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**ORIGINAL ARTICLE**

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# The Hazardous Effect of Short Birth Interval on Physical Growth. A 4 - Case Study

by

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### **Abstract**

*A case study of the hazardous effect of short birth interval upon the physical growth of four siblings of a middle-class, well-educated family has been undertaken. For the purpose of the study the records of four siblings were retrospectively evaluated to the age of 18 months. This study revealed that short interval between birth and the next conception exerted great influence on the physical growth as shown by the weight curve. Further decline of the body weights did not occur, possibly due to good diet, good sanitary facilities and the high level of education of the parents. Other factors that might exert influence on the growth and development could be excluded in this study. We have the impression that good growth surveillance in M.C.H. centers or in under-five clinics may contribute greatly to the final outcome of the attitude and practice of family planning measures.*

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## Introduction and Overview

The perinatal, infant and childhood mortality is markedly increased in a short birth interval. The good health of a small child depends to a certain degree on a sustained period of breast-feeding, which is made impossible by a short birth interval. A small study undertaken in Columbia by Wray and Aguirre (1969) showed that when the birth interval exceeded three years, there was a fairly marked decline in the incidence of malnutrition. In one study undertaken in the U.S.A. by Yerushalmy et al., (1956), it was shown that as the birth interval increased, the survival rate also increased. In the calculation for this study, the intervals between birth and the next conception were related to mortality. The effect of birth interval on morbidity has rarely been studied. In the field of malnutrition it is well-known that kwashiorkor in particular likely to develop at the time or shortly after a new baby is born.

The word "kwashiorkor" in the Gatribal language is usually interpreted as "the disease of the disposed baby when the next one is born" (Morley, 1973). It is analogical with the Indonesian word "kesundulan". "Sundul" means to charge by the head bones with the face turned down or to hit the ball with the head, a term very much familiar to soccer fans. Thus the term ""kesundulan" is a metaphor for unplanned pregnancy, leading to the malnourishment of the preceding child. The aim of this report

is to observe the influence of a short birth interval on the growth and development in general and on the weight gain pattern in particular of four siblings of a middle-class family. Other concomitant factors related to growth and development were also observed and analyzed properly. For the purpose of this case study the records of the four siblings had been retrospectively evaluated only up to the age of 18 months. Home-visits and interviews with parents were carried out to obtain a complete background picture regarding the family.

### Report of cases

The four siblings had healthy parents who were well-educated and had a good income by local standards, lived in a healthy premise with healthy surrounding in the outskirts of the city provided free of charge by the institution where the father worked. They were taken regularly to our M.C.H. center for consultations, immunizations as well as for medical treatment. All children have been immunized against tuberculosis, smallpox, diphtheria, pertussis, tetanus, cholera, typhoid and paratyphoid fever as well as for poliomyelitis. As far as family planning goes, the mother chose to have an IUD shortly after the birth of the third child. However, spontaneous expulsion occurred after three months. Re-insertion of a new device was not executed due to incomplete information given to her regarding the possibility of spontaneous expulsion. After the birth of the fourth child she took oral contraceptives.

**CASE I.**

J., a girl, now aged 6 years and 8 months with a body weight of 16 kg and body length of 113 cm was the first child of the family, born at term spontaneously, cried immediately after birth and delivered by a midwife. The body weight at birth was 3.2 kg with the body length of 52 cm.

Her weight was regularly recorded and plotted to the weight chart. During the first nine months of age body weight was above 85.4% of the 50th centiles of the Harvard-Standards-Stuart-Stevenson (1975). However, thereafter her weight fell down below 78.07% of the 50th centiles of the Harvard Standards. No serious illnesses were observed during that period, except for bronchitis at the age of four months (figure 1 and table 1).

Basic immunizations against diphtheria, pertussis, tetanus, cholera, typhoid and paratyphoid fever, and poliomyelitis were completed at the age of five months, against tuberculosis at the age of twelve months.

Further history revealed that her mother conceived again when she was nine months old. She was breastfed up to twelve months, with extra fresh cow's milk added from the age of eight months. Besides, she was given regular feeding according to the schedules recommended by our center.

**CASE II.**

D., a boy, now aged 5 years and 3 months, with a body weight of 19.5 kg

and body length of 112 cm, was the second child of the family, born at term spontaneously, cried immediately after birth, delivered by a midwife. His body weight at birth was 3.8 kg with a body length of 53 cm. His weight was regularly recorded and plotted to the weight chart. During the first nine months his body weight was well above the 50th centiles of the Harvard Standards-Stuart-Stevenson (1975). Thereafter his weight fell between 93.7 — 95.3% of the 50th centiles of the Harvard Standards-Stuart-Stevenson (1975). He came off breast at the age of six months, and thereafter was given fresh cow milk and the regular feeding according to the schedules recommended by our center. No serious illnesses were encountered during that period (figure 2 and table 2). Immunizations against diphtheria, pertussis, tetanus, cholera, typhoid and paratyphoid fever, poliomyelitis were completed at the age of six and a half months; against tuberculosis at the age of twelve months. Further history revealed that his mother conceived again when he was nine months old.

**CASE III.**

S., a girl, now aged 3 years and 9 months, with a body weight of 12 kg and body length of 94 cm was the third child of the same family, born at term spontaneously, cried immediately after birth, delivered by a midwife. Her body weight at birth was 3.48 kg with a body length of 51 cm. Her body weight was regularly charted. During the first six

months her body weight was above 88.7% of the 50th centiles of the Harvard Standards. However at the age of twelve months her weight fell down to 72.8% of the 50th centiles of the Harvard Standards. No serious chronic illnesses occurred during the last six months period; at the age of 13 months she suffered from measles, however no further striking decrease of the body weight was observed; she came off breast at the age of three and half months, and thereafter was given fresh cow milk and the regular feeding in accordance with schedules recommended by our center (figure 1 and table 1). Basic immunizations against diphtheria, pertussis, tetanus, cholera, typhoid and paratyphoid fever, and poliomyelitis were completed at the age of seven months; against tuberculosis at the age of twelve months. Further history revealed that her mother became pregnant when she was ten months old.

#### CASE IV.

R., a boy now aged 2 years and 2 months, with a body of 11 kg and body length of 84.5 cm, was the last child of this family, born at term spontaneously, cried immediately after birth, delivered by a midwife. His body weight at birth was 3.37 kg with a body length of 51 cm. His weight was regularly charted, although visits to our center were not as frequent as for the other children.

Up to the age of eighteen months his body weight was well above 90.9% of

the 50th centiles of the Harvard Standards (figure 2 and table 2). He came off breast at the age of two and half months, thereafter was given S.G.M. baby formula and the recommended regular feeding. No serious illnesses occurred during that period. Basic immunizations against diphtheria, pertussis, tetanus, cholera, typhoid and paratyphoid fever as well as against tuberculosis were completed at the age of six months. He was 2 years and 2 months old when this study was undertaken and his mother was not pregnant.

#### Discussion

According to Morley (1973), in countries with a short birth interval, breastfeeding is usually brief, and may last only three to six months. In these circumstances, malnutrition occurs early, and is not uncommon in the first six months of life. Each of the first three cases was "kesundulan" or "disposed". This unfavourable period of kesundulan lasted for nine months. During this critical period their growth was retarded apparently due to decreased parental attention; case one and case three fell into the state of under nutrition; the weight curve of case two although showing a deviation, its course remained in the normal weight zone. Measles did affect the weight gain of case three as in the case shown by Morley (1973). It demonstrated how short birth interval, which also means short interval between birth and next conception, will decrease especially maternal attention with ill-

effects to the children's growth. In a normal family environment, an infant may be cared for by many individuals, but generally one person is the chief caretaker. For optimal development a single caretaker with whom the baby can have a close and continuing relationship is important, but is not enough. The baby must also be provided with a considerable amount of perceptual stimulation from this caretaker (Martin, et al., 1959). In Indonesian families usually the mother is the caretaker. An abrupt, extreme and continuing change accompanied by a situation in which substitute persons do not supply the proper stimulus conditions may bring about progressive withdrawal and apathy (Martin et al., 1959). This critical period of maternal deprivation may occur during the period of kesundulan. In our first three cases the weight did not fall down further after cessation of breastfeeding possibly due to sufficient feeding substitutes given to conform with the recommendations suggested at the regular consultative visits to M.C.H. center; hygiene surroundings; as well as to the educational level of the parents. Although she is currently taking

oral contraceptive, we have to bear in mind that adverse effects may happen any time, leading to termination of its-use. Then it is highly advisable to recommend the re-use of an IUD, for she had experienced no serious complications except for spontaneous expulsion of the device.

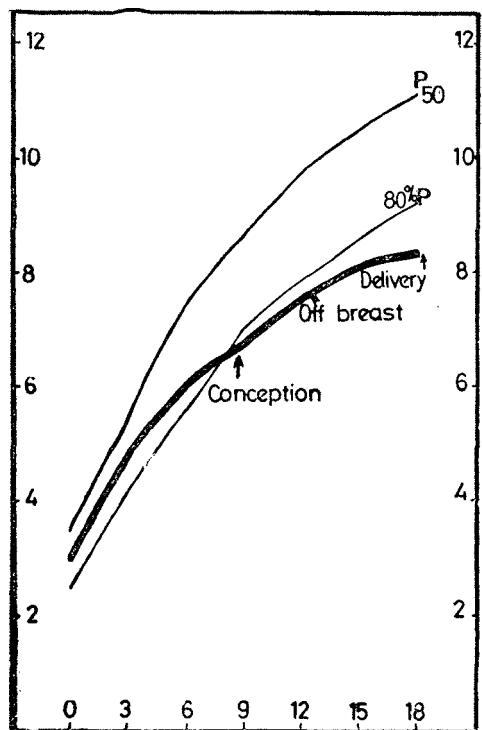
Goldsmith and Snowden (1972) reported that spontaneous expulsion accounts for 60% of total termination in the first twelve months of use.

Calderone (1964) advised to give complete and clear instruction to the mothers, including to report immediately whenever spontaneous expulsion occurs.

This should become the role of any medical and paramedical personnel assigned to MCH Centers or underfives clinics. Health cards of the children may be used for discussions with their parents about the impact of short birth interval to their off-spring's weight-gain (Jelliffe, 1966; Morley, 1973).

Thus, good pediatric practice, especially in underfives clinics, may contribute greatly to the attitude and practice of family planning.

Case I.



Case III.

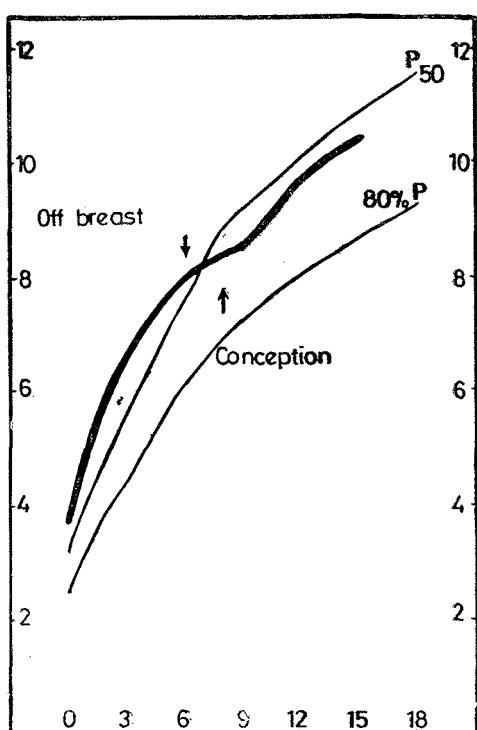
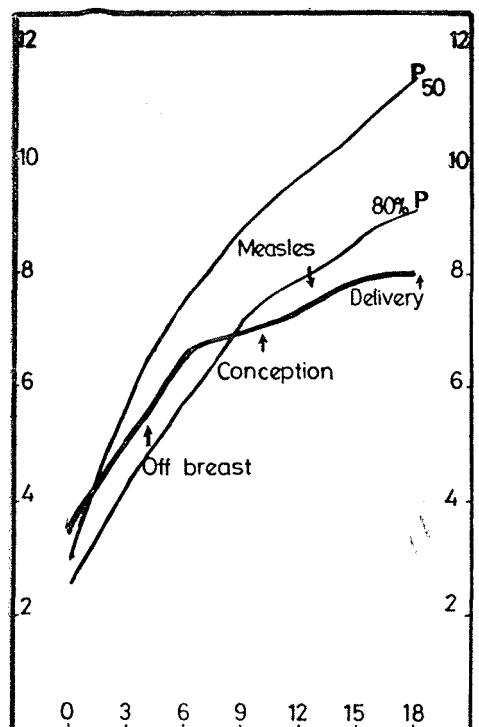


FIGURE 1 : *Development of undernutrition during the period of "kesundulan" or "disposal"*

Case II.



Case IV.

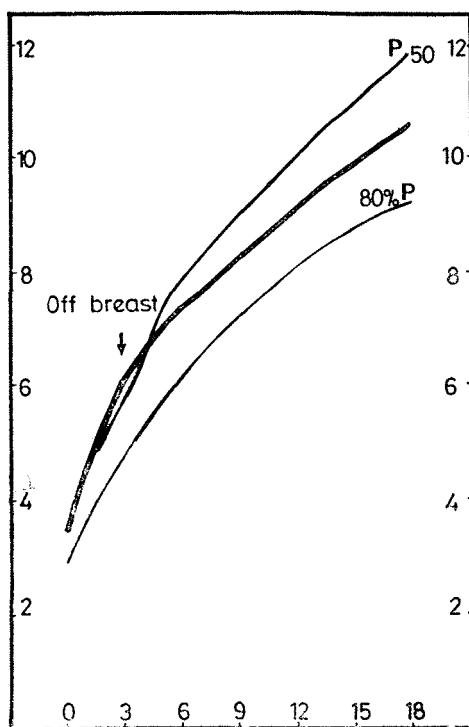


FIGURE 2 : Normal physical growth. Deviation of growth curve in Case II. during the period of "kesundulan" or "disposal"

TABLE 1: *Body Weight of Female Cases in Kilograms and Expressed as Percentage of 50th Centiles of Harvard Standards Stuart — Stevenson (1975)*

Age group in months	Harvard		Cases (weight)			
	P. 50	80% P 50	In kilograms		% P 50	
			I	III	I	III
0	3.36	2.69	3.2	3.48	95	104
3	5.62	4.50	5.0	5.25	89	93
6	7.26	5.81	6.2	6.44	85	89
9	8.71	6.97	6.8	6.80	78	78
12	9.75	7.80	7.5	7.10	77	73
15	10.43	8.34	8.0	7.80	77	75
18	11.11	8.89	8.0	8.0	72	72

TABLE 2: *Body Weight of Male Cases in Kilograms and Expressed as Percentage of 50th Centiles of Harvard Standards Stuart — Stevenson (1975)*

Age group in months	Harvard		Cases (weight)			
	P. 50	80% P 50	In kilograms		% P 50	
			II	IV	II	IV
0	3.40	2.72	3.8	3.37	112	99
3	5.72	4.58	6.5	6.60	114	115
6	7.58	6.06	7.9	7.30	104	96
9	9.07	7.26	8.5	—	94	—
12	10.07	8.06	9.6	—	95	—
15	10.75	8.60	10.25	—	95	—
18	11.43	9.14	—	10.40	—	91

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