

Discussion: Session 3

Paper by C.A. Powell and S.M. Grantham-McGregor

A.M. Molla:

I have two questions on your intervention study. First, a methodological one: how did you keep your controls in the hospital? Second, an ethical one: on what reasons was it found to be justified not to intervene in the malnourished group since you had the knowledge of their status and the possibility of supplementing?

C.A. Powell:

Because in a number of studies the effect of hospitalisation was not investigated, we did so in our intervention study. The group of adequately nourished children were recruited from children admitted to the pediatric ward for several other reasons (for example, breaking a leg). They were tested at that time and followed up after leaving the hospital.

The second part of your question indeed refers to a difficult ethical matter that one is faced with in doing this kind of study. The children would normally have gone back to their poor environment and there is no nationwide programme for stimulation. Since we wanted to see whether it was possible to demonstrate any benefits to the children's development, we judged it to be necessary to leave the control group in the situation that they would normally have gone back to.

L. Mata:

What would you consider to lead to the most significant improvement in behavioral aspects in malnourished children: nutrition or social stimulation?

C.A. Powell:

This is not a new question and in my opinion there is not much relevance to try to answer it. The fact is that nutrition on its own can have an independent effect, but we also know about the importance of the social background.

C. Gopalan:

I am very happy with the findings concerning the effects of the school meal programme in your study, certainly in view of the many discussions on the relevance of such programmes. Since this kind of supplementation can only be given during 200 days a year and may supply just about one third of the daily requirements, it is not astonishing that miracles such as significant differences with respect to growth performance cannot be found as a result of such school meal programmes. Although we found in some of our studies at the Nutrition Foundation that the learning abilities, in agreement with your study, are improved in schools with school meal programmes, these data are not considered to have the same conviction as, for instance, growth performances. Therefore, the question has been raised many times whether we are justified in investing millions of dollars in school meal programmes in rural schools.

C.A. Powell:

The literature on school feeding is indeed very conflicting and to my knowledge only a few studies have dealt with really undernourished children. Although I am very much in favor of school feeding programmes, I would say, also based on our own study that if the resources are extremely limited, we perhaps should target the children especially at risk, rather than feeding everybody at school.

E. Suroto-Hamzah:

Did you also explore in your study any differentiation between marasmic and kwashiorkor children with respect to behavioral effects? I am aware of one study where it was found there were no differences with either marasmic or kwashiorkor boys, but that the situation with kwashiorkor girls was less unfavorable than with marasmic girls.

C.A. Powell:

We have investigated this in our study and found, in agreement with the results published from some other studies, that the development of kwashiorkor children is not as adversely affected as that of the marasmic child. We suggest that this may be due to the duration of malnutrition, realising that kwashiorkor is a much more acute state less often accompanied with severe stunting than is the case with marasmus. We found that stunting on its own showed dramatic effects, rather than actual severe episodes. Therefore we think that the observation that kwashiorkor children show less deficits than marasmic ones is related to the fact that they are less stunted.

A. Li Ming Cheng:

Did you consider in your study the possible contribution which iron deficiency could have in the behavioral change?

C.A. Powell:

In the present studies we did not look at iron deficiency and its effect on behavior. Several other studies, however, of which one has been performed in Indonesia, demonstrated that iron deficient anaemic children on receiving supplementation showed improvements in functions which were previously depressed.

S. Drahaman:

Please allow me to make some comments. First, from our own previous studies on the effects of nutrition supplements we were not convinced that they were very helpful in mental improvement. Recently, however, new studies from Sri Lanka showed that stimulation did reveal definite improvements in these children. Therefore, I think we should all get together and agree on a number of common series of tests. Secondly, I would like you to comment on the theory of aflatoxins being one of the major causes of kwashiorkor.

C.A. Powell:

We are currently investigating the effects of supplementation and/or stimulation on the development of stunted children. The three groups in this study received supplementation alone, stimulation alone, or supplementation and stimulation. Our preliminary results show that for both groups in which the effects of supplementation or stimulation alone were investigated an improvement was observed. The most interesting results should be obtained in the near future when we hope to find out whether the children who receive both treatments will show improvements over and above those from the other groups.

Your question to comment on the relation between aflatoxins and kwashiorkor is difficult to answer since we are not really convinced that the published work indeed substantiates this theory to be of general importance. More research is needed.

A. Alisjahbana:

I am curious to know your experiences on how the mothers reacted on the interventions and how much time they gave to stimulate their child.

C.A. Powell:

All the studies I have described were done in urban areas. We obtained a very high level of cooperation from the mothers. The mothers which were not so literate sometimes gave trouble at the start, probably because they were afraid to show up their level of literacy. Once they got used to us the cooperation was very good. We made materials both for the mothers and the children which had a positive effect on their compliance. We put strong emphasis on language development; we encouraged the mothers to talk much more to their children than they were used to.

Moersintowarti Navrendra:

If we are aiming for an appropriate intervention, what would be the most adequate time to start and what is the most sensitive period of catching up?

C.A. Powell:

In our studies we found that development in the first year is mostly very good. Many poor deprived children start to show a decline somewhere between 12 and 18 months of age; at about 4 years of age they are already considerably behind. Unless a preventive programme is executed, I would say the need is less to start intervention under the age of one year; above that age the damage really starts to become obvious.

Paper by P.F. Heywood and A.H. Heywood

C. Gopalan:

On comparing the presented data with those from the 1956 study by Venkatachalan, the most striking observation is indeed the remarkable secular trend, the increase in height. Observations on any high prevalence of parotid swelling or gynaecomastia in this 1956 study have not been referred to in studies performed in recent years, including the above paper. In India and many other developing countries, the clinical profile of malnutrition is changing: we do not observe parotid swellings or gynaecomastia anymore. Does this also apply to the above study?

P.F. Heywood:

Indeed we could observe the same, we also see only very little gynaecomastia and parotid swelling. In the area where this 1956 study was performed, the Zimbu province, we now hardly observe any kwashiorkor.

M. Gracey:

The very dramatic secular trend in the growth of children in Papua New Guinea raises an important practical point with respect to comparison of the investigated growth data with a set of standards or reference values for growth. Is there a set of data which can be considered to be the most appropriate one in this respect? Moreover, I wonder to which extent this is due to nutrition alone and what the contribution of eradication of endemic and/or parasitic diseases during the past period of 25–30 years was.

P.F. Heywood:

We used the international standards merely to have a constant point of reference that allows us to make comparisons with other populations. We do not consider these standards to be appropriate as a goal for the several populations in our study.

The issue about whether this secular trend in growth is due to nutrition alone might perhaps never be answered satisfactorily. It should be reminded in this place that in the area we performed our study, malaria was not endemic because of the altitude and that diarrhea is neither a dominant cause of morbidity or mortality. The most dominant cause for disease or death in children here has probably already been for a long time pneumonia. There have also been large improvements during the last 10 years regarding the education of the mothers.

D. Karyadi:

Since we found in a study in Indonesia very strong correlations between anaemic condition and child

behavior, I wonder whether your data might support this work. Secondly, do you also have data available on the changes in food habits and the change in lifestyle as a result of the improvement in income during the last 25 years?

P.F. Heywood:

On the question of iron, I would like to refer to two of our own studies on this subject. Firstly, we did a double blind supplementation programme in infants at 2 months of age in a rural setting and then looked at their visual attention when they were 1 year old. We found a strong and significant effect of supplementation on visual attention. In a second study, it was aimed to study behavioral effects of iron supplementation together with the possible effect iron supplementation might have on malaria. In this study we neither found any effects of iron on malaria, nor did we find any effect of iron on the attending behaviour of the school children. Therefore, one might conclude that iron supplementation is only effective in neonates and not in school children.

The question on the food habits in the highlands is an important one. Indeed there have been enormous changes in what the people actually are eating. In 1956 sweet potato contributed to 90% of total calories and probably around 80% of total protein intake. In 1981 over 50% of the energy was derived from cereals, while protein intake from cereals was also near 50%. Their total protein content did also show a marked increase as a result of these changing food habits.

Fortunately for the highlanders of New Guinea, the attitudinal changes which have come with participation in the cash economy did not result in a cultural conflict. Survival and competition in the cash economy was for the highlanders not so different from survival and competition in the traditional society. The availability of western medical care, however, represents another marked change in the peoples' attitude. Western medical care now exists alongside persistent beliefs about traditional medicine. For adults it is quite common to first consult a traditional healer and as a second resort the available western medical services are consulted. There are some indications that with children this hierarchy is actually reversed and that mothers directly seek western medical care for their infants.

Paper by A. Alisjahbana, R. Peeters, M. Maertens, S. Tanuwidjaja, H. Tjokrohusodo, W. Ngantung and D.A. Primana

D. Karyadi:

From your paper, I understand that the mother and child card is intended to be a tool of management, a tool of evoking the awareness of the mothers as well as the TBA's. I am wondering whether it is possible to demonstrate the benefits of the card by analysing the range of activities exerted as a result of the use of the card such as immunisation, iron supplementation and pill distribution. If you could show that the extent of these activities differ between the areas where the card is used and those where this is not the case, you might have an extra validation of its use.

A. Alisjahbana:

In theory, you are absolutely right and we should be able to extract these data from our material. In practice, the situation is more complex. It is not yet possible to perform all the actions indicated in the card at all sites where the card is used, neither in any area which you would choose to be a control area. Health service programmes like iron supplementation or pill distribution are not always available.

J.A. Kusin:

I have two questions: firstly, I am interested in the profile of the mothers in your study which do not have a card; how do they compare with the group having a card? Secondly, I would like to ask you whether you have set yourself a time target in your programme in which you would hypothesise to reach certain percentages, for instance within five years.

A. Alisjahbana:

With respect to the first question, the type of mothers in both groups is not very different. The main difference happens to be that mothers without a card do live far apart from the main road and are on the average older than the mothers with a card. The reason for this is trivial since it would take these

mothers three hours or longer to walk to the health centres. The intervention in both groups, however, is the same.

About the question concerning the time target, we fully realise that it is impossible to achieve a change in behavior in 1 or 2 years; probably at least 3 to 5 years are necessary. Our study will last only until the child is 2 years of age, but we will continue to do cross-sectional studies to monitor any behavioral changes of the women in the community.

M. Gracey:

We have tried a similar system to your child cards with aboriginal mothers in north-west Australia which has not been very successful because many mothers lose the cards. This caused unnecessary extra work for child health centre nurses.

W.C. Liu:

In Taiwan we have already used a similar card for about 20 years. The cards are distributed by the public nurse and the main success of it now is its role in birth control.

A. Alisjahbana:

We monitor the availability of the cards by the mothers every 3 months and have so far found that only a small amount of the mothers lose the card: 2–3%. Since we are only at the start of the study, it is not possible to predict whether this figure will also be applicable after 3–5 years. For practical reasons (the population in the research area amounted to 80,000 with only 5 nurses, 1 midwife and 1 doctor) it was decided not to keep central records at the child health centres. The card handed out to the mother is the only one and is used both for the grass root level as well as for the upper level.

A. Li Ming Cheng:

I am interested in the utilisation of the TBA's in your approach which appears very rational. Did you observe difficulties of performance with these people based on their educational background? Do you have difficulties in changing their attitude from their former practice by training?

A. Alisjahbana:

Indeed, we do have problems in training the TBA's. We hope to improve on this situation by also involving the TBA's in antenatal care, so they have more contact with the patient. Since this also increases the income of the TBA's, they are better motivated to do their work and undergo training. As a result of the ongoing study, we were able to increase the number of TBA's from 70 to 100 by mainly young literate women attracted by the programme. These TBA's all have potentials to develop into primary health workers.

A.W. Qureshi:

In Pakistan, where we have a similar system in which more than 80% of the deliveries are conducted by TBA's, we are now training the TBA's because the incidence of neonatal tetanus was rather high. These programmes are performed with the help of UNICEF and the WHO where the TBA's are also equipped with kits to enable them to perform deliveries.

A. Alisjahbana:

In doing the baseline survey, we were very surprised that the levels of neonatal tetanus were essentially the same between trained and untrained TBA's. This points to the fact that some of the training the TBA's have received is not well utilized. The incidence of neonatal tetanus in our study is rather low. In the intervention study, there was only one case of neonatal tetanus over the whole period of nearly one year.

D.R. Karunaratne:

Please allow me to comment on this, based on the situation in Sri Lanka. We have managed to achieve that 95% of deliveries are in hospital and that the literacy rate for women is about 85–95%. In this way we have nearly banned neonatal tetanus. To my opinion, education of the women is indeed very important as a contributory factor in the health of the mothers.

A. Alisjahbana:

That is indeed impressive, but in our country we have to face literacy rates up to 50% maximum, which is rather indicative for our approach. However, we just cannot wait until all mothers are educated to start our field experiment.

General discussion: Session 3

W.C. Liu:

I would like to ask Dr. Powell whether, in the study she mentioned on the effect of intervention by stimulation, there is a dependency of the effect at the age of the child between 6 and 24 months.

C.A. Powell:

Although in that particular study we did not look at the age of entry, we found in another study, which, however, was not performed with severely malnourished infants, that children from just below 1 year to 2 years of age responded equally well upon intervention. The reason why others did not find an effect on intervention may be that they started later with intervention, say at 3 years of age. By that time the damage may already be done.

L. Mata:

Did you do any studies on comparing the mental development between kwashiorkor infants and, let us say, normal ones and follow them longitudinally? In a study in the highlands of Costa Rica, one of my colleagues found that many children at 3 and 6 months perform less than the standards while passing the tests at 10 and 12 months of age. It appeared that the deficits were corrected by the contact the field worker had in these rural areas with the mothers and the infants. Traditionally the mothers do not interact enough with the infants because of their busy daily work. However, after they saw the psychologist play with the children, they started to like this and adapted to it. The problem in the highlands of Costa Rica is not only that of malnutrition.

C.A. Powell:

We did not perform studies with newborns. With infants up to approximately 6 months of age the development is quite good, probably because the contact with the mother is very close. Later on, however, when they are left to fend for themselves, we found that their development slopes off.

S. Drahaman:

Could you find in your studies that breast fed infants might have a better development of IQ than non-breast fed infants because of the form of stimulation the former might receive?

C.A. Powell:

This is an interesting question but I am sorry that I cannot answer you since we have not attempted to establish any relationship here.

L. Mata:

I would like to change the subject somewhat and come back to the discussion on the possible explanations of the secular trend in the growth of children in Papua New Guinea. I can hardly accept that this is accomplished only by changes in nutrition. In my opinion we just cannot uncouple the improvements in nutrition from other parameters which obviously have also been changed. In the area between 600 and 1200 metres, where most intestinal parasites are found, I suspect that most people now walk in shoes and perhaps take showers frequently. In doing so, infection is efficiently combated. Therefore, I would like to ask professor Heywood whether he has data on the incidence of diseases which determine mortality like tuberculosis, measles and whooping cough. I would expect that the incidence of these diseases has decreased and that this would also be an explanation for the secular trend, next to the improved nutrition, of course.

P.F. Heywood:

Let me first mention that the infant mortality for the whole country has decreased dramatically: from

around 130 to about 70 now. However, I do not think that shoes and showers are an acceptable explanation for this, since they are not yet available on a larger scale in the middle altitude zones. Moreover, perhaps unlike Professor Mata's experience, we were astonished to find out that the Papua New Guinea people are traditionally extremely careful about water in terms of what they drink. Unfortunately, we do not have reliable data on the incidence of diseases over the last 50 years. When we compared different levels of economic development with respect to the incidence of acute respiratory infections, we were astonished to learn that there was no dramatic difference in the attack rates on comparing the different levels of environments. Although, this perhaps is not too unexpected, I would never state that infections are unimportant in this context. However, it would be equally wrong to stress only infections without recognising the economic factor. There are places in Papua New Guinea where health services have been significantly improved but without any economic development. As a result of this we see halved infant mortality, which did not make a difference in the growth rate of the children. The point I want to make here is that improving health services alone without paying attention to economic and social development appears to be insufficient.

M. Gracey:

Could I bring in another interesting variable, namely the rapid urbanisation in Papua New Guinea. Is it known what effect this has on children's nutrition and growth apart from the issues Professor Mata has raised before?

P.F. Heywood:

First of all, I think there has been a deterioration in the environment of the people who move to the urban areas. If anything, their health status has probably decreased overall, although their access to services has probably increased. There is no baseline level against which we can compare the growth of urban children, partly because urbanisation is recent. At the moment people do feel that children in urban areas are growing better than those in rural areas, but there is really no good data to support or to deny this.

M. Gracey:

What about the ethnic and racial diversity of the country?

P.F. Heywood:

There is clearly enormous diversity in the country in the way people grew at the moment. In general people in the highlands are short compared to western standards but have very high percentages of weight for height. The lowland people are taller and are also slimmer. We have to some extent tried to avoid the question of whether they are all, growth wise, going the same way. We are making only comparisons within a region and not across regions. It would not surprise me that we will find out that people in Papua New Guinea have the same potential in terms of linear growth but that the body proportions are rather different group by group.

D.R. Karunaratne:

Apart from nutrition, environment and economic factors, there is obviously also a genetic factor in the size of the newborn babies. For instance, Eskimos or Cameroons give birth to relatively large babies, while Pigmies bear small babies.

P.F. Heywood:

I think that there is clearly a genetic factor involved in birth weight. We do not really know at which point environmental factors become more important. There are also inter-generational effects going on in the secular trend in birth weight which means that it is even harder to sort these effects out. We see in Papua New Guinea that it is possible to modestly increase birth weight as people change their lifestyle; the next generation is going to see a further increment which is related to them having larger women bearing those children and so on. These long-term inter-generational effects are the basis of the secular trend, I think.