison in Condongcatur only 45 persons were recorded as not having attended school.

Banyuroto is the poorest village of the subdistrict. Whereas the estimated per capita income is about $ 15 per month for the subdistrict, Banyuroto has an estimated $ 4.8 per capita income per month (Annual Report UPGK of the subdistrict Nanggulan, 1986). The division of the arable land within Banyuroto shows its disadvantaged position: about 15 % of Banyuroto area is used as irrigated ricefields, whereas for the district as whole 27 % is used for wet rice-fields. In Banyuroto 30 % of the land is unirrigated arable land, which is comparable to the average district figure. The yields of unirrigated fields are much lower and the production is limited to low yield

dry rice, cassave, soya beans and vegetables. In the dry season people living on the border of the river Progo collect pebbles and sell them. The income acquired by selling the pebbles is an important addition to the income from agriculture.

Nanggulan has one community health center, one birth clinic, one private practice and three private paramedics practices. The village Banyuroto does not have health facilities of its own. The staff of the community health center visits the village once a week to deliver services at a particular hamlet's integrated health post. There are 8 hamlets and each hamlet is covered once a month, because one visit is meant for two hamlets.

5 Survey

The sampling procedures' most important criteria were a good spread of educational levels of the mother and of residence, because behavioural differences by education and residence were to be explored. So the results do not intend to be representative for the villages at stake.

The households for the survey could not be sampled at the village level because, the registration of couples having children under five was only available at hamlet level. In the villages hamlets were chosen (see below) and a random sample of households was selected at hamlet level.

For the survey 150 households with children under five years of age were visited, of which 141 provided all the necessary data for the analysis, 71 urban and 70 rural households. These households provided 177 cases for the analysis, that is children under five whose nutritional status is measured, 90 urban and 87 rural children (households could have up to three children under five).

The three hamlets in Condongcatur nearest to Yogyakarta town, with the clearest suburban features, delivered 25 households each to the urban sample of 75 households (71 for the analysis). Two smaller hamlets 10 km. north of the town provided another 25 households (21 for the analysis). These 21 households are added to the rural sample of Banyuroto because socio-economic and environmental conditions were rural and not suburban; In contrast to the

suburban hamlets there was no electricity, no piped water, no garbage collection and no sealed roads and people hardly made use of the facilities in the town Yogyakarta. In Banyuroto 50 rural households from two hamlets were visited (49 for the analysis).

The unit of research is the child under five years of age, so the number of children in the sample has to be related to the number of the children in the villages. There are about 2000 children under the age of five living in Condongcatur in 1986 (Annual Report Condongcatur, may 1986). The survey dealt with 120 (90 urban and 30 rural) of them. In Banyuroto there are 280 children under the age of five in 1986 and the survey covered 57 of them.

6. Mother's Nutrition and Health Practices

For the core analysis of the paper the results of the survey are used (see Heering, 1988). The unit of analysis is the child under five years of age and not the mother. The questions in the interview on nutrition and health were posed in such a way that the knowledge and application of the nutrition and health recommendations could be checked.

In this section the nutrition and health practices of the mother are discussed. The differences in these practices among mothers of different educational level and of different residence status (rural or urban) are explored. So level (5) and (6) of the analytical model are discussed.

It is important to realize an unavoidable problem of the analysis with respect to the distribution of the rural and urban group over the educational classes. Whereas 51 % of the underfives in the urban sample have a highly educated mother, only 17 % of the underfives in the rural area have mother with comparable education. So 75 % of the children with high educated mothers live in the urban area. Of the rural group 54 % of the underfives' mother did not go to school at all, opposed to 22 % of the underfives of the urban group, with the result that 70 % of the children with an illiterate mother live in the rural area. (Heering, 1988: 74). A further subdivision of the (small) sample results in another problem, namely cells with very few cases.

6.1 Nutrition Practices

6.1.1 Breastfeeding

Of the 177 underfives, 102 had finished their breastfeeding period. The observations made in this section are therefore based on these 102 cases. The underfives are on average breastfed for about 2 years (mean value is 22 months and median value is 24 months). With 'The Primary Child Care Manual' (King, 1978) as a reference, judgements are made about these time-intervals and three categories of breastfeeding behaviour are defined:

'short' (1) = less than 18 months or more than 18 months and weight below 10 kg.
'good' (2) = between 18 and 24 months.
'long' (3) = more than 24 months.

The distribution of the valid cases of the sample over the three categories is as follows:

Table 1 Breastfeeding period

breastfeeding period		number of cases	%
short	1	31	30
good	2	42	41
long	3	29	29
TOTAL		102	100

Source: Heering (1988: 76).

Though the majority of cases are breastfed long enough, a considerable amount is weaned too soon. With table 2 differences in breastfeeding behaviour by educational level of the mother are shown;

Table 2 Breastfeeding period by educational level of the mother.

educational level	no education	primary education	secundary + education
breastfeeding	%	%	%
short 1	26	24	40
good 2	32	59	37
long 3	42	17	23
Total	100	100	100
no. of cases	38	29	35

Source: Heering (1988: 77).

Higher education of the mother is associated with a marked shortening of the breastfeeding period. As much as 40 % of underfives with high educated mothers are breastfed too short, whereas this is the case for only 25 % of underfives with low educated mothers.

The next step is to explore the influence of rural-urban differences on this pattern. Traditional patterns of long breastfeeding are expected to be stronger in the rural community. The mean and median value of breastfeeding for the rural group is considerably higher than that of the total group: 27 months and 24 months respectively. Table 3 differentiates urban and rural behaviour in breastfeeding.

Table 3 Breastfeeding period by residence

breastfeeding	urban		rural	
	no.	%	no.	%
short 1	24	45	7	14
good 2	23	44	19	39
long 3	6	11	23	47
total	53	100	49	100

Source: Heering (1988: 77).

Patterns in breastfeeding duration are very different for the rural and the urban group and these differences are more outspoken than for the different

educational groups (table 2). Whereas urban underfives are rarely breastfed longer than two years, almost half of the rural underfives have a very long breastfeeding period.

It is probable that the differences within the educational groups are brought about by residence status and not by educational level. In order to explore this relationship, breastfeeding is broken down by education and residence in table 4.

Table 4 Breastfeeding period by education and residence (numbers)

residence		urban			rural		
education		no	pri-mary	sec +	no	pri-mary	sec +
breastfeeding							
short	1	6	6	12	4	1	2
good	2	5	7	11	7	10	2
long	3	2		4	14	5	4
total		13	13	27	25	16	8

Source: Heering (1988: 78).

The numbers in the cells are small, but the rural - urban differences remain outspoken.

6.1.2. Weaning and post-weaning nutrition

Weaning or the start of giving the infant semi-solid food, such as rice porridge, fruit and cooked green vegetables was, in terms of timing, on average close to the nutrition advice. But the range of the values makes clear that the averages mask a big variety. Table 5 gives an overview of some descriptive statistics of weaning and post-weaning (= family food) behaviour.

Table 5 Basic statistics of weaning behaviour

weaning	porridge	fruit	family food
advice	4 months	4 months	12 months
mean value	3.9 months	3.1 months	10.9 months
mode	3 months	3 months	12 months
range	1 week to 18 months	3 days to 24 months	3 months to 36 months
total number of valid cases	168	168	163

Source: Heering (1988: 80).

The nutrition advice of the UPGK programme and 'The Primary Child Care Manual' (King, 1978: 90/91) are used and they are almost identical in their weaning recommendations. The introduction of porridge and protective foods and fruit is classified as follows:

'too early' 1= start before the third month.
'in time' 2= start between 3 and 6 months old.
'too late' 3= start later than 7 months old.

The introduction to the food the whole family consumes has to start around one year of age; Its introduction is classified as follows:

'too early' 1= start between 0 and 9 months.
'in time' 2= start between 10 and 15 months.
'too late' 3= start later than 16 months.

Table 6 shows a distribution of the timing of the three different measured aspects of weaning behaviour of the mothers.

Table 6 Timing of weaning

start weaning		porridge no.	porridge %	fruit no.	fruit %	family food no.	family food %
too early	1	52	31	81	48	68	42
in time	2	101	60	73	44	75	46
too late	3	15	9	14	8	20	12
total		168	100	168	100	163	100

Source: Heering (1988: 81).

A third to half of the children are weaned when they are still very young. A phenomenon which is observed in other parts of Java as well. Kusin and Kardjati (1985) note for East-Java: "the most striking observation was that infants are fed from the first month onwards. Complementary foods consist of banana and rice in the first two months, and rice in the next six months." (Kusin, 1985: 5).

Weaning behaviour varied strongly with educational level of the mother; Low educated mothers weaned their children earlier, adhering to traditions (see Kusin, 1985). Higher educated mothers behave more in accordance with the nutrition advice. Roughly half of the underfives with non educated mothers get their fruit and porridge too soon whereas this is only the case for about 20 % of the underfives with higher educated women. In fruit and porridge weaning, residence is not a powerful differentiator. The introduction to family food is however significantly different for rural and urban underfives. Almost half of the rural underfives start too early, against a third of the urban ones. The majority (60 %) of urban underfives start in time, against 37 % of the rural ones. (for detailed tables see Heering, 1988: 81-86).
Rural underfives join the family dish earlier than the urban ones, which has probably not only to do with 'tradition', but is to a great extent influenced by the time available to the mother to prepare special dishes for her infant. In the rural area mothers are very heavily burdened.

Conclusion: Higher level of education of the mother is associated with a shortening of the mean duration of breastfeeding and a closer following of the adviced timing for weaning and post weaning nutrition. The duration of breastfeeding differs more by residence status than by educational level. Long breastfeeding is universal in the rural group. Except for family food there are no clear rural urban differences in weaning and post-weaning nutrition. The introduction to family food starts earlier for the rural than for the urban underfives.

6.2 Health Practices

6.2.1. Reproductive Practices

In the context of this study only limited use is made of reproductive practices of the mothers of the sample. Only the retrospective birth-intervals are used. These are defined as the time interval between the pregnancy which resulted in the birth of the child, and that of the previous pregnancy. The World Health Organization recommends to spread births at least two years. Studies from Central Java report long birth-intervals as a tradition in this part of the country. Singarimbun and Manning mention a mean birth interval of 37 months in a rural village in Central Java in 1974. They observed a marked relationship between the lactation (breastfeeding) period and the practice of abstinence. Women stated that intercourse was only to be resumed after the weaning of the child and that the resumption of intercourse is detrimental to the mother's milk (Singarimbun and Manning, 1974 :34). With the WHO recommendations and the traditions in mind the following classification is made:

short birth-interval: less than 2 years;
medium birth-interval: between 2 and 3 years
long birth-interval: more than 3 years.

For 136 cases a retrospective birth interval was recorded. The remaining 41 cases are first children and therefore without a retrospective interval. Table 8 gives a first indication of the distribution over the categories in the sample.

Table 7 Length of birth-interval

birth-interval length	number	%
short	33	24
medium	45	33
long	58	43
TOTAL	136	100

Source: Heering (1988: 120).

The tradition of long birth intervals is not yet eroded: more than two-thirds

of the underfives are more than 2 years younger than their older brother or sister. The next step is to look at differentials by educational level of the mother and residence.

The literature suggests changes in reproductive behaviour with rising levels of education of the mother. Higher educated mothers have shorter birth intervals because traditional practices like long breastfeeding and abstinence are eroding in this group first (Schoenmaekers e.e.a, 1986). In the following table this relationship is explored, using four instead of three educational categories, because the 'secondary +' group was too diverse to lump together.

Table 8 Retrospective birth interval by mother's education (in percentages).

	educational level			
birth interval	no education	primary education	secondary education	tertiary education
short 1	20	28	18	29
medium 2	38	28	41	33
long 3	42	44	41	38
TOTAL	100	100	100	100
number of cases	55	39	27	24
total number in educ.category	66	49	31	30

Source: Heering (1988: 123).

With the exception of the secondary group there is a shortening of the birth-interval with higher education of the mother, but there is no outspoken trend. Rural-urban differences in the length of birth-interval, may be more outspoken; Table 9 gives an impression.

Table 9 Birth interval by residence

birth interval	urban %	rural %
short	28	19
medium	37	29
long	35	52
Total	100	100
no. of cases	73	63

Source: Heering (1988: 125).

The expected larger amount of long birth intervals in the rural group is confirmed: more than 80 % of the rural underfives had a birth interval longer than 2 years, which is favourable to their health. The differences in the length of birth-interval appear to be more clearly associated with residence status than with education of the mother.

6.2.2. Use of health services and drugs.

To explore mother's behaviour in case her child falls ill, two questions were were asked for the three most common illnesses in underfives: fever, cough and diarrhoea. First:' What is your first action when your child falls ill with fever (F), cough (C) or diarrhoea (D)?'. Secondly: 'After how much time do you seek professional health care (PROHC), when your child suffers from fever (F), cough (C) or diarrhoea (D) ?' The answers to the first question could be summarized by three categories:

1.1 Use a modern medicine (obtainable without prescription and available in drugstores and small shops).
1.2 Use a traditional medicine or method.
1.3 Immediately seek help of professional health care.

The answers to the second question could be summarized by four categories:

2.1 Immediately go to professional health care (PROHC).
2.2 After 1 day go to PROHC.
2.3 After 2 to 7 days go to PROHC.
2.4 Do not go to PROHC.

Tables 10 and 11 show the general results to the questions.

Table 10 First action when underfive falls ill.

illness first action		fever no.	%	cough no.	%	diarrhoea no.	%
modern	1	115	66	72	41	92	53
tradition	2	22	12	40	23	43	24
seek help	3	38	22	62	36	40	23
Total		175	100	174	100	175	100

Source: Heering (1988: 94).

Table 11 Timing of seeking professional health care

seeking PROHC		fever no.	%	cough no.	%	diarrhoea no.	%
immediately	1	43	24	65	37	44	25
1 day	2	51	29	26	15	45	26
2-7 days	3	73	41	68	38	76	43
not	4	10	6	18	10	12	6
Total		177	100	177	100	177	100

Source: Heering (1988: 94).

Fever and diarrhoea are fairly common illnesses in small children and the advertisements for modern medicines to treat fever for example, are popular; also in the remote rural area. About half of the underfives are therefore self-medicated first by the mother. If it is serious, or there is little improvement, about the same amount (52 %) is taken to a PROHC within two days. Cough is generally thought to be a more serious matter by a number of mothers; more than a third of the underfives are immmediately taken to PROHC.

The differences in behaviour by educational level of the mother are interesting. Some surprising results were encountered; the use of traditional medicines did not decrease with higher education and especially for illiterate women the numbers in this category are the smallest. And, on the other hand, about 45 % of underfives with mothers who attended secondary school are treated with traditional medicines. With a rise in educational

level the child is more often treated by the mother herself first. With the exception of the secondary educated mothers this involves modern medicines. Lower educated and illiterate mothers more often immediately go to a health facility. When the child is brought to a PROHC after self medication however, higher educated mothers tend to go there faster than lower educated mothers (see for detailed tables, Heering, 1988: 95-99).

Rural-urban differences are easy to show in tables, and they are remarkable.

Table 12 First action when underfive falls ill by residence.

residence		urban			rural		
first action	illness	fever %	cough %	diar %	fever %	cough %	diar %
modern	1	80	39	58	50	43	46
tradition	2	13	33	23	12	11	25
seek help	3	7	26	17	37	45	29
number of cases		90			87		

Source: Heering (1988: 97).

The somewhat higher use of modern medicines with urban underfives is no surprise, but the difference with the rural underfives is not very big. This is remarkable because these modern medicines can be bought at every corner in the urban area, which is not the case in the rural area. Rural mothers rely on the health center or the integrated health post for all medicines. The surprising fact is that rural mothers are not the ones who use traditional medicines, the larger part of them immediately visits a health facility when a child falls ill, despite their more limited possibilities in time and the bigger distance to the health center.

Rural-urban differences in the timing of seeking professional health care are summarized in table 13.

Table 13 Timing of seeking PROHC by residence.

residence		urban			rural		
seek PROHC	illness	fever %	cough %	diar %	fever %	cough %	diar %
immediately	1	10	27	21	39	47	29
after 1 day	2	49	23	35	8	6	16
after 2-7 days	3	32	38	34	51	39	52
not at all	4	9	12	10	2	8	3
number of cases			90			87	

Source: Heering (1988: 98).

Rural underfives are more often brought to PROHC than urban underfives. They are either immediately taken there as 'first action' - to a higher degree than urban underfives - , or the visit takes place after a few days untill a week. For urban underfives the whole range of options is used, the visit takes place after 1 to 4 days.

Conclusion: The differences in the length of birth-interval - like breastfeeding - appear to be more clearly associated with residence status than with education of the mother. Breastfeeding practices and birth-intervals are related in the conceptions and traditions in childbearing- and-rearing.
The treatment of children who are ill is influenced by educational level of the mother. Higher education leads to more confidence in the own capacities of the mother and therefore with a first try of herself. Low educated mothers more often choose for PROHC immediately. Rural mothers are not 'traditional mothers' who treat their children with traditional medicines and refrain from going to PROHC. They rely to a large extent on these facilities, for treatment and for drugs.

After looking at health inputs and they way in which inputs are used, the next section tries to evaluate health output in terms of health or nutritional status of the recipients.

7. Nutritional Status of the Underfives and the Influence of Mother's Characteristics and Health Practices

7.1. Nutritional Status of Underfives

Nutritional Status of the underfive child is operationalized with four parameters weight-for-age (WFA), height-for-age (HFA) and weight-for-height (WFH), which are compared with an international standard as a reference, the National Center of Health Statistics standard (NCHS) (WHO, 1983). Each parameter measures different aspects of nutritional status and growth so that distinctions can be made between different types of malnutrition or in the medical termininology: Protein-Energy Malnutrition (PEM).

Weight-for-age (WFA) and weight-for-height (WFH) are sensitive for shortterm or acute malnutrition (in medical terms this is called wasting). They give very different results and both are needed for a proper evaluation of PEM. Over the age of 2 years WFA has the problem of giving unrealistically high proportions of PEM when HFA is affected as well. WFH, on the other hand, underestimates malnutrition, because it is not sensitive for age, it only measures if the child has a good weight for its height. Height-for-age (HFA) is influenced by longterm or chronic malnutrition rather than short term or acute malnutrition and is the most robust of the three parameters.

The results for the sample as a whole reveal the following pattern; the majority (75 %) of underfives weighs too little for their age. For their height, on the other hand, 65 % have a good weight, so these two-thirds do not look ill-fed but are small and well proportioned and are mildly to moderately retarded in their HFA. The majority of underfives are stunted (HFA too low) but not wasted (WFH is good) and suffer from chronic malnutrition. The growth pattern in weight and height of this sample is similar to most published data from Indonesia (see Kardjati, 1985). The common features are acceptable growth during the first 4 to 6 months, a progressive faltering till about 24 months and a steady growth, parallel to reference curves but at a lower level, after two years of age.

7.2 Mother's Education and Nutritional Status

In this section the educational level of the mother and the nutritional status of the underfives are crosstabulated to explore their relationship.

Table 14 Nutritional status by educational level of the mother

educational level		no education			primary education			secondary + education		
nutritional status		WFA %	HFA %	WFH %	WFA %	HFA %	WFH %	WFA %	HFA %	WFH %
normal	0	14	23	73	23	39	53	43	48	67
mild PEM	1	61	42	27	57	41	39	29	34	26
moderate PEM	2	25	24		20	18	8	26	16	7
severe PEM	3		11			2		2	2	
no. of cases			67			49			61	

Source: Heering (1988: 117).

In line with expectations are the results measured with the most robust measure height-for-age. Higher HFA is associated with higher educational level of the mother; Weight-for-age measurements however show that, although the percentage of underfives with normal WFA increases with a rise in educational level, the proportion moderate to severe malnutrition rises as well. So, wasting or acute malnutrition is surprisingly high in underfives with high educated mothers. The figures for weight-for-height confirm this finding: the proportion mild to moderate wasting rises with the level of education.

7.3 Residence and Nutritional Status

The second important variable in the analysis - urban and rural residence status - is crosstabulated with the three parameters for nutritional status of the underfives.

Table 15 Nutritional status by residence

residence		urban			rural		
nutritional status		WFA %	HFA %	WFH %	WFA %	HFA %	WFH %
normal	0	29	40	54	23	31	77
mild PEM	1	39	37	37	60	41	23
moderate PEM	2	31	17	9	17	23	
severe PEM	3	1	6			5	
no. of cases			90			87	

Source: Heering (1988: 118).

The degree of stunting or low height-for-age is larger in the rural group. The pattern in weight-for-age, on the other hand, is surprisingly well for the rural group; the majority of moderate and severe cases of underweight are found in the urban setting. Because height is more retarded in the rural group, their weight-for-height is on average better than that of the urban group.

The living conditions of the rural underfives of the sample are on the whole poorer than those of the urban underfives (see Heering 1988), but the nutritional status of the rural sample of underfives is not worse. The bulk of rural underfives is mildly underweight, mild to moderately underheight and there is hardly any acute malnutrition.

7.4 Reproductive Practices and Nutritional Status

The analysis of the effect of reproductive practices of the mother on the health performance of underfives provides some keys for the explanation of why we do not find a straitforward positive relationship between educational level of the mother and nutritional status of her child.

Table 16 Nutritional status by birth interval

birth-interval	short	medium	long
nutritional status as % of reference value NCHS	%	%	%
mean WFA	79	85	85
mean HFA	91	93	94
mean WFH	92	96	95
no. of cases	33	45	58

Source: Heering (1988: 121).

The influence of length of birth interval on the health status is significant and primarily influences the degree of wasting. Underfives with a birth interval of less than 2 years have a mean WFA and WFH that is lower than those with a birth-interval of more than 2 years.

The student t-test is done to test the significance of the differences. The comparison of WFA among the birth interval classes 'short' versus 'medium' ; and 'short' versus 'long' are significant (prob. value 0.019 and 0.011 resp.). For HFA only the difference between 'short' versus 'long' birth interval is signifcant (prob. value 0.017). Finally the t-tests for WFH is significant for the comparison of 'short' versus 'medium' birth intervals (prob. value 0.064).

Since a larger proportion of underfives with high educated mothers have shorter birth intervals, a favourable effect of more education is counteracted by the negative effect of a short birth interval. Rural-urban differences in the length of birth-intervals are very marked. Rural underfives have significantly longer birth intervals which is a crucial aid to their health and partly explains the good results of this group.

8. Conclusion

The study of differences in health practices by education and residence of the mother shows the importance of these practices as mediators between health interventions and health performance. The analysis in this paper reveals that higher educational level of the mother does not always lead to higher nutritional status of her child and that rural residence is not associated with poor nutritional status of the children, but with relative prosperity and equality of nutritional status.

Among underfives of higher educated mothers there is indeed less stunting and chronic malnutrition, but there is more acute malnutrition or wasting and the spread in the values for nutritional status is high. Although rural underfives are to a higher degree stunted than urban underfives, they are significantly less wasted and the spread in the values of nutritional status is much smaller than in the urban cases.

The analysis of mothers' health practices provided keys for some explanations for the observed pattern. Higher educated mother's have shorter birth-intervals and terminate breastfeeding earlier. A short birth-interval is significantly associated with a weaker nutritional status. Higher education is positively associated the application of health and nutrition recommendations and the use of modern medicines, but there is no widespread use of traditional medicines by uneducated mothers. The last group more often chooses to go to the health center at the first sign of illness of the child.

Traditions of long breastfeeding, early weaning and long birth-intervals are still in practice in the rural context and they benefit the children. Rural mothers are not 'traditional or backward ' mothers; The use of traditional medicines is not higher in the rural cases and the use of the community health center as a first resort is not mentioned less but rather more often mentioned by rural mothers, compared to urban ones.

Glossary

HFA	Height for age
IMR	Infant mortality rate: annual number of deaths of infants under 1 year of age, per 1000 live births.
MCH	Mother and child health.
MI syndrome	Malnutrition - Infections syndrome.
NCHS	National Center for Health Statistics: short hand for the WHO recommended international reference standards for HFA, WFA and WFH.
PEM	Protein-Energy Malnutrition
PHC	Primary health care.
PROHC	Professional health care.
Stunted	'a retarded growth or development' Oxford Reference. In this case; a retarded height development of children.
U5MR	Under-five mortality rate: annual number of deaths of children under five years of age, per 1000 live births.
UNICEF	United Nations Children's Fund.
UPGK	Usaha Perbaikan Gizi Keluarga: Family Nutrition Improvement Programme.
Wasted	'wear away gradually' Oxford Reference. In this case; a too low weight for height of children.
WFA	Weight for age.
WFH	Weight for height.
WHO	World Health Organization.

REFERENCES

Annual Report Condongcatur, may 1986.

Annual Report UPGK of the subdistrict Nanggulan, 1986

Caldwell, J.C. and MacDonald, P. (1981)
'The influence of maternal education on infant and child mortality: levels and causes. International Union for Scientific Study of Population. Conference, Manilla, 1981, vol. 2

Heering, Liesbeth (1988)
'Health Development of Children Under-Five in an Urban and a Rural Area in the Special Province Yogyakarta, Indonesia. A case study.' Unpublished Msc. thesis.

Hobcraft, J.N., MacDonald and Rutstein, S.O. (1984)
'Socio-economic factors in infant and child mortality: a cross national comparison.' Population Studies, 38.

Kardjati, S., Kusin, J.A. and With, C. De (1985).
Anthropometry of children in rural areas in East Java. II Prevalence and type of malnutrition among preschool children. In: Peadiatrica Indonesia, 25, March-April 1985.

King, M., King, F. and Martodipouro, S. (1978).
Primary childcare: A manual for health workers, book one. Oxford Medical Publications.

Kusin, J.A. and Kardjati, S. (1985).
'The mother - infant dyad in Madura, Indonesia. Nutritional aspects.' in: Eeckels, R.E., Ransome-Kuti, Kroonenberg, C.C. (eds) 'Child Health in the Tropics.', Dordrecht, Martinus Nijhoff 1985: 269-280.

Norren, N.B. Van, and Vianen, H.A.W. Van (1986).
The malnutrition infections syndrome and its demographic outcome in developing countries. PCDOL (Programming Committee for Demographic Research), publi. no.4.

Norren. N.B. Van (1988).
'Combatting the Infections- Malnutrition syndrome: An intermediate variables model for studying the effects of primary health care interventions.' (mimeo) Department of Demography, Geographical Institute, Groningen State University.

Schoenmaekers, R., Shah, I.H., Lesthaege, R and Tambushe, O. (1986)
The Child Spacing Traditions and the Post-parting Taboo in Tropical Africa: Traditions and Change.

Singarimbun, M. and Manning, C. (1974).
Fertility and Family Planning in Mojolama. Chapter 4: Family marriage and fertility. In L.C.L. Zuidberg (1977), Family Planning in rural West Java, the Serpong Project.

UN (1985)
Socio-economic differences in child mortality in developing countries. Department of International Economic and Social Affairs. (UNDIESA)

UNICEF-Indonesia (1984).
An analysis of the situation of children and women in Indonesia. Central Bureau of Statistics and United Nations Children's Fund. Jakarta, Indonesia, August 1984.

UNICEF (1984).
The State of the World's Children. Oxford University Press.

UNICEF (1987).
The State of the World's Children. Oxford University Press.

W.H.O. (1983).
Measuring change in nutritional status. Guidelines for assesing the nutritional impact of supplementary feeding programmes for vulnerable groups.

Williams, Glen (1986)
A Child Survival Revolution: Prospects for Indonesia. In Prisma, (1986) The Indonesian Indicator. Preparing a better world for children. N. 40, June 1986.