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Growth Monitoring – Some Basic Issues

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In most discussions on growth monitoring, it is the technical details of actual growth measurement and growth charting that generally claim central attention. The more fundamental issues regarding the basic objective of growth monitoring, and its feasibility and relevance in the prevailing total context of primary health care in developing countries, are hardly addressed adequately. In an earlier communication, global experience with regard to growth monitoring had been critically reviewed (Gopalan, C. and Chatterjee, M.: *Nutr. Found. India, Spl. Publ. Series 2*, 1984).

Growth monitoring is by no means a new discovery. Paediatricians and nutrition scientists have long relied heavily on growth measurements for assessments of health and nutritional status of children. Anthropometry has always been a widely used tool in nutrition surveys of communities. What is relatively new is the attempt to introduce a system of periodic (longitudinal) growth measurements of individual children in a community and charting their growth as an integral part of routine primary health/nutrition care at the community level.

At the risk of stating the obvious, it must be emphasised that growth monitoring is no more than a diagnostic and (possibly) educational tool. If wisely used, it could guide and facilitate action on the part of the health worker and the mother. Growth monitoring by *itself*, however efficiently executed, cannot bring about nutritional improvement; it must always be followed by action on the part of the health worker and the mother — the action consisting of appropriate and necessary improvements in child-feeding and child-rearing practices. Thus, growth monitoring is not even a means to an end; it is only a means to the means. In this respect, it stands on an entirely different footing from the rest of the items in GOBI. It is necessary to emphasise this in view of the fact that growth monitoring is sometimes being pursued as an end in itself with no adequate thought and preparation for the follow-up action.

If the necessary conditions exist – and only if they do – growth monitoring could become a useful adjunct to primary health and nutrition care. Two important conditions stand out in this connection.

In the first place, it is important to be clear about the basic objective of growth monitoring. Secondly, it is important to ensure that we have a health system and health infrastructure which can effectively apply and utilise growth monitoring technology in a meaningful manner consistent with the realisation of the objective.

The Basic Objective

The objective of growth monitoring, as originally envisaged by Morley and others, is *prevention* of growth retardation through timely and *early* detection of growth faltering. Indeed, promotion of growth monitoring as an integral part of preventive and promotive health care can only be justified if this is the objective. This makes sense for two good reasons.

(1) Early stages of growth faltering may be missed by the health worker and mother, not being obvious to the naked eye; and it is here that weighing scales can help. Growth monitoring could help in timely detection of growth failure and in alerting the health worker and mother to take immediate appropriate remedial measures. On the other hand, weighing scales are hardly necessary to *detect* growth retardation in children who are already so undernourished that they are only 70 percent or 60 percent of their expected body weight. Even the illiterate grandmother in the village could identify these children as malnourished. Weighment exercises resorted to for the purpose of arriving at administrative decisions as to which malnourished children should be included in feeding operations and which should be excluded, and when, can hardly be claimed to be part of preventive and promotive health care; they are no more than screening procedures for a rehabilitation and relief programme.

(2) In the early stages of growth faltering in late infancy and early childhood, marginal changes in child feeding and rearing practices, which are feasible and within the means and resources of poor families, might suffice to arrest growth retardation as Cowan and co-workers in Punjab have ably demonstrated (Das, D., Dhanoa, J. and Cowan, B.: *Bull. Nutr. Found. India,* 3.2.1982). In later stages, where growth retardation has already proceeded to any significant degree, the inputs needed for its reversal will be clearly well beyond the resources of poor families; and such children are bound to end up as stunted adults. At this late stage, education of the mother may not be of much avail in reversing the child's undernutrition; what the child would then need is intensive rehabilitation. Hence it is good strategy to help poor families to *prevent* growth retardation in their children through timely action at the early stages of growth falter-

when effective and successful action by the mother in her own home is still possible. In short, the battle against growth retardation must be fought, and can possibly be won, by even poor families at the very early stages of childhood; what can be accomplished at late stages is at best a relief operation limited to ensuring "survival". Herein lies the strong case for growth monitoring.

Recent Misleading Postulates

Unfortunately, however, today there seems to be considerable confusion with regard to the basic objective of growth monitoring. Though lip service is still being paid to early detection of growth faltering as being the objective, in actual practice this is apparently not being taken seriously.

Several recent pronouncements by noted experts have served to generate confusion and doubts as to the real purpose of growth monitoring. The messages which broadly stand out from these pronouncements are: (i) it is not all that important for developing countries to be concerned about the "less severe" forms of growth retardation in their children; (ii) growth retardation, other than that of the so-called "severe" degree, would no doubt result in "stunting", but such stunting should not matter as this would still not unduly compromise "function" and jeopardise "survival"; indeed, such growth retardation could be no more than "adaptation" to the prevailing environmental and economic situation.

Thus, in a recent publication (Pacey, A. and Payne, P.: *Agr. Dev. and Nutrition,* Hutchinson Press, London 1985), it has been suggested that "even if all human groups have basically the same genetic potential", national standards for growth norms should "take into account environmental and economic status", and, further, that the utilisation of the international standard of growth by developing countries will "overstate the case concerning malnutrition" among their child population.

The clear message here is that, even though all recent studies have clearly demonstrated that differences in current levels of growth and physical development as between children of developed and developing countries are attributable to environmental and not to genetic factors, developing countries need not strive to improve growth and development of their children to levels which will allow them to express their genetic potential but could settle for lower levels of growth in consonance with their "environment and economic status" – a euphemism for poverty. This is a plea for acquiescence in growth retardation up to a point, which runs clearly counter to the professed goals of growth monitoring and has rightly been rejected (Rao, Kamala S. Jaya: *Economic & Political Weekly,* 21. 24, 1986) as an exercise in "perpetuation of undernutrition".

Secler (Secler, D: *Newer Concepts in Nutrition and their Implication for Policy:* Ed. Sukhatme, P.V., Maharashtra Assocn. for Cultivation of Science, 1982, p. 127) had earlier been equally forthright and had argued that "smallness" is an appropriate and welcome attribute of poor people consistent with their good health. He had advised Indian nutrition scientists not only not to use "international standards" of growth (as this would yield "overestimation" of undernutrition) but also not to use the "best indigenous standard" of the Indian high socio-economic group because even these will be "abnormally large" for the majority of Indians who are poor. We had dealt with Secler's hypothesis earlier in this Bulletin (Gopalan C,: *Bull. Nut. Found. India,* October 1983).

Waterlow's otherwise useful classification of growth retardation is often being mistakenly invested with functional significance. It is being assumed that "stunted" children with weights appropriate to their height are functionally normal despite clear evidence pointing to the contrary from the extensive and fascinating studies of Spurr and colleagues (Spurr *et al: Am. J. Clin. Nutr.* 39. 452-459, 1984; 37. 834-847, 1983 M Parac-Nieto *World Review of Nutrition and Dietetics*, 49.22, 59, 1987.

Chen's observations based on his studies in Bangladesh (Chen, L., *et al, Am. J. Clin. Nutr.* 33. 1836-1845, 1980) that risks of mortality in "mild" and "moderately" growth-retarded children were no greater than in normal children, but were significantly increased only in "severely" malnourished children with weights for age less than 60 percent of the standard, have been widely interpreted to mean that the goal of "child survival" (which now seems to have replaced old-fashioned "maternal and child health" as the target of international agencies) is quite consistent with, and is not compromised by, mild & moderate degrees of growth retardati Chen's subsequent clarification of earlier observations in a later publicat rebutting such inference (Chen, L: *B Nutr. Found. India,* October 1982) h unfortunately not received the sa hearing as his earlier communication

The confusion with regard to the re objective of growth monitoring is beir reflected in the use (misuse) to wh growth monitoring operations are beir put. While lip service is still being pa to "education of the mother", the er phasis seems to have clearly shifte from early detection of growth falterinc to the identification of children who have drifted far enough away from normalcy, and whose retardation has become sufficiently "severe" to merit relief and rehabilitation through feeding programmes.

Growth monitoring has thus been used extensively as a screening procedure to choose beneficiaries for supplementary feeding operations in ICDS (Integrated Child Development Service) and the World Bank-assisted Tamil Nadu project, and to carefully exclude the so-called mild and moderately growth retarded children from supplementary feeding. This is in consonance with the advice of Payne (referred to above) who has warned developing countries against "diversion of resources" to children who are not as yet severely growth retarded. Growth monitoring, under the circumstances, instead of being used as an instrument for preventive and promotive health care, is becoming a tool for the implementation of a nutrition policy of brinkmanship and as an adjunct to supplementary feeding programmes which, in any case, are of doubtful value.

To be sure, it is being claimed with respect to both ICDS and the World Bank-assisted Tamil Nadu project that growth monitoring in these programmes is also being used to "educate" the mothers of less severely malnourished children as well. But the cursory manner in which such "education" is now being conducted in ICDS, and the great emphasis on the elaborate and time-consuming so-called "no-weight-gain strategy" employed just for selection of beneficiaries for feeding operations in the World Bank project, would indicate that the choice of beneficiaries for feeding programmes, rather than early detection of growth faltering has now

become the central purpose.

If it is the intention that growth monitoring need be used mainly for categorisation of established cases of undernutrition into different grades for the purpose of screening children for relief operations, then such weighment operations should not be glorified as an integral part of preventive and promotive primary health care but must be restructured and limited to rehabilitation centres and clinics and made much less elaborate and less expensive than at present for this restricted purpose.

Feasibility and Relevance

It was earlier pointed out that meaningful growth monitoring implies the fulfilment of two basic conditions – a clear understanding of the objective, and a health infrastructure which is capable of effectively utilising the technology. We have discussed the first; we will now consider the second.

Even very heavy investments on growth monitoring will fail to yield expected results if the health system as a whole is not adequately geared to utilise the technology. For any meaningful growth monitoring to take place, the outreach of the health system must be such that a reasonable proportion of pregnant women and children under three years in the community are covered. In India, for example, nearly a third of infants start their lives with the initial disadvantage of low birth weight. The elegant and pioneering longitudinal studies of Shanti Ghosh and her colleagues (Ghosh, S. and Bhargava, S.K.: *Twenty Year Longitudinal Studies on Growth and Development of a Birth Cohort,* to be published) demonstrated that these low-birth-weight babies continue to grow and develop in a developmental trajectory which is significantly and consistently poorer than that of babies of the same socio-economic group who did not start with such initial disadvantage. Proper antenatal care and improved diets during pregnancy could serve to reduce the incidence of "small-for-date" births and enable a larger number of infants in the community to start their journey without this initial handicap; and growth monitoring will then become a far less frustrating operation. If the mother had been contacted even during her pregnancy and rapport had already been thus established between her and the health worker, the follow-up after delivery and monitoring the growth of her infant would be easy. It is absolutely essential for successful growth monitoring that a significant proportion of under-threes is thus captured.

Unfortunately, however, in India, at present, according to some estimates, on an average only less than 10 percent of pregnant women in rural areas are reached through the health centres and in the backward states the proportion is even less. Health clinics and even the *anganwadis* of the ICDS system attract only a small proportion of children under three in the community; a large number of children visiting them are older children.

Under the circumstances, the only way that pregnant women and under-threes can be reached is through a well-structured system of home visits by health workers. Unfortunately, this is perhaps currently the weakest link in the health care system. Home visits by auxiliary nurse midwives of the health system are too few and far between to make any significant impact. Simple and relatively inexpensive inputs like bicycles which could improve their mobility are often not provided; also they are not supported by a sensible record and management system which would help to identify in advance the "households at risk" — the homes which need to be visited as a priority — with the result that even the all-too-short precious time during their infrequent visits is not used wisely and purposefully to derive maximal benefit. Under the circumstances, it will be neither feasible nor desirable to consider home-based growth monitoring.

Effective functional linkage between the *anganwadi* worker (of the Social Welfare sector) who is expected to reside in the village and the visiting auxiliary nurse midwives could contribute greatly to the development and implementation of a meaningful programme of domiciliary visits, but this functional linkage is not evident in many cases. The intersectoral linkage implicit in the creation of the Human Resources Development Ministry at the Centre embracing health, social welfare and education, is not being reflected at the village level — the level which matters most.

The *anganwadi* worker herself could do a great deal on her own through home visits; but being rooted to the *anganwadi* (day care centre) most of the time, having to implement the feeding programme and maintain a multiplicity of records, she has little time; and moreover she is cramped by lack of effective referral service facilities — which require the cooperation of the health sector.

Furthermore, there is considerable scope for improvement in the training of the health worker and the *anganwadi* worker with respect to infant and child nutrition. What they need to know is what concrete and *feasible* steps they can suggest for the improvement of diets of young children (between six months and two years) in the poorest households — steps which the mother could implement within the time and resource constraints to which she is subject. If growth monitoring does reveal growth faltering, what precise advice to the mother are they going to render? This implies that the training must be specifically tailored to suit local conditions and traditions. Not much thought is going into this, at least not as much thought as has gone into the training of the workers on the techniques of growth measurement and growth charting. And perhaps there are also not many trainers who can provide such very practical training.

Pushing elaborate and expensive growth monitoring into a health system which suffers from such major weaknesses is bound to lead to aberrations. If the children that are "available" for growth monitoring are well over three years, with a majority already in the so-called moderate and severe grades of malnutrition, growth monitoring could turn out to be a frustrating exercise for both health worker and mother, and education to the mother at that stage could not be of much avail. Under the circumstances, it should not be surprising if both the mother and the health worker turn to a tangible item on the *anganwadi* agenda, namely supplementary feeding, which can at least provide some immediate relief. Supplementary feeding thus becomes the centrepiece and growth monitoring comes in handy to decide which children should get single ration ("moderate malnutrition") and which should get double ration ("severe malnutrition"). Indeed, the weaknesses in our health system thus actually favour the observance of the policy of brinkmanship mentioned earlier.

Clearly, the first priority for developing countries like India, with highly inadequate health systems, is to over-

come current gross deficiencies with respect to outreach and quality of their maternal and health services. In situations where less than 10 percent of pregnant women are being reached, where health and child welfare clinics fail to attract the bulk of under-fives and where domiciliary visits are cursory, few and far between, heavy investments on elaborate growth monitoring are likely to prove infructuous. It will be naive to assume that a liberal supply of weighing scales and growth charts will automatically correct these imbalances. To say this is not to argue against growth monitoring as such but to emphasise that conditions that would permit meaningful growth monitoring must first be created. To concentrate our energies on supplies of weighing scales and growth charts and on training of workers in the techniques of growth measurements *without* preceding, or at least parallel, intensive efforts to strengthen the health system, is to put the cart before the horse. Indeed, it will be sound and sensible strategy on the part of international agencies to support and strengthen the development of integrated programmes of maternal and child health care, which include growth monitoring as a part, rather than promoting growth monitoring programmes as such in isolation.

Concluding Comments

The ideal situation that we must strive for is one in which our health system will be strengthened and geared to effectively utilise the technology of growth monitoring for the purpose of *prevention* of growth retardation and undernutrition in our children. Despite the several limitations which currently stand in the way of meaningful growth monitoring, growth monitoring programmes have been successfully carried out in quite a few small scale projects. These have been recently reviewed (*Successful growth monitoring — some lessons from India*, UNICEF South Asia 1986) and this experience should show that given the right leadership and the proper conditions, growth monitoring will be a useful tool for the promotion of child health and nutrition.

Merits of Growth-Monitoring

Growth monitoring, as an integral part of primary health care, is welcome for three reasons, apart from those discussed in the earlier part of this paper.

1) Relative to family planning and immunisation, nutrition currently receives very poor focus in the primary health care package. This is because unlike immunisation and family planning which are well-charted operations, that lend themselves to "achievement audit", nutrition inputs appear vague and have no immediately demonstrable impact, specially in the context of poverty. Nutrition education is also currently largely a "blind operation", it being impossible to measure its impact. A well-designed growth monitoring programme could provide support and direction to nutrition education efforts, enhance their credibility, enable the measurement of their impact and help build better rapport between the mother and the health worker.

2) The Integrated Child Development Service (ICDS) is a unique input which provides vast opportunities for improvement of child health and nutrition. Unlike the conventional health system which is overburdened with curative work load, the programme of ICDS can be wholly oriented towards preventive and promotive health and nutrition care. Through proper training, supportive supervision, and through effective linkage between the health worker (of the health system) and the *anganwadi* worker (of the ICDS) it should be possible to provide for each village in the country effective maternal and child health care and nutrition services supported and facilitated by meaningful growth monitoring.

3) It has indeed been demonstrated that with existing resources, when the health system is properly supported and managed, meaningful growth monitoring is possible and could help in preventing growth retardation and improving child nutrition even in the poorest households (Das, D., Dhanoa, J., and Cowan, B.: *Loc. cit.*). Cowan's model involved the employment of facilitators who were not part of the health system. An *anganwadi* worker of the ICDS system can easily be now trained to play the role of such facilitators. Now that we have opted for the expansion and strengthening of the ICDS system, we may use this valuable input to overcome our deficiencies in primary health care.

Model Districts

It may not be possible to overcome overnight the several shortcomings which currently beset our health system. A practical approach could be to take immediately at least one district in ea state for intensive efforts directed to p mote the outreach and quality of hea services. In such efforts, emphasis m be placed on bringing about close fu tional linkages between the regu health system and the ICDS. Grov monitoring for the purpose of prevent of undernutrition and early detection growth faltering could be introduced part of a comprehensive system of m ernal and child health/nutrition care. well-structured system of regula domiciliary visits could be organised an it could be ensured that all poor house holds with pregnant women, nursin mothers and children under three ar periodically visited, and that the healt worker spends sufficient time with the mothers in these critical households no just to carry out weighment and growth charting but, more importantly, to edu cate them as to how child feeding anc rearing practices could be improved; as was emphasised earlier, intensive prac tical training will be needed for this latter purpose. Under such circumstances meaningful growth monitoring will be come possible and will greatly reinforce maternal and child health care services. These model districts could serve as demonstration-cum-training areas for each state. There could be a phased programme for extension of the programme to other districts in the state so that by the turn of the century, we may be able to achieve impressive improvement in maternal health and nutrition services all over the country.

Inaugural address at the Seminar on Growth Monitoring, National Institute of Public Cooperation and Child Development, Delhi February 3, 1987.

Irradiation of Wheat

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Studies carried out at the National Institute of Nutrition, Hyderabad some years ago showed elevated levels of polyploidy (chromosomal aberrations) in blood cells of experimental animals and human subjects fed freshly irradiated wheat (dosage 80 Krads — recommended level). Mice fed freshly irradiated wheat showed evidence of dominant lethal mutation. This was not observed if irradiated wheat had been stored for a period of 12 weeks after irradiation before being fed. There was some controversy as to whether the increase in polyploidy observed in the NIN experiments could be considered statistically significant, and also as to the pathological significance of the polyploidy itself. Considering that wheat happens to be the staple of millions in the country, NIN had then recommended that if official clearance for irradiation of wheat was going to be given, it might be prudent to ensure that such irradiated wheat was stored for a minimum period of three months before being released for public distribution. In making this recommendation, NIN was guided by the consideration that it would be better to err, if at all, on the side of abundant caution in a matter concerning a vital major food item. The Ministry of Health in the Government of India took the view that since there was no test by which any food-regulatory agency could satisfy itself about the duration for which irradiated wheat had been stored before public release, clearance for irradiation of wheat could not be granted. This decision was hotly contested by the agency promoting food irradiation before the then Prime Minister (Mrs. Indira Gandhi). After careful examination of all the available evidence, the Prime Minister endorsed the Health Ministry's stand; and despite pressures of various kinds, this decision remained in force until very recently.

It is understood that the Government of India, in a reversal of their earlier decision, have now accorded clearance for irradiation of foods including wheat. As far as we are aware, the clearance for wheat does not carry the stipulation regarding the minimum period of storage after irradiation before public distribution, advocated by NIN earlier.

NIN's findings and recommendations had been consistently misrepresented and distorted by the forces keen on securing clearance for irradiation, in national and international forums. In an earlier issue of this Bulletin (Vol. 7. No.3, 1986), Dr. S.G. Srikantia, former Director, NIN had presented a factual account of the studies carried out at NIN on irradiated wheat. He also indicated how NIN's observations had been confirmed in at least two other laboratories — one in the Federal Republic of Germany and the other in the U.K. There are other reports which have challenged NIN's findings. Dr. Srikantia's account should have helped to set the record straight, to put NIN's work in its proper perspective, and to counter false statements and misconceptions. It is not necessary to go over that ground again here. It would, however, appear that there is still considerable confusion and ignorance with regard to what NIN had said on this subject and why.

Thus in a recent performance over the national TV, a scientist (recently retired from the Atomic Energy Establishment) breezily dismissed NIN's observations as being the statement of some scientist not based on any evidence. He also misquoted the ground on which NIN had voiced its concern and sought to convey the impression to his listeners that food irradiation has now gained unquestioned acceptance in several countries.

The truth is that currently there is fierce controversy with respect to the use of irradiated foods in Europe, the U.S.A. and Canada, and indeed practically in all countries where it is claimed that food irradiation has been permitted. There is an on-going active campaign against food irradiation in Canada. It is understood that in the next few weeks there is to be a Senate hearing in the U.S.A. on this subject. It is also important for those who naively claim that the U.S.A. (FDA) has permitted irradiation of wheat, to find out (a) whether or not irradiation of wheat in the U.S.A. is currently being mostly undertaken only for wheat being *exported* to other countries, and (b) whether (and if so, to what extent) bread actually consumed by the Americans in the U.S.A. is made out of such irradiated wheat.

We reproduce below an extract from the report of the Science Correspondent (Thomson Prentice) in *The Times* London of March 7, 1987. The extract should speak for itself:

"The British Medical Association said that the irradiation of foodstuffs could pose long-term health hazards and called on the Government to postpone 'for some years' any plans to introduce the process.

"The report by the BMA's board of science says that current advice to the Government on the safety of the process 'may not sufficiently take account of, still less exclude, possible long-term medical effects'.

"The Association endorsed the report and called for a full-scale study of the risks and benefits of the process.

"Such a study is necessary before the process can be confidently accepted in this country', the report said.

"The BMA was influenced in its report by scientific studies, one on humans and one on laboratory rats, which indicated that irradiation could cause potentially malignant changes in the blood cells.

"The report conflicts with the findings of the Advisory Committee on Irradiated and Novel Foods (ACINF), set up by the Government, which said there was no reason not to proceed with plans to introduce food irradiation.

"The committee is receiving submissions from interested parties and advice will then be forwarded to the relevant government departments.

"Dr. John Dawson, head of the BMA professional division, said yesterday: 'The potential benefits to the consumer seem quite small. Of much more concern to us are the potential risks and we feel further research is necessary.

"In effect, this would mean shelving the introduction of the process for some years until the findings of such research can be evaluated.' "

It will thus be seen that the impression that there is near unanimity with regard to the use of irradiated foods is completely misleading.

The oft-repeated argument that a Committee of IAEA and WHO had "cleared" irradiation of wheat is neither here nor there. International agencies