

Costs of Community-based Protocolized Management of Severely Malnourished Children at Selected NGO Clinics in Dhaka, Bangladesh

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Acronyms

BINP	Bangladesh Integrated Nutrition Project
ESP	Essential Services Package
EPI	Expanded Programme on Immunization
GMP	Growth Monitoring and Promotion
ICDDR,B	International Centre for Diarrhoeal Disease Research, Bangladesh
NGO	Non-Governmental Organization
NNP	National Nutrition Programme
NSDP	NGO Service Delivery Program
NIPHP	National Integrated Programme on Health and Population
PSKP	Progati Samaj Kallayan Protisthan
PM	Protocolized Management
SPSS	Statistical Package of Social Science
TK	Taka (Bangladesh currency)
USAID	United States Agency for International Development
UFHP	Urban Family Health Partnership
UNICEF	United Nations Children's Fund
WFP	World Food Programme

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Executive Summary

This study was aimed at assessing the additional cost of implementing a nutrition intervention built on an existing service-delivery system of three selected urban primary-care clinics run by Progati Samaj Kallayan Protisthan (PSKP). The intervention was based on a protocol developed by ICDDR,B for the management of non-complicated severe malnutrition in weaning-age children through adopting a clinic- and home-based approach.

The cost exercise was specifically focused on estimating the cost of the intervention-related activities that took place at the field level with respect to provider's cost and client's cost, assessing the effectiveness/outcome of the intervention and relate the cost with the outcomes. The ingredients approach was applied to identify, quantify, and value each of the additional resources used for producing the output/outcome. Total cost was calculated, multiplying the quantity of individual input(s) by corresponding price(s) and summing up the results. Provider's costs were categorized into capital cost and recurrent cost, while client's costs were categorized as direct and indirect costs. Average cost per child incurred by the intervention clinics and selected households have been presented with respect to, and irrespective of, outcomes. Two reference periods were considered for assessing the intervention-related activities and for the calculation of cost. For estimating the provider cost, the total intervention period of 25 months (1 March 2001-31 March 2003) was included, while for assessing the client cost, a three-month observation period was considered. Therefore, provider costs were calculated for all children enrolled during the 25-month long intervention, i.e. 465 children. Client costs were calculated in a sub-set comprised of 67 children enrolled during 19 December 2002-18 March 2003 and followed prospectively until April 2003. A combination of prospective and retrospective data was, therefore, used in the study. Clinic records, service statistics, and the intervention database were reviewed to gather information on provider cost. Besides, interviews with key providers and a group discussion with clinic managers were also organized. A staff time-log was used for recording the time spent by individual staff members for protocol-related activities. Series of household interviews were conducted to collect information on client cost.

An estimated total additional cost of US\$ 19,624.20 was incurred by the three intervention clinics, of which capital and recurrent costs were amounted to US\$ 3,544.90 and US\$ 16,079.30 respectively. Provider's average cost per child enrolled and managed, irrespective of outcome, was US\$ 42.20. With replacement of a food supplement (replacement of *pustipack* and soyabean oil by multimix), the average cost was reduced to US\$ 38.55. These investments resulted in the identification and management of 465 severely-malnourished children, of whom 292 (62.8%) improved to moderate under-weight. Providers total cost, especially capital cost for initial investment, was small. However, a high proportion of provider's average cost per child (57.5%) was for personnel cost. As an alternative to the appointment of one additional dedicated Nutrition Counsellor job description and training of the existing clinic paramedics have been proposed, but were not considered to be feasible. Replacement of the food supplement by available alternatives indicates that scope of further cost minimization exists. It was observed that cost per selected outcome decreased with increase in the actual number of beneficiaries, i.e. number of children graduated, rehabilitated, and then sustaining weight gain. Client's unit cost for obtaining care was low. Actual contact time of clinic staff with clients did not show any extra pressure on the intervention clinics. However, the enrollment of severely-malnourished children was low and could probably be improved with active outreach and community mobilization.

Introduction

Severe malnutrition (weight-by-age) affects about 16% of weaning-age children in Bangladesh and an estimated one child in four in urban slums. Consequences include higher susceptibility to infectious diseases, higher mortality, and long-term adverse effects on child development. Service statistics collected by the Bangladesh Integrated Nutrition Program (BINP) have already reported impressive results in decreasing rates of severe child malnutrition. As of now, there has been no tested 'urban' BINP/National Nutrition Program (NNP) approach. Nor has it been established that the BINP/NNP model, which requires a separate infrastructure and complementary interventions to promote household food security, will be feasible and cost-effective in urban Bangladesh.

Under the USAID-supported National Integrated Population and Health Program (NIPHP), child malnutrition is primarily addressed through promotion of improved practices for breastfeeding and supplementation of vitamin A. Clinic personnel in most urban primary-level clinics are not trained and equipped to identify and manage severe child malnutrition, or to counsel effectively on improved feeding and caring practices. Researchers, development partners, and policy planners are, therefore, considering how to address child malnutrition through urban primary-level clinics and community outreach. This has prompted ICDDR,B: Centre for Health and Population Research to develop its hospital-based experience with standardized management protocol for severe malnutrition into a community-based model, combining a clinic and home-based approach, for non-complicated cases of severe child malnutrition.

Background

The ICDDR,B model titled "Community-based Protocolized Management of Severe Child Malnutrition" was piloted at three Progati Samaj Kallyan Protisthan (PSKP)-run outpatient clinics in Dhaka at Mirpur, Tejgaon and Pallabi. The intervention was conducted from March 2001 through March 2003.

ICDDR,B, in collaboration with PSKP, a partner NGO of USAID-funded NGO Service Delivery Program (NSDP), formerly Urban Family Health Partnership, decided in June 1999 to explore the potential of the existing PSKP-run urban clinics for the delivery of child nutrition services with a focus on severe child malnutrition. This approach, which uses existing primary healthcare clinics and integrates child nutrition services with contacts for other 'essential services package' (ESP), was thought to be more cost-effective than the establishment of a separate infrastructure for urban nutrition services. The existing PSKP clinics are staffed with well-trained medical and paramedical personnel and have well-established practices for the management of common childhood illness, including ensured access to appropriate essential drugs. The clinic-based approach makes it possible to jointly address associated childhood illness and inadequate dietary intake. With this in mind, related child nutrition services under the protocolized management intervention were started in one PSKP-run clinic in the Dhaka metropolitan area (Mirpur 10) from July 2000 and were scaled up to two more clinics (Pallabi and Tejgaon) from March 2001.

The preliminary findings of this intervention suggest that integration of this approach into the routine child healthcare component of ESP delivery at the NGO-run urban clinics is feasible and effective in achieving recovery in the majority of weaning-age children suffering from severe malnutrition. However, scaling up of this model to other PSKP clinics or similar NGOs requires further understanding of its cost implications and long-term effectiveness. Keeping this in mind, this cost-analysis exercise was designed and conducted.

PSKP Clinic Profile: The Intervention Site

PSKP operates several urban outpatient clinics to provide ESP through its Static Clinics and Satellite Clinics. Each Static Clinic is staffed with one Clinic Manager/Medical Officer, several support staff designated as Paramedic, Service Promoter, Senior Service Promoter, Counsellor, Laboratory Technician, Female Attendant, and Security Guard. Each clinic has a minimum of three outreach teams comprising two staff (one Paramedic and one Service Promoter) providing ESP at several spots

at the community level. Except for the Pallabi Clinic, the Static Clinics remain open from 9:00 am to 8:00 pm with an evening shift from 4:00 pm to 8:00 pm. The PSKP management has introduced different mechanisms of partial cost-recovery at these clinics with provision of a safety-net for the poor. These include user-fees, revolving drug funds, franchising services at garment factories, and *zakat* fund (donation in cash or kind on account of possession of a certain amount of gold and/or cash savings by a Muslim).

Community-based Protocolized Management of Severe Child Malnutrition at PSKP Clinics: The Intervention

The purpose of this intervention was to test the feasibility of integrating the management of severe child malnutrition into the ESP provided by the urban NGO-run clinics and to examine whether such management would be effective in achieving recovery from severe child malnutrition. The target group of the intervention was children aged 6-23 months. The intervention began on 1 March 2001 and continued throughout the following 25 months. For the purposes of the intervention, staffing of the selected PSKP clinics was strengthened by adding to each clinic one female paramedic who was trained by ICDDR,B to serve as Nutrition Counsellor. Training sessions on protocolized management of severe child malnutrition for other service providers of these clinics were also organized simultaneously. Focusing on a complementary approach of clinic and home-based care, the intervention prescribed delivery of the following services:

- Counselling of the mother and other caregivers on child's nutritional requirements and on the feeding of a home-prepared nutrient-rich diet, including continuation of breastfeeding
- Medical management of any infection or deficiency disease with counselling on preventive measures
- Administration of an eight-week course of micronutrients (multi-vitamin drops, zinc syrup, and iron) and, if overdue, high dose of vitamin A supplement
- Deworming of children aged one year and older
- Ensuring that the enrolled child's EPI immunizations are up to date
- Longitudinal follow-up, including scheduled weight-gain monitoring until 'exit' from the protocol with weight-for-age > -3 SD or exit for other reasons
- Referral of severely-wasted or of severely-under-weight children with complications to a specialized centre.

The clinic-based provision of these services was complemented by at least one home-visit by the Nutrition Counsellor for the purpose of a home assessment.

Target-age children were identified as severely malnourished by making it a required practice to obtain a child's weight-for-age at each child's first visit to an intervention clinic for whatever reason. For this purpose, both Static Clinics and Satellite Clinic teams of the intervention clinics were supplied with SECA Uniscales for measuring child weight and with z-score-based growth charts. Children with severe under-weight (weight-for-age z-score of less than -3) or presenting with severe visible wasting or bi-pedal oedema were identified as severely malnourished and referred to the Static Clinic for a further nutritional assessment and medical check-up. Mothers or other caretakers of all other children were invited to purchase a growth chart for the child and to return at monthly intervals for growth monitoring. Malnourished children were, thus, for the main part identified among clinic-attending children. This was occasionally complemented by community-level outreach, when the PSKP Service Promoters identified target children during their scheduled home-visits prior to organizing a satellite session as 'thin' in appearance or wasted and then invited the child to the Satellite Clinic.

Target-age children found to be severely under-weight were then referred to the Static Clinic for an assessment of their weight-for-length and check-up by the Medical Officer for any infectious disease or other associated illness. Children found to be severely wasted (weight-for-length less than -3 z-scores) and/or with bi-pedal oedema were referred for hospital-based management, as recommended by the World Health Organization (WHO), as were severely under-weight children

with serious complications. For these children, back-referral to the sending clinic followed by protocolized management was ensured upon discharge from hospital. Children who were severely under-weight, but not severe wasted and with no serious complications were enrolled for protocolized management. Mothers or other caretakers of these children were counselled on improved feeding and caring practices. In addition to breastfeeding, the protocol recommended complementary child feeding with home-made *khichuri* (ICDDR,B recipe), milk-*suji*, and other family foods. Children from severely food-insecure households or with compromised caring capacity were also supplied with a take-home food supplement (BINP-type *pustipack* or WFP-supplied wheat-soya blend multimix). Mothers or other caretakers were also provided with a plastic cup to help them with gauging the amount of food to be offered to the child. Newly-enrolled children were initially followed weekly and later fortnightly or every four weeks, until their weight-for-age improved to moderate under-weight (>-3 SD). The intervention clinics maintained a growth card for each child for recording and plotting dates of weighing and measurements and for tracking the intake of micronutrients supplied for the child. For medical check-ups of enrolled children, the usual PSKP consultation fees were waived. Prescribed medicines were purchased by the children's caretakers from the PSKP clinic pharmacy or from outside pharmacies. In many instances, the cost of prescribed medicines was covered from a 'Welfare Fund' maintained by the Nutrition Counsellor. The Welfare Fund could also be used for reimbursing needy mothers or other caretakers for transport costs for follow-up clinic-visits and, for hospital-referred children, for transport costs to and from the hospital.

Costs of necessary equipment, training, supplies, stationeries, Welfare Fund for the poor, and compensation for three Nutrition Counsellors were borne from ICDDR,B-administered project funds, while the existing infrastructure, manpower, and some waiver on consultation fees to poor patients were offered by the PSKP management for this intervention.

Objectives of the Study

The objectives of cost-analysis of the above-mentioned intervention were to:

- Assess the cost of intervention-related activities with regard to provider and client costs
- Assess the outcomes/effectiveness of the intervention
- Relate the outcomes/effectiveness of the intervention to provider and client costs.

Methodology

Study Design

This cost analysis is an attempt to measure the additional cost of introducing 'protocolized management of severely-malnourished children' through selected PSKP clinics. The intervention was aimed at improving the nutritional status of weaning-age children using the existing PSKP clinic infrastructure. The additional cost of the intervention has been assessed from two perspectives-- provider cost and client cost perspectives. An estimation of costs through identification, quantification, and valuation of each resource used during the process was carried out, known as ingredients approach. Using this approach, the total cost was calculated, multiplying the quantity of input(s) by corresponding price(s) and summing up the results. Unit or average cost for different outputs/outcomes was estimated by dividing the total cost by the number of output/outcome (1). The inputs include all additional resources mobilized by the selected PSKP clinics and client households. The process envisaged the intervention-related activities at the clinics and households, while the outputs were measured in terms of number of target children enrolled for the protocolized management, recovered, and un-recovered represented by several exit codes (Annexure C, Table 1c).

Two reference periods were considered for assessing intervention-related activities and calculation of their cost. For the estimation of provider cost, the whole intervention period of 25 months (1 March 2001-31 March 2003) was included, while for assessing client cost and their socioeconomic characteristics, a three-month observational period (19 December 2002-18 March 2003) was considered.

Study Subjects

For the estimation of provider costs, all 465 severely-malnourished children aged 6-23 months enrolled and managed during 25 months of intervention (1 March 2001-31 March 2003) were included in the costing study. For assessing client costs and socioeconomic characteristics of the beneficiaries, a sub-set of the same study population comprising 67 children enrolled consecutively during 19 December 2002-18 March 2003 was purposively taken and followed prospectively until end-April, 2003. A combination of prospective and retrospective data was, thus, considered in the costing study.

Source of Information and Data Collection

Provider's cost information was gathered by reviewing clinic records, service statistics and intervention database. Key providers interviews were conducted to collect information on the protocol-related activities and validate the same. Providers were interviewed by Clinic Managers, Nutrition Counsellors, Service Promoters, Senior Service Promoters, and Paramedics of the three intervention clinics. A group discussion with clinic managers was organized to understand opinion of providers about the intervention. A staff time-log was administered to calculate the time spent by individual staff members for rendering protocol-recommended services. Client costs were collected through a series of household interviews beginning on the day after the day of enrollment (Day 0), and follow-up interviews continued until any outcome had resulted.

Provider Costs

Provider costs were categorized into capital costs and recurrent costs according to the nature of inputs. Costs associated with inputs that had a useful lifetime of one year or more were considered capital costs. Such inputs included non-expendable materials, such as weighing machines, length boards, carrying bags, and non-recurrent training. Costs associated with inputs that were consumed/used up in the course of a year and were procured/obtained regularly were considered recurrent costs. Recurrent inputs included personnel cost, micronutrient and food supplements, drug and transport allowances, stationeries, growth cards, plastic cups, and containers supplied to enrollees. All non-expendable materials identified as capital input were considered for annualization. Annualized value of these goods was calculated through dividing the current market price of each by the corresponding annualization factor taken from the standard table (Annexure D, Table 7d) considering a 5% discount rate and individual lifetime. The lifetime of goods and current price were obtained from the provider and supplier's sources. Cost of donated goods was estimated by shadow price available at an alternative source. Quantity and price of additional stationeries supplied were collected from the database of the intervention. Based on information on individual price and quantity used, the costs of recurrent inputs were calculated by multiplying the quantity with the price. Staff-time allocation to the intervention-related activity was apportioned using a staff-time log.

Each of the children enrolled for protocolized management was provided, free of charge, with a growth card and with at least one plastic measuring cup. For enrolled children meeting the eligibility criteria for 'crisis rations', the protocolized management project also provided a take-home food supplement. Two types of supplements--*pustipack* and *multimix*--were used. At the beginning of the project, March 2001-May 2002, a BINP-type dry mix consisting of ground-roasted rice and sugar and packed into '*pustipacks*' prepared by ICDDR,B Employees' Cooperative Society Limited was used. Soyabean oil was then distributed along with *pustipacks*. During the latter part of the project, *pustipacks* were replaced by a micronutrient (fortified wheat-soya blend) called '*multimix*' donated by the World Food Programme. *Multimix* was supplied to the children's mothers or caretakers in bulk, using a plastic container procured by the project. Based on the condition of household food security and/or child-caring capacity, the eligibility criteria for crisis ration were set as follows:

Household food security (two criteria to be met)

- No earning household member
- Mother is borrowing food or begging
- No food stocks or severely-restricted diet
- Household is selling assets or borrowing to meet consumption needs.

Compromised caring capacity (both criteria to be met)

- No regular (adult) care provider for the child and
- Cooking not feasible.

Zinc sulphate syrup (Pep-2 syrup) was procured and distributed to the clinics by the project for free-of-charge onward distribution. Other micronutrients (paediatric multi-vitamin drops and iron tablets) and drugs, such as antibiotics, analgesics, anti-histamines, and anti-helminthics prescribed for treating associated infections of the enrolled children were meant to be purchased by the children's caretakers at the PSKP clinic pharmacy, which sold these drugs at 5% discount on the retail price (price list annexed) for children meeting the eligibility criteria for crisis rations. The costs of these medicines were reimbursed by the project from its Welfare Fund.

Training sessions on protocolized management of severely-malnourished children were organized by the Project in collaboration with ICDDR,B's Training and Education Unit for the providers of the PSKP intervention clinics. Types of training included (a) Basic training (start-up) for 12 half-days, (b) Compressed basic training for 18 days, and (c) Refresher training for 7 days. This training programme was a part of start-up activities and was not repeated. All concerned staff attached with the selected PSKP clinics at that time participated in the training.

Client Costs

Client costs were estimated in terms of direct and indirect costs. All out-of-pocket expenditure (additional cost for the protocol-recommended improved diet, prescribed drugs, travel cost, consultation fees) were considered direct cost, while wage loss and time cost of mothers/caretakers were taken as indirect cost. Opportunity cost of time spent by mothers/caretakers for waiting and consultation at clinics was calculated using local wage rate/market value for the next best alternative activity. Information on client cost of the child's participation in management under the protocol was collected from the sub-set through household interviews. Parents or any other adult caregivers who were familiar with the household costs incurred for obtaining the care and well-informed about other particulars of the household were selected as respondents.

Interviews with each respondent began on the day after the day of enrollment; follow-up interviews were held with the same respondent on the day after each of his/her scheduled follow-up clinic visit. These follow-up interviews continued until recovery or exit from the protocol for other reasons had occurred in the sub-set of children. Nine female data collectors conducted household interviews supervised by three field supervisors. Household locations/addresses were collected from the clinic, and an interview schedule was developed and maintained in consultation with the clinic staff. The data collectors were earlier given a two-week orientation and training on the intervention and cost-related data collection.

Instruments

For household interviews of mothers/caretakers of children under the sub-set, three sets of pre-tested semi-structured questionnaires were used. These were designed to capture visit-specific cost information for households. The questionnaire administered on day 0 (day after enrollment) had three sections: (1) Particulars of clients, (2) Socioeconomic information, and (3) Cost information. The second set of questionnaire was used for collecting data on client's particulars and cost information relating to subsequent revisits to the clinic. The third set of questionnaire was used for collecting data from households of sub-set children who recovered. This contained a few additional questions on quality of care and willingness to pay for services. For interviewing key providers of the PSKP clinics, a semi-structured questionnaire was used. A guideline was developed and followed to conduct group discussions with the Clinic Managers. Different templates were used for recording provider and household inputs by cost category, quantity, and price, which were then entered into spreadsheets for calculation of individual and total cost.

Outcome Indicator

The following outcome indicators were used for assessing the effectiveness of the intervention:

Number and proportion of identified severely-malnourished children

- graduated to moderate malnutrition and
- rehabilitated and then sustaining normal rates of weight gain.

Analysis

Data were entered into spreadsheets and FoxPro after necessary editing and coding and were then analyzed using SPSS. Averages, medians and proportions were calculated and presented using bivariate tables and charts. Based on similarity of response, qualitative data were grouped, and contents were analyzed.

Limitations

The study estimated the additional cost of implementing the protocol at the field level incurred by the selected PSKP clinics and households. It did not include the routine operating costs of these clinics and costs relating to operating the project office at ICDDR,B. Referral-level treatment costs for enrolled children who were referred to higher centres for the management of severe wasting or severe under-weight with serious complications were not included in this study. Consultation fees waived among the larger study population (n=465) were not adjusted for calculation of provider cost due to inadequate information. However, it was considered for the sub-set of 67 children (Annexure D, Table 1d). Shadow price of vitamin A capsule was not calculated as it was routinely distributed by the clinics through their ongoing immunization programme. On several occasions, the household survey was interrupted by demolition of slums.

Results

Profile of Study Subjects

During 25 months of the protocolized management intervention (referred to as 'PM project' hereafter) conducted at selected PSKP clinics, the total number of enrolled children was 465. Of these, 292 (62.8%) recovered to moderate under-weight.

Of the 465 children, 236 (50.8%) were male and 229 (49.2%) were female. The mean age of male and female children at enrollment was 13.5 and 13.3 months respectively. On average, 85 days were required for recovery. Average enrollment of children per clinic per month was 6.2.

In the study sub-set, 67 children were enrolled, 36 (53.7%) of whom recovered. For the remaining 31 children, the observation period was censored. (Annexure C, Table 2c). During enrollment for the sub-set, the mean enrollment per clinic per month was 7.4.

Of all children observed in the sub-set, 33 (49%) were male and 34 (51%) were female, showing no gender predominance. Forty-three percent (29) of the children observed were aged 7-12 months, while 24 (36%) were aged 13-18 months (Annexure A, Table 1a) at the time of enrollment. The mean age of males and females in the sub-set was 13.6 months and 12.8 months respectively.

Profile of Respondents

Most (90%) respondents were biological mothers of the enrolled children. Most mothers were aged 15-30 years and had 1-3 child(ren). Twenty-one percent had four or more living children.

Sixty-seven percent of mothers had no formal education, 12% had completed primary schooling, 18% had some primary schooling, and 3% had completed secondary schooling.

Overall, 30% of the respondents had a monthly family income of ≤ Tk 2,000, and 52% had an income of Tk 2,001-4,000. The median income was Tk 3,000 per month. Considering the median family size of four, the per-capita income per day stood at Tk 25 or US\$ 0.43. This suggests that the

majority of the respondent families were living below the generally-accepted poverty-line of US\$ 1 per person per day.

Fifty-seven percent of the respondents incurred monthly expenditure on food ranging from Tk 1,000 to Tk 2,000, while 25% spent less than Tk 1,000 a month.

Overall, 58% of mothers of the enrolled children were housewives, 20% were working as maidservants, and 13% were garment workers. Forty-three percent of fathers were rickshaw-pullers, and 26% were unskilled labourers. Of these fathers, only 10% were service-holders, and 9% were engaged in small trades. Overall, 84% had electricity supply in their houses.

Most (98%) respondents had access to piped water for drinking purpose, and 52% had this within their households. The type of latrine used by them was mostly (70%) water-sealed sanitary latrines, while 21% used open places for toilet for lack of any type of latrine facility (Annexure A, Table 2a).

Based on construction materials, the respondent's households were categorized into permanent, semi-permanent, and non-permanent dwellings of typical urban slum. Fifty-five percent of the respondents were living in semi-permanent tin-roofed dwellings with walls made of straw/bamboo/polythene or jute material, and the floor made of mud. Twenty-five percent were living in permanent houses made of low-cost concrete roof and walls, and 20% were living in non-permanent houses (Annexure A, Table 3a).

Provider's Interview

Interview with key providers revealed the average quantity of protocol-recommended supplies consumed by each enrollee. It also elaborated the experience of the providers in delivering the protocol-recommended services.

Protocol-recommended consumable supplies

According to the Nutrition Counsellors, the average consumption of protocol-recommended micronutrient and food supplement per enrolled child was as follows:

- Pep-2 syrup (zinc sulphate preparation): 3 bottles
- Multivitamin drops: 2 phials
- Iron tablet: 15-20 tablets (depending on the age of the child)
- Multimax: 7 kg

The provider clinics had access to a regular supply of vitamin A from the health department of Dhaka City Corporation under its routine immunization programme.

Provider's Opinion about the Intervention

During the interviews, 82% of the service providers suggested that attendance of severely-malnourished target-age children at the clinics was consistently low throughout the intervention. When asked about the possible reasons for the low community-level coverage, 50% suggested that mothers did not perceive malnutrition as a health problem. Other factors suggested by the providers were:

- Lack of information in the community on availability of nutrition services at the clinic
- Absence of promotional activities of the project at the community level
- Lack of active surveillance
- Mothers were preoccupied with other activities.

Regarding problems encountered in managing the enrolled children, the service providers mentioned some areas of concern as below:

- Non-compliance of mothers/caretakers of the enrolled children with the protocol-recommended activities
- Difficulty in motivating mothers and/or other family members for regular follow-ups

- Repeated infections of children
- Frequent migration of families out of the catchment area without notice
- Demolition of slum by the city corporation authority, resulting in displacement of enrollees
- High expectation of mothers for free supplies.

Group discussion with clinic managers

When asked about the feasibility of future continuation of the intervention after the completion of its piloting, all Clinic Managers categorically pointed out the difficulty of maintaining logistic support. However, they agreed that it would be possible to continue protocol-recommended consultation and counselling services if a capacity-building programme could be run for selected PSKP staff. A limited number of clients falling under eligibility criteria for crisis ration could be supported by the PSKP's 'Zakat fund'. One of three Clinic Managers suggested that, if refresher training is offered, one of their existing female paramedics could be reassigned to take over the charges of the Nutrition Counsellor. The other two managers suggested that an additional staff would be required as replacement for the project-funded Nutrition Counsellor. The clinic managers opined that the PSKP/NSDP decision-makers should consider the detailed modalities of additional resource mobilization on completion of the piloting phase. Talking about the strengths of the intervention, the managers identified that an additional infrastructure was not required for this intervention, and it was well-accommodated within the ongoing ESP delivery system of the clinic. However, the managers opined that lack of the community involvement was its major weakness.

Profile of Providers Cost

Capital cost of non-expendable materials

The current value of non-expendable material inputs (weighing machines, length boards, and carrying bags) were Tk 4,640 (US\$ 80), Tk 1,500, and Tk 400, respectively. The current price of weighing machine (Uniscale, SECA-980) was determined in consultation with the local UNICEF office that had supplied these machines for the intervention. The current prices of other two items correspond to the local market price of 2003 as suggested by their manufacturers. Useful lifetime of these inputs was estimated from the same sources.

Table 1 shows that the total 'annualized cost' of non-expendable material inputs was Tk 60,871 (US\$ 1,050). However, the overall usage of weighing machines for the PM-project was 17%, while the remaining 83% of its usage went for growth monitoring and promotion (GMP) of children who were not severely malnourished. Calculating the cost of 25 weighing machines according to its 17% use for the PM project, the annualized cost of weighing machine stands at Tk 7,242 (US\$ 125) only. Similarly, based on 17% use for the PM project, the cost of 33 carrying bags stands at Tk 2,357 (US\$ 40.63) only. Among these three items, length boards were exclusively used (100%) for the PM project. Therefore, the total apportioned and annualized cost of these non-expendable material inputs stands at Tk 14,005 (US\$ 241.46) and for the whole project period of 25 months it stands at Tk 29,177 (US\$ 503).

Table 1. Capital cost of non-expendable material inputs

Input	Total quantity (1)	Price per unit (Tk) (2)	Current value (Tk) (3)	Useful lifetime (years) (4)	Annualization factor (5)	Annualized cost (Tk) (6)	Apportioned cost by % of use (Tk) (7)	Total cost (Tk) (8)
Weighing machine	25	4,640	116,000	3	2.723	42,600	7,242*	15,087.50
Length board	8	1,500	12,000	3	2.723	4,406	4,406**	9,179.20
Carrying bag	33	400	13,200	1	0.952	13,865	2,357*	4,910.40
Total						60,871 (US\$ 1,050)	14,005 (US\$ 241.46)	29,177.10 (US\$ 503.05)
Note: Discount rate=5%; Local exchange rate of 2003; US\$ 1= Tk 58 (Standard table of annualization factor annexed) * 17% of annual cost; ** 100% of annual cost (Figure in column 7 is divided by 12 months and then multiplied by 25 months to get the figures shown in column 8)								

Capital cost of non-recurrent training

Table 2 depicts the overall actual expenditure borne by the project by type of training offered, clinic name, and distribution of participants, excluding faculty time.

Table 2. Training cost

Sl. no.	Name of training	Clinic name	Batch	No. of participants	Total amount (Tk)
1	PSKP basic training (12 half-days)			34	127,590
	Sub-total				127,590
2	PSKP refresher training (7 days)	Mirpur 10	1 st	6	3,600
		Pallabi	1 st	4	2,250
		Tejgaon	1 st	4	2,000
	Sub-total				7,850
	PSKP refresher training (7 days)	Mirpur 10	2 nd	4	2,400
		Pallabi		7	4,800
		Tejgaon	2 nd	4	1,900
	Sub-total				9,100
3	PSKP compressed basic training (18 days)	Mirpur 10	1 st	2	2,250
		Pallabi	1 st	5	8,000
		Tejgaon	1 st	2	2,250
	Other expenditure				390
	Sub-total				12,890
	Total actual expenditure				Tk 157,430 (US\$ 2,714)

Considering a useful lifetime of two years and 5% discount rate (at an annualization factor of 1.859), the annualized value of this non-recurrent training stands at $(157,430 \div 1.859)$ Tk 84,685.31 and for 25 months $(157,430 \div 12 \times 25) =$ Tk 176,427.72 equivalent to US\$ 3,041.85. Total capital cost (annualized total) for 25 months is shown in Table 3.

Table 3. Total capital cost (annualized total for 25 months)

Cost category	Taka	US \$
Non-expendable materials	29,177.10	503.05
Training (non-recurrent)	176,427.72	3,041.85
Total	205,604.82	3,544.90

Recurrent cost of additional staff

Three female paramedics (one for each clinic) were recruited, trained, and deployed at the intervention clinics by the project to work as Nutrition Counsellor. This was the only category of additional manpower provided by the project for the intervention clinics. As all Nutrition Counsellors were assigned full-time to the intervention-related activities and their salary was fixed, 100% of this staff cost was calculated for the whole of the intervention period (fixed cost). A consolidated amount of three Nutrition Counsellors' salaries is shown in Table 4. Time-log annexed (Annexure C, Table 14c) shows the time spent in actual contact of the enrolled children by Nutrition Counsellors and other key providers at the clinic and household levels. However, it does not include the Nutrition Counsellor's time spent in travelling, record-keeping, attending meetings, and preparing report returns.

Table 4. Additional staff cost

Designation	Number	Duration (Month) June 2001- April 2003	% of efforts	Total basic pay (Tk)	Total other allowances (TA, phone calls, photocopy)	Total cost (Tk)
Nutrition Counsellor	3	23	100	411,600	243,202	654,802
Total						654,802 US\$ 11,290
TA=Travelling allowance						

Staff cost of other key providers

In addition to the Nutrition Counsellors, other key personnel involved in the delivery of protocol-recommended management of the enrolled children included Clinic Managers, other Medical Officers, Sr. Service Promoters, and Paramedics. Salaries and other benefits of these regular staff members were borne by the PSKP clinic authority. They were mainly assigned to deliver the ESP for the catchment population. As the PM Project was operated through the PSKP's ongoing ESP programme, cost of these routine staff members was not considered in calculating additional staff cost. However, time allocation between the intervention-related activities and other ESP activities was observed by type of provider (Annexure C, Table 15c).

Recurrent cost of supplies

Table 5 shows the total cost of non-consumable supplies used up during 25 months of the intervention was Tk 8,035 (US\$ 138.51). Quantity of these items varied as the number of each item consumed by each child enrolled varied according to their individual requirement (variable cost). The unit price of plastic measuring cup, container, and bottle was Tk 3, Tk 14, and Tk 3 respectively, while the unit price of growth card was Tk 5 (Annexure C, Table 10c).

Table 5. Recurrent cost of non-consumables

Items	Total quantity	Unit price (Tk)	Total cost (Tk)	US\$
Growth card	509	5	2,545	43.87
Plastic cup	465	3	1,395	24.05
Plastic container	216	14	3,024	52.13
Plastic bottle	357	3	1,071	18.46
Total			8,035	138.51

Food supplements: The project had to buy *pustipack* and soyabean oil at the beginning of the project at a rate of Tk 4 per packet and Tk 50 per litre respectively. During the later part of the project (June 2002-March 2003), *pustipacks* were replaced by WFP-donated 'multimix' that did not require any oil for cooking. As the market price of multimix was not available, price of a similar product produced by Gonoshasthya Kendra (GK) was taken as shadow price for estimating the cost of multimix that was equivalent to Tk 23 per kg (Annexure C, Table 3c-6c).

Welfare Fund for drugs and transport cost: The project operated a 'Welfare Fund' for each intervention clinic to reimburse the money spent by the respective intervention clinic for supplying prescribed drugs (multi-vitamin drops, iron tablets, and other medicines to treat associated illness) to the enrolled children falling under eligibility criteria and for reimbursing transport costs to the parents of those children who were unable to pay for the same. An imprest account of Tk 2,000 per clinic was maintained throughout the 25-month intervention period. However, the Welfare Fund was not uniformly used over the intervention period. Actual spending under this head was calculated from the project database (Annexure C, Table 9c) and other records. Zinc syrup (local brand name of which is Pep-2 syrup) was procured from the supplier at a price of Tk 20 per phial and was distributed to all enrolled children as required. Table 6 represents the costs of the above-mentioned recurrent variable inputs that include supplies, welfare fund and stationeries (Annexure C, Table 8c) and Table 7 shows the total recurrent costs.

Table 6 Recurrent cost of consumables and stationeries

Item	Total quantity	Unit price (Tk)	Total cost	
			Tk	US\$
Pep 2 (zinc syrup)	1,420 bottles	20	28,400	489.65
Multimix* (food supplement)	850 kg	23	19,550	337.00
Pustipack** (Food supplement)	228 bags x 100 packs =22,800 packets	4	91,200	1,572.41
Soyabean oil**	150 litres	50	7,500	129.41
Welfare Fund (for drugs and transport cost)			107,678	1,856.51
Stationeries	25 months		15,418	265.82
Total			269,746	4,650.79

* Supplied since June 2002

** Supplied initially during March 2001-May 2002

Table 7. Total recurrent cost

Input	Cost	
	Tk	US\$
Additional staff cost	654,802.00	11,290.00
Consumables, stationeries, and welfare fund	269,746.00	4,650.79
Non-consumables	8,035.00	138.51
Total	932,583.00	16,079.30

Table 8. Provider's total cost

Cost category	Tk	US\$
Capital cost		
Non-expendable materials	29,177.10	503.05
Non-recurrent training	176,422.72	3,041.85
Sub-total	205,599.82	3,544.90
Recurrent cost		
Additional personnel	654,802.00	11,290.00
Consumables, stationeries and welfare fund	269,746.00	4,650.79
Non-consumables	8,035.00	138.51
Sub-total	932,583.00	16,079.30
Grand-total	1,138,182.82	19,624.20

Table 8 shows that the total additional costs incurred by the provider stands at Tk 1,138,182.82, an equivalent of US\$ 19,624.20, for the whole period of the intervention. Therefore, the provider's average cost per child enrolled and managed under the protocolized management project of 25 months stands at (US\$ 19,624.20÷465) US\$ 42.20 irrespective of outcomes. An additional input-mix worth of US\$ 19,624.20 has resulted in the enrollment and management of 465 severely-malnourished target children irrespective of outcomes. However, the unit cost of 292 children who eventually recovered stands at (US\$ 19,624÷292) US\$ 67.20. Other outcome-specific average costs have been presented in the section on effectiveness indicator.

Breakdown of provider's unit cost

Table 9 shows that the greatest proportion of providers unit cost arises for personnel cost. About 58% of the unit cost went for paying salaries and benefits of additional staff in each clinic.

Table 9. Breakdown of provider's unit cost per child enrolled and managed by inputs (n=465)

Cost category	Input	Total cost (US\$)	Cost /unit (US\$)	Share of unit cost (%)	Share of total cost (%)
Capital cost	Non-recurrent training	3,041.85	6.54	15.49	15.50
	Non-expendable materials	503.05	1.08	2.55	2.56
Sub-total		354.90	7.62	18.04	18.06
Recurrent cost	Personnel	11,290.00	24.27	57.51	57.53
	Consumables, stationeries, and welfare fund	4,650.79	10.00	23.69	23.69
	Non-consumable items	138.51	0.29	0.68	0.70
Sub-total		16,079.30	34.56	81.88	81.92
Total		19,624.20	42.20	100.00	100.00

Table 10 shows a further breakdown of recurrent inputs by specific items with their corresponding cost profiles. With regard to the supply of food supplement, per-capita cost of multimix was (337÷465) US\$ 0.72, while for *pustipack* with soyabean oil and a plastic bottle for carrying oil, the per-capita cost was much higher i.e. (1,720.18 ÷465) US\$ 3.69.

Table 10. Breakdown of unit cost by recurrent inputs (n=465)

Cost category	Input	Total cost (US\$)	Cost/unit (US\$)	Share of unit cost (%)	Share of total cost (%)
Recurrent	Personnel	11,290.00	24.27	70.22	70.21
	Pep-2 (zinc syp.)	489.65	1.05	3.03	3.04
	Other drugs transp.	1,856.51	3.99	11.54	11.54
	Multimix	337.00	0.72	2.08	2.09
	Pustipack+oil+bottle	1,720.18	3.69	10.67	10.69
	Growth cards	43.87	0.09	0.26	0.27
	Plastic cups	24.05	0.05	0.14	0.14
	Plastic containers	52.13	0.11	0.31	0.32
	Stationeries	265.82	0.57	1.64	1.65
	Total	16,079.30	34.56	100.00	100.00

The results suggest that provider's unit cost for 292 children who recovered during the intervention period was US\$ 67.20. Breakdown of this unit cost by inputs also reflects similar cost implications of the line items on the average cost as shown in Table 11.

Table 11. Breakdown of provider's unit cost for 292 recovered children

Cost category	Input	Total cost (US\$)	Cost/unit (US\$)	Share of unit cost %	Share of total cost %
Capital	Non-recurrent training	3,041.85	10.41	15.75	15.50
	Non-expendable materials	503.05	1.72	2.59	2.56
Sub-total		3544.90	12.13	18.34	18.06
Recurrent	Personnel	11,290.00	38.66	58.39	57.53
	Consumables, stationeries, and welfare fund	4,650.79	15.92	24.04	23.69
	Non-consumables	138.51	0.47	0.70	0.70
	Sub-total	16,079.30	55.05	83.13	81.92
Total		19,624.00	67.20	100.00	100.00

Profile of Client's Cost

Client costs were assessed for the sub-set of 67 enrolled children who were prospectively followed for three months. The findings are presented in two ways: client costs with respect to outcomes (recovered and un-recovered) and irrespective of outcomes.

Travel time, waiting time, and consultation time

Waiting time was nil in 33.3% contacts, while more than half of the contacts reported 1-10 minute(s) of waiting time. Nearly 80% of the contacts were living within a distance of 1 km from the clinic, which took only 15 minutes to travel by 95% of them. As walking was the mode of transportation for 69.4% of the contacts, the travel cost was nil among them. Consultation time at clinic (that includes physical assessment, counselling, treatment, and record-keeping) ranged from 30 to 60 minutes in 42% of the client-provider contacts, while it was 60-80 minutes in 40% of the contacts. In the

remaining 18% of contacts, <30 minutes were spent for consultation. The mean total time spent at the clinic (waiting + consultation) by the respondents in each visit was 50 minutes.

Client's opportunity cost

Socioeconomic information on occupation showed that 58% (n=39) of the mothers were housewives. The remaining 42% (28) mothers were working women (maidservant, garment worker, day labourer). The opportunity cost of these working-mothers has been shown based on wage loss (if any) in Tables 12 and 14. Replying to a question on opportunity forgone for seeking nutrition care for their children the housewife-mothers opined that their next best alternative use of time spent would have been housework. If we apply the market value approach to capture the economic value of time lost by housewife-mothers in seeking care, a wage rate for similar activities has to be apportioned for these mothers. For a similar activity, work and wage of maidservant can be considered as the majority of the working mothers in the sub-set were maidservants. In the sub-set, the average number of clinic visits by the respondents was 4. Considering an average time of 60 minutes spent in each visit, the total time spent at a clinic, on average, stands at 4 hours per respondent. Taking Tk 1,000 as average monthly wage of a maidservant (8 hours x 30 days), the income per hour stands at Tk 4.17. Therefore, in 4 hours it would be equivalent to (4.17x4) Tk 17. The intangible time cost for the housewife-respondents on account of time spent for seeking protocolized nutrition services from the clinic was equivalent to Tk 17 only. Of the 39 housewife-mothers, 21 had children who eventually recovered. Therefore, the total time cost of these 21 mothers could be maximally (Tk 17x21) Tk 357.

Children of the remaining 18 housewife-mothers did not recover during the costing study period. Therefore, the total time cost of 18 housewife-mothers of un-recovered children could be maximally (17x18) Tk. 306.

Outcome-specific (recovered and un-recovered) client costs

Tables 12 and 13 show the client costs borne by the households of 36 recovered sub-set children by clinic visits and cost components. Client costs for the remaining 31 sub-set children who eventually did not recover on account of other outcomes (labelled with exit code 2-6) during the same period were estimated as long as they complied with the protocol-recommended follow-up schedules. This is shown in Tables 14 and 15.

Table 12. Direct and indirect client costs borne by households of 36 recovered children by type of clinic visit

Clinic visit	Direct cost (Tk)						Indirect cost (Tk)		
	Travel		Drugs		Protocol food*		Wage loss		Time cost of house wives
	Actual	Mean	Actual	Mean	Actual	Mean	Actual	Mean	
Day of Enrollment	56 (8)	7	132 (11)	12	00	0	127 (3)	42.3	
1 st follow-up	48 (7)	7	15 (1)	15	1,485 (30)	49.5	12 (1)	12	
2 nd follow-up	58 (8)	7.2	8 (1)	8	1,632 (28)	58.2	0	0	
3 rd follow-up	30 (6)	5	00	0	1,339 (25)	53.5	0	0	
4 th follow-up	21(4)	5.2	00	0	939 (21)	44.7	0	0	
5 th follow-up	10 (2)	5	22 (2)	11	1,181 (18)	65.6	0	0	
6 th follow-up	4 (1)	4	00	0	338 (7)	48.2	0	0	
7 th follow-up	0 (0)	0	00	0	46 (2)	23.0	7 (1)	7	
Total	227 (36)	6.3	177 (15)	12	6,960 (131)	53.1	146 (5)	29.2	357 (21)
*Protocol-recommended foods included home-made <i>khichuri</i> , milk-suji, and family food with extra oil for children (Figures in parentheses indicate the number of respondents)									

Table 13 shows that the total direct cost borne by the households of 36 recovered children was Tk 7,364.00 (US\$ 126.97). The total indirect cost relating to wage loss and time cost of mothers of the recovered children stood at (146+357) Tk 503 and the total client cost stood at (7,364+503) Tk 7,867

(US\$ 135.64). Therefore, the average cost to get a child recovered through the protocolized management project was $(7,867 \div 36)$ Tk 218.52 (US\$ 3.76) or US\$ 4 only for the corresponding households of the study subjects under the sub-set.

Table 13. Total client costs for 36 recovered children of the sub-set

Cost category	Tk	US\$
Direct cost	7,364.00	126.97
Indirect cost	503.00	8.67
Total	7,867.00	135.64

Tables 14 and 15 show client costs for the remaining 31 households whose children did not recover during observation. The total direct out-of-pocket expenditure was Tk 4,326 and the indirect cost through wage loss and time cost of working/housewife-mothers was $(305+306)$ Tk 611. Therefore, the total client cost for those 31 households stood at $(4,326+611)$ Tk 4,937, and the client's unit cost for this category of un-recovered children was $(4,937 \div 31)$ Tk 159.25 (US\$ 2.74).

Table 14. Direct and indirect client costs borne by households of 31 un-recovered children by type of clinic visit

Visits	Direct cost (Tk)			Indirect cost (Tk)	
	Travel	Drug	Protocol food	Wage loss	Time cost of house wives
Enrollment (31)	96 (10)	120 (7)	-	151 (3)	
1 st Follow-up (27)	76 (7)	112 (4)	672 (22)	66 (1)	
2 nd Follow-up (17)	73 (9)	17 (2)	820 (16)	25 (1)	
3 rd Follow-up (17)	54 (5)	-	531 (15)	3 (1)	
4 th Follow-up (17)	43 (5)	26 (1)	587 (16)	-	
5 th Follow-up (13)	38 (4)	-	683 (11)	-	
6 th Follow-up (9)	10 (1)	-	184 (8)	60 (1)	
7 th Follow-up (3)	6 (1)	-	99 (2)	-	
8 th Follow-up (2)	2 (1)	-	167 (2)	-	
9 th Follow-up (1)	6 (1)	-	-	-	
Total	308 (44)	275 (14)	3,743 (92)	305 (7)	306 (18)

(Figures in parentheses indicate the number of respondents)

Table 15. Total client cost for 31 unrecovered children

Cost category	Tk	US\$
Direct cost	4,326	74.58
Indirect cost	611	10.53
Total	4,937	85.11

Client costs irrespective of outcomes: Summing up the amount of direct and indirect costs incurred by the client households (Tables 13 and 15), the total costs borne by the households of the 67 sub-set children stood at $(11,690+1,114)$ Tk 12,804 (US\$ 220.75). So, the client's unit cost, irrespective of outcome stood at $(12,804 \div 67)$ Tk 191.10 (US\$ 3.29).

Table 16. Client costs in sub-set by cost category and outcomes

Outcome	Number (n)	Direct cost (Tk)			Indirect cost (Tk)		Total client cost
		Travel	Drugs	Protocol food	Wage loss	Time cost	
Recovered	36	227	177	6,960	146	357	7,867
Unrecovered	31	308	275	3,743	305	306	4,937
Total	67	535	452	10,703	451	663	12,804 (US\$ 220.75)

Breakdown of client's unit cost

Table 17 elaborates the breakdown of client's unit cost by inputs. It was evident that the average out-of-pocket expenditure (direct cost) for protocol-recommended food ranked highest among all the line items. It represented 84% of client's unit cost, equivalent to US\$ 2.75 of US\$ 3.27. Overall, 91% of client's unit cost was spent for meeting direct expenditure incurred by the households on travel, drugs, and protocol-recommended food.

Table 17. Breakdown of client's unit cost by inputs in the sub-set (n=67)

Cost category	Input	Total cost (Tk.)	US\$	Cost/unit (US\$)	Share of unit cost %	Share of total cost %
Direct	Travel	535	9.22	0.13	3.97	4.17
	Drugs	452	7.79	0.11	3.36	3.53
	Protocol food	10,703	184.53	2.75	84.09	83.59
Sub-total		11,690	201	2.99	91.43	91.29
Indirect	Wage loss (5+7=12)	451	7.77	0.11	3.36	3.52
	Time cost (H/W mothers, 21+18=39)	663	11.43	0.17	5.19	5.17
Sub-total		1,114	19.2	0.28	8.56	8.69
Total		12,804	220.75	3.27	100	100

Table 18 shows a similar picture being reflected in the unit cost of 36 children recovered in the sub-set.

Table 18. Breakdown of client's unit cost for 36 recovered children in the sub-set

Cost category	Input	Total cost (Tk)	US\$	Cost/unit (US\$)	% of unit cost	Total cost
Direct	Travel	227	3.91	0.10	2.67	2.88
	Drugs	177	3.05	0.08	2.14	2.25
	Protocol food	6,960	120.00	3.33	89.04	88.50
Sub-total		7,364	126.96	3.51	93.85	93.63
Indirect	Wage loss (5)	146	2.51	0.06	1.60	1.85
	Time cost (H/W mothers, 21)	357	6.15	0.17	4.55	4.53
Sub-total		503	8.66	0.23	6.15	6.38
Total		7,864	135.62	3.74 (Tk 217)	100.00	100.00

Effectiveness Indicators

Number and proportion of identified severely-malnourished children graduated to moderate malnutrition

For effectiveness evaluation of the intervention, management and monitoring of the enrolled children were extended for one month beyond the enrollment period, i.e. until 30 April 2003. Of the 465 children enrolled up to 31 March 2003 and managed and observed through 30 April 2003, 292 (62.8%) improved to moderate malnutrition. The mean weight-for-age improvement achieved by these children between enrollment and discharge upon recovery from severe under-weight was an increase of 0.86 in the weight-for-age z-score. Their mean duration in the Protocol was 88 days, corresponding to a monthly rate of improvement of 0.29 in the weight-for-age z-score. The final status at 'exit from protocol' for the remaining 173 children at the closing date of the observation period was as follows:

Table 19. Final status at exit from the protocol of 173 children

Status	Number	Percentage
Remaining under management	30	6.5
Moved to unknown address	30	6.5
Left the clinic area	51	11.0
Discharged from Protocol unimproved on grounds of parents' non-compliance and non-cooperation	52	11.2
Died while enrolled ¹	5	1.1
Lost to follow-up	5	1.1

Number and proportion of identified severely-malnourished children achieving adequate rates of weight gain

For hospital-based rehabilitation of severely-wasted children, whose intakes and weight gains were intensively monitored, a weight gain of less than 5 g/kg per day for three consecutive days has been defined as failure to respond to treatment for children under home-based management, no similar standard exists. Considering the less-well controlled feeding and disease-control regimens for under-weight children under community-based protocolized management, a weight gain of at least 3 g/kg per day was considered to be acceptable. By this measure, only 142 (33.4%) of enrolled children with weight-for-age z-scores available both at enrollment and exit from the protocol² achieved this pre-defined daily rate of weight gain. Of 292 children who improved to moderate under-weight, 126 (43.2%) improved at this rate.

As an alternative standard for assessing rates of improvement, the protocol adopted a monthly improvement of at least 0.25 weight-for-age z-scores as the minimum weight gain to be achieved by each child under management. This measure was used for monthly monitoring of weight-for-age improvements of individual children and provided as feedback to the Clinic Managers and Nutrition Counsellors of the intervention clinics. Using this alternative measure, 220 (51.8%) of the 425 enrolled children³ improved at a rate of >0.25 weight-for-age z-scores per month, 148 (34.8%) improved at less than the targeted rate ($0 \geq \Delta W/A \text{ z-score/month} < 0.25$), while weight-for-age of 32 (7.5%) children deteriorated even while under protocolized management ($\Delta W/A \text{ z-score/month} < 0.0$).

¹ Of the five children who died while enrolled, two died while under management at the Nutrition Unit of a referral hospital, one during surgery for congenital heart disease at a tertiary-level referral hospital, while one child died after discharge from the referral hospital. The fifth child died at home shortly after enrollment following a post-circumcision infection and after refusing feeds due to an infected mouth, with no care having been sought for his terminal illness.

² Excluding 30 children who remained under management, 5 children who died and 5 children lost to follow-up.

³ See footnote 2

Number and proportion of identified severely-malnourished children rehabilitated and then sustaining normal rates of weight gain

For enrolled children who had improved to moderate under-weight, the protocol allowed a six-month follow-up after discharge from protocolized management to assess whether normal rates of weight gain were being sustained. There were, among 418 children enrolled before 30 September 2002, 170 children who had improved to moderate under-weight by that date and who had, thus, been due for six-monthly follow-up at the intervention clinics by 31 March 2003. Due to high mobility of the mainly slum-resident study population and the limited follow-up capabilities of the intervention clinics, six monthly follow-up weights were available for only 76 (44.7%) of these children. Of them, 64 (84.2%) sustained and even further improved on the weight-for-age improvements achieved while they were under protocolized management; only 12 children (15.8%) had regressed to severe under-weight:

Table 20. Mean weight-for-age z-scores of children by status

Status	Mean W/A z-score at enrolment	Mean W/A z-score at discharge	Mean W/A z-score at 6-month follow-up	Mean difference in W/A z-score between discharge and 6-month follow-up
W/A improvement sustained or further improved: 64 children	- 2.66	- 2.81	- 2.47	0.34
W/A improvement not sustained: 12 children	- 3.66	- 2.90	- 3.41	- 0.52

Seven of the 76 children had, in fact, further improved to normal weight-for-age status, achieving a mean weight-for-age z-score at follow-up of -1.64.

To summarize the above-mentioned effectiveness by selected indicators, it is evident that, in total, 465 children were identified as severely-malnourished, of whom 292 improved to moderate malnutrition, showing 62.8% recovery. The final status of the remaining 173 enrolled children is shown in Table 14. Taking weight-gain of at least 3 g/kg/day as standard for the protocol, 142 of 425 children achieved adequate rates of weight gain (excluding 40 from 465 as 30 enrolled children remained under management, 5 died, and 5 lost to follow-up) showing 33.4% of children achieving adequate rate of weight gain. With regard to the number and proportion of children rehabilitated and then sustaining normal rate of weight gain, 76 of 176 children recovered by 30 September 2002 were available for six monthly-follow up by 31 March 2003. Of them, 64 (84.2%) had sustained and even improved further.

Based on the above-mentioned effectiveness measures, cost per outcome is shown in Table 21.

Table 21. Distribution of cost by selected outcomes

Indicator	Outcome(s)		Total cost (US\$)	Cost/outcome (US\$)
	No.	%		
Graduated to moderate under-weight	292 (465)	62.8	19,624.00	67.20
Rehabilitated and sustained adequate weight gain	64 (76)	84.2	6,172.91*	96.45
*Based on the number of enrolled children shown in parentheses, the proportionate recurrent cost was calculated and then added to the total capital cost to calculate the total cost)				
(Parentheses show the total number of enrolled children identified to measure the effectiveness of the corresponding indicator.				

Discussion

The cost profile of the protocolized management project showed that the provider's average cost was not low (US\$ 42.20 irrespective of outcome). However, it should be compared with the costs of other child-survival interventions with known effectiveness. Attanayake *et al.* 1989-90 conducted an economic study on Matlab MCH-FP project which showed the in case of ARI that the average cost per case treated was US\$ 40, while the Matlab nutrition rehabilitation unit (NRU) incurred an average cost of US\$ 400 per case treated and managed (2). Ann *et al.* 1997-98, by examining the costs of immunization services in the public sector in Bangladesh, showed that the average cost per fully-immunized child was US\$ 21.5. After more than a decade of running the EPI project and having achieved 50% coverage of full immunization in children, the average cost per child was still found to be moderately high in 1998 (3). Horion and Claquin 1979-80, in a cost-effectiveness study on Matlab treatment centre found that the average cost (in the long-run) of treating diarrhoea cases at the Matlab hospital was US\$ 16-17 with an additional cost of US\$ 13 if the patient came by ambulance. Results of this study suggest that the clinic-based curative care for diarrhoea is high compared to the resources available in a developing country (4).

With regard to malnutrition in children, serious consequences, including death and reduced productivity in adulthood, have long been evident through different studies. Rehabilitating such children is difficult and expensive, and prevention is not cheap either (5).

Results of a costing exercise generally provide useful information for assessing the efficiency, effectiveness, equity, affordability, cost projection, and cost-recovery of an intervention. Some of these have been discussed here in the light of the data shown in the results section.

Economic efficiency is the combination of inputs that minimizes the cost of producing a given level of output. There are different ways by which we can look at the economic efficiency of an intervention. One way is to analyze the cost profiles and highlight the categories of inputs with high cost and its implications on cost savings, if any. Average cost and economies of scale are the other two indicators commonly used.

Provider cost

For analyzing the cost profile, the breakdown of average cost by inputs has been shown in Tables 9, 10, 11, 17, and 18 to assess the potential for cost containment. For initial investment, the overall total additional cost (US\$ 19,624) incurred by the three PSKP clinics for this project was not high. Especially the capital cost was low (US\$ 3,544.90); it was only 18% when calculated as proportion of unit cost (Table 9). This is indicative of potential of further enrollment and, thereby, improvement of efficiency.

The average number of new enrollments per clinic per month was low (overall 6.2 and during the cost study period 7.4 only). The low enrollment of malnourished children can be attributed to three main factors. First, even severe under-weight, which was the enrollment criteria for this intervention, may not be readily discernable by mothers and other caretakers; mothers and other caretakers are, moreover, mostly unaware of the consequences of malnutrition and, hence, do not perceive it as a health problem for which services would be sought. Second, the clinic personnel had no managerial incentive to actually assess weight-for-age of all attending children at first visit. Nutritional assessments were, thus, most likely to be missed on 'busy' clinic days, like EPI days, presenting the best opportunities for identifying malnourished children. Third, although there had been an initial intention for conducting household-level outreach systematically and on the basis of a household register for the catchment areas of satellite clinics, outreach was conducted only sporadically and haphazardly. Of the total provider costs, costs of the Nutrition Counsellor and of training constituted 73%. This indicates that an increase in enrollment, e.g. through active and systematic outreach, could significantly reduce the unit (average total) cost per enrolled child.

As a whole, 88% of the unit cost was borne by the provider (Table 9) for mobilizing recurrent inputs (equivalent to US\$ 35 of US\$ 42). So, it is important to identify ways for reducing cost, especially staff cost as 57.5% of the unit cost was spent for paying one additional staff (Nutrition Counsellor) in each clinic. This might warrant examination whether the duties of the 'dedicated'

Nutrition Counsellors used in this pilot could be added to the job description and responsibilities of the existing female Paramedics currently employed at the PSKP clinics. This is, however, unlikely to work: Job tasks as defined for this pilot included nutritional anthropometry, nutrition counselling and weight gain monitoring, monitoring of attendance for scheduled follow-up visits and household visits to defaulters, home-visits for assessing the malnourished child's home environment, assistance with hospital admissions for referred children, administration of take-home supplements and the Welfare Fund, and related record-keeping. It is unlikely that these job responsibilities could be 'fitted' into the job responsibilities of a Paramedic. Even more importantly, the changes in household-level feeding and caring behaviours sought under this intervention depend on the establishment of trust between clinic personnel and children's caretakers. This will only develop if clinic personnel care about the recovery of individual children and can take time to interact with the child's caretaker. In the 'normal' work routines for PSKP paramedics this is not allowed.

Among other recurrent inputs, costs of consumable supplies, stationeries, and welfare fund ranked highest (US\$ 10), equivalent to around 24% of the unit cost. As a whole, around 82% of the unit cost went for mobilizing recurrent inputs (equivalent to US\$ 35 of US\$ 42).

Introduction of multimix as a substitute to *pustipack* was a cost-effective measure taken by the pilot. The costs of *pustipack*, oil, and plastic bottle have been included in the calculation of average cost, although their use was dropped during the latter half of the intervention (Table 10). So, the unit cost was virtually reduced by US\$ 3.69 by replacing *pustipacks* with multimix and, hence, the overall unit cost was reduced from US\$ 42.20 to US\$ 38.51. It is evident that there is one line item (*pustipack* with soyabean oil and bottle) that could be dropped and, thus, a scope exists for a decrease in unit cost by about US\$ 4.

The growth card and weighing machine had contributed only US\$ 0.09 and US\$ 0.56 per capita in the unit cost respectively. As mentioned earlier, these weighing machines were mainly used for monthly growth monitoring and promotion of children who were not severely under-weight. Through this activity, 5,357 growth cards were sold at a per-copy rate of Tk 10 (or less), which generated a revenue of Tk 53,018 (US\$ 914), which was equivalent to 4.65% of the total provider cost (US\$ 19,624), used by the provider clinics. It indicates that the project had potential for cost-recovery of at least 4.65% which could be further enhanced by publicizing the project among the catchment population. A separate study is needed to investigate the feasibility of such cost-recovery. The weighing machines and growth cards had served two purposes: efficient-revenue generation and service delivery to the poor who were unable to pay.

Efficiency can be further examined by looking at the ratios of cost and effectiveness. The results on effectiveness indicators (Table 21) showed that cost per outcome decreased as the number of enrolled children increased for measuring outcome/effectiveness.

Client costs

For receiving and following the protocol-recommended management, each household of 67 sub-set children had to spend, on average, an additional amount of Tk 191.10 (US\$ 3.29) only. This includes the indirect cost estimated through time cost of 39 housewife-mothers and wage loss of 12 working mothers--equivalent to Tk 663 and Tk 451 respectively (Tables 12 and 14). Therefore, the opportunity cost of obtaining nutrition care under the PM project was low for the majority of cases.

Considering the average time required for recovery in the sub-set as 56 days and client's unit cost for children who recovered as Tk 218.52, clients cost per day stands at $(218.52 \div 56)$ Tk 4 only and Tk 120 per month only. For the average period of recovery, it amounts to (4×56) Tk 224 only. Considering the median income of the household as Tk 3,000 per month and monthly expenditure of Tk 120, the proportion of client cost becomes 4% of the monthly household income. Therefore, it is evident that the cost incurred by households surveyed in the sub-set whose children did recover was low, and it is indicative that the intervention was affordable for those households.

The project overwhelmingly covered the poor section of the catchment population enhancing equity by way of improving their nutritional status, thereby reducing the nutritional gap between the rich and the poor. Activities of the protocolized management project were self-targeted on the poorest, supporting equity objectives.

Summary

The provider's average cost per children enrolled and managed irrespective of outcome was US\$ 42.20. With replacement of food supplement (replacement of *pustipack*-soyabean oil by multimix), the average cost per child was reduced to US\$ 38.55. The estimated total additional cost incurred by the three intervention clinics was equivalent to US\$ 19,624.20, of which capital cost was US\$ 3,544.90 and recurrent cost was US\$ 16,079.30. The average cost of running the intervention per clinic was US\$ 6,541. Over a 25-month period, these investments in three PSKP clinics have resulted in identification and management of 465 severely-malnourished children, of whom 292 (62.8%) eventually recovered. The cost per selected outcome decreased with an increased number of actual beneficiaries, i.e. numbers of children graduated and numbers of children rehabilitated and then sustaining weight gain. However, personnel cost was high as a proportion of providers average cost per child (57.5%)

Conclusions

1. Provider's unit cost was not low, but should be compared with the unit costs of other preventive and treatment-based child-survival interventions of known effectiveness.
2. Enrolment of target children was low and could probably be improved with active outreach and community mobilization. Actual contact time of PSKP staff with clients did not show any extra pressure on PSKP clinics.
3. Provider's total additional cost, especially capital cost for initial investment, was low. However, a high proportion (57.5%) of provider's unit cost per child was spent for personnel cost.
4. There is a considerable scope for effecting efficiency gains by increasing enrollment. Increased enrollment would reduce unit costs per enrolled and per rehabilitated child, while also increasing community-level impact.
5. Replacement of *pustipacks* by multimix reduced the unit cost by around US\$ 4, indicating a scope for reducing provider's unit costs through cost minimization.
6. Revenue generated by using two material inputs of the PM project (weighing machine and growth card) for growth monitoring and promotion of children who were not severely malnourished was equivalent to 5% of the total cost of the PM project, showing the possibility of partial cost-recovery.
7. Client's unit cost for obtaining care was low (US\$ 3), indicating that participation in the intervention was affordable mainly for the target group of poor urban households.
8. The majority of the beneficiaries were far below the absolute poverty level, indicating that the protocol interventions were 'self-targeted' on the poorest, supporting equity objectives.

Recommendation

A strong component on community mobilization supported by active outreach should be considered in similar urban clinics to create increased demand and, thereby, increased use. With the increase in enrollment of target children, the unit cost is likely to decrease further in the long run.

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Annexure A

Table 1a. Percentage distribution of age and sex of children in sub-set

Age (months)	Sex		Total (n=67)
	Male (n=34)	Female (n=33)	
6	2.9	12.1	7.5
7-12	44.1	42.4	43.3
13-18	44.1	27.3	35.8
18+	8.8	18.2	13.4

Table 2a. Percentage distribution of selected socioeconomic variables of clients in sub-set

Variable	Tejgaon clinic (n=25)	Mirpur clinic (n=22)	Pallabi clinic (n=20)	Total (n=67)
Age of respondents (years)				
15-20	32	46	20	33
21-25	28	27	15	24
26-30	32	9	25	22
31-35	4	5	10	6
Above 35	4	13	30	15
Respondent's relationship with children				
Mother	92	96	80	90
Father	0	0	5	1
Grand mother	8	4	15	9
Number of living children				
1	48	50	40	48
2	28	14	20	21
3	12	9	15	12
4+	12	27	25	21
Family size				
3-4	64	41	45	51
5+	36	59	55	49
Mother's occupation				
Housewife	48	64	65	58
Maidservant	20	18	20	20
Garments worker	24	14	0	13
Small trader	4	0	15	6
Day labourer	4	4	0	3
Father's occupation				
Service holder	16	14	0	10
Skilled labour	24	18	15	20
Unskilled labour	8	5	5	6
Rickshaw-puller	32	45	55	43
Small trader	4	18	5	9
Others	16	0	20	12

Table 2a (contd...)

Table 2a. *Contd.*

Variable	Tejgaon (n=25)	Mirpur (n=22)	Pallabi (n=20)	Total (n=67)
Mother's education	64	73	65	67
No education	12	14	30	18
Primary incomplete	20	9	5	12
Primary complete	4	4	0	3
Above primary				
Father's education	36	41	45	40
No education	12	9	25	15
Primary incomplete	8	27	15	16
Primary complete	44	23	15	29
Above primary				
Monthly income (Tk)	16	36	40	30
Up to 2,000	60	50	45	52
2,001-4,000	24	14	15	18
4,001 and above				
Monthly expenditure on food (Tk)	28	32	15	25
Up to 1000	52	50	70	57
1,001-2,000	20	18	15	18
2,001 and above				
Source of drinking water	40	86	30	52
Piped inside dwelling	60	9	70	46
Piped outside dwelling	0	5	0	2
Tubewell				
Type of latrine	56	59	100	70
Water-sealed sanitary latrine	0	23	0	8
Pit latrine	44	14	0	21
Open place	0	4	0	1
Hanging latrine				
Fuel for cooking	48	18	0	24
Gas	0	14	10	8
Kerosine	52	68	85	67
Electric heater	0	0	5	1
Others				
Household possession of selected goods	80	73	100	84
Electricity	0	9	0	3
Radio	32	27	15	25
TV	57	36	25	40
Clock	8	5	5	6
Almirah	12	23	30	21
Table/chair	4	9	0	5
Bench	76	82	85	81
Cot/bed	8	0	0	3
Bicycle	4	5	0	3
Sewing machine				
Family planning methods used	20	32	25	25
Pill	12	9	0	8
Condom	0	0	0	0
IUD	12	18	10	13
Injection	0	5	0	2
Norplant	4	0	5	3
Tubectomy	48	36	35	40
Non-user	4	0	25	9
Others				

Table 3a. Type of household by construction materials

Type	Floor	Wall	Roof	Total (%) (n=67)
Non-permanent	Mud	Straw/jute/ polythene/mud	Straw/jute/polythene	13 (20)
Semi-permanent	Mud	Straw/jute/ polythene/bamboo	Tin	37 (55)
Permanent	Concrete/brick	Concrete/brick	Concrete/brick/tin	17 (25)

Table 4a. Percentage distribution of ownership of house and house rent

Ownership of house	Tajgoan (n=25)	Mirpur (n=22)	Pallabi (n=20)	Total (n=67)
Own	0	4.5 (1)	30.0 (6)	10.4 (7)
Rented	72.0 (18)	81.8 (18)	70.0 (14)	74.6 (50)
Government	4.0 (1)	9.1 (2)	0	4.5 (3)
Others	24.0 (6)	4.5 (1)	0	10.4 (7)
Monthly house rent (Tk)				
Not pay	28.0 (7)	18.2 (4)	30.0 (6)	25.4 (17)
≤500	12.0 (3)	18.2 (4)	35.0 (7)	20.9 (14)
501-1,000	44.0 (11)	50.0 (11)	35.0 (7)	43.3 (29)
1,001-1,500	4.0 (1)	13.6 (3)	0	6.0 (4)
1,500+	12.0 (3)	0	0	4.5 (3)

Note: Figure in parentheses indicate the number of respondents.

Annexure B

Table 1b. Percentage distribution of distance travelled by respondents of 36 recovered sub-set children

Distance travelled (km)	Tajgoan (n=13)	Mirpur (n=12)	Pallabi (n=11)	Total (n=36)
<0.5	15.4	41.7	100	50.0
0.5-1	46.2	41.7	0	30.6
1-2	38.5	16.7	0	19.4

Table 2b. Percentage distribution of travel time reported by respondents of 36 recovered sub-set children

Travel time (minute)	Tajgoan (n=13)	Mirpur (n=12)	Pallabi (n=11)	Total (n=36)
1-5	23.1	8.3	45.5	25.0
5-10	30.8	16.7	27.3	25.0
10-15	30.8	75.0	27.3	44.4
15-20	15.4	0	0	5.6

Table 3b. Percentage distribution of vehicles used from residence to clinic by 36 recovered sub-set children

Vehicle*	Tajgoan (n=13)	Mirpur (n=12)	Pallabi (n=11)	Total (n=36)
On foot	30.8	83.3	100	69.4
Rickshaw/van	69.2	16.7	0	30.6
Bus/tampo/autorickshaw	0	0	0	0
Others	0	0	0	0

*Multiple responses were accepted

Table 4b. Percentage distribution of travel cost reported by respondents of 36 recovered sub-set children

Travel cost (Tk)	Tajgoan (n=13)	Mirpur (n=12)	Pallabi (n=11)	Total (n=36)
Not spend money	30.8	83.3	100	69.4
4-10	69.2	16.7	0	30.6

Table 5b. Percentage distribution of reported waiting time among 36 recovered sub-set children

Waiting time (minute)	Tajgoan (n=13)	Mirpur (n=12)	Pallabi (n=11)	Total (n=36)
No waiting	30.8	33.3	36.4	33.3
1-5	15.4	8.3	36.4	19.4
6-10	38.5	41.7	18.2	33.3
11-15	7.7	0	9.1	5.6
15+	7.7	16.7	0	8.3

Table 6b. Percentage distribution of total time spent at clinic (waiting and consultation) by 36 recovered sub-set children

Time spent (minute)	Tajgoan (n=13)	Mirpur (n=12)	Pallabi (n=11)	Total (n=36)
<30	15.4	16.7	18.2	16.7
30-60	46.2	0	81.8	41.7
61-120	30.8	16.7	0	16.7
120+	7.7	66.7	0	25.0

Table 7b. Percentage distribution of services received free among 36 recovered sub-set children

Free service	Tajgoan (n=13)	Mirpur (n=12)	Pallabi (n=11)	Total (n=36)
Yes	92.3	100	100	97.2
No	7.7	0	0	2.8

Table 8b. Percentage distribution of work foregone for seeking care by respondents of 36 recovered sub-set children

Work foregone	Tajgoan (n=13)	Mirpur (n=12)	Pallabi (n=11)	Total (n=36)
Could have worked outside for money	38.5	41.7	9.1	30.6
Could have worked at home for money	7.7	0	0	2.8
Could have engaged in house work	53.8	58.3	90.9	66.7

Table 1c. Exit codes used in the intervention for denoting final status of enrolled children

Exit code	Interpretation
1	Recovered
2	Left the area for unknown address
3	Left the area for known address
4	Discharged un-recovered for non-compliance
5	Death
6	Lost to follow-up

Table 2c. Distribution of status of children enrolled and observed in sub-set by clinics

Status	Mirpur (n=21)	Pallabi (n=21)	Tejgaon (n=25)	Total (n=67)
Remaining under protocol	6	3	4	13
Exit code: 1 Recovered	11	12	13	36
2: Left the area for unknown address	3	6	7	16
3: Left the area for known address	-	-	-	-
4: Discharged unrecovered for non-compliance	-	-	-	-
5: Death	-	-	1	1
6: Lost to follow-up	-	-	-	-
Referral	1	-	-	1

Table 3c. Clinic-wise distribution of Multimix per month

Item	Clinic	Current value per kg (Tk)	Quantities supplied per month (kg)											Total (kg)
			May 02	June 02	July 02	Aug 02	Sep 02	Oct 02	Nov 02	Dec 02	Jan 03	Feb 03	Mar 03	
Multimix	Mirpur-10	23	20	40	20	20	20	20	20	20	45	25	25	275
	Pallabi	23	-	-	-	-	-	80	40	40	75	50	75	360
	Tejgaon	23	20	10	10	20	20	20	20	20	25	25	25	215
Grand-total														850

Table 4c. Clinic-wise *pustipack* distribution per month

Item	Clinic	Current value per pack (Tk)	Quantities supplied per month (packets)															Total (Pack)
			Jul 01	Aug 01	Sep 01	Oct 01	Nov 01	Dec 01	Jan 02	Feb 02	Mar 02	Apr 02	May 02	Jun 02	Jul 02	Aug 02	Sep 02	
Pustipack	Mirpur	4	500	100	400	1,200	300	900	100	400	300	300	300	-	-	-	-	4,800
	Pallabi	4	300	800	500	1,000	1,300	1,200	900	1,000	900	600	800	1,100	1,400	1,400	1,200	14,400
	Tejgaon	4	200	100	100	600	800	300	300	300	300	300	300	-	-	-	-	3,600
Grand Total																		22,800

Table 5c. Clinic-wise soyabean oil distribution per month

Item	PSKP Clinic	Current value per litre (Tk)	Quantities supplied per month (ml)															Total (ml)
			Jul 01	Aug 01	Sep 01	Oct 01	Nov 01	Dec 01	Jan 02	Feb 02	Mar 02	Apr 02	May 02	Jun 02	Jul 02	Aug 02	Sep 02	
Soya-bean oil	Mirpur	50	3,000	2,000	3,000	6,000	2,000	4,000	2,000	2,000	1,000	1,000	2,000	-	-	-	-	28,000
	Pallabi	50	2,000	6,000	4,000	6,000	8,000	6,000	8,000	8,000	8,000	4,000	6,000	6,000	12,000	6,000	8,000	98,000
	Tejgaon	50	2,000	1,000	1,000	4,000	4,000	2,000	2,000	2,000	2,000	2,000	2,000	-	-	-	-	24,000
	Grand Total																	150,000 ml (150 litre)

Table 6c. Expendable supplies for PM project over 25 months

Item	Current value (Tk)	Quantities supplied to intervention clinics	Percentage and quantity used for enrolled children		Total cost (Tk)
			%	Quantity	
(1)	(2)	(3)	(4a)	(4b)	(5=4bx2)
Growth card	5	7,360	6.9	509	2,545
Pep-2 syrup	20	1,050	135.2	1,420	28,400
Plastic cups	3	960	48.4	465	1,395
Plastic container	14	216	100.0	216	3,024
Plastic bottle	3	357	100.0	357	1,071

Table 7c. Non-expendable equipment supplied for PM project over 25-months

Item	Current value (Tk)	No. supplied	Percentage of use by enrolled children	Annualized cost (Tk)	Apportioned cost (Tk) for intervention by % of use
Weighing machine	4,640	25	17	42,600	7,242
Carrying bags	400	33	17	13,865	2,357
Length boards	1,500	8	100	4,406	4,406

Table 8c. Stationeries supplied to three intervention clinics (January 2001-February 2003)

Month	Items	Unit price		Mirpur 10		Pallabi		Tejgaon	
		US\$ ICDDR,B	Amount Tk	No.	Amount (Tk)	No.	Amount (Tk)	No.	Amount (Tk)
Jan 01	Laminated reference chart		15	16	240	16	240	16	240
	Databank ring binder		100	2	200	2	200	2	200
	Storage box for longit record		35	2	70	2	70	2	70
	Nutrition counsellor diary		100	1	100	1	100	1	100
	Nutrition counsellor year planner (wallchart)		50	1	50	1	50	1	50
	Pilot V-5, green pen		70	7	490	8	560	6	420
	Kit correction fluid white		70	7	490	8	560	6	420
	Plastic ruler		10	7	70	8	80	6	60
Apr 01	Databank ring binder		100	6	600	6	600	6	600
Oct 01	Stapling machine	1.8878	109	1	109	1	109	1	109
	Staple remover	0.5066	29	1	29	1	29	1	29
	Scissor	0.6763	39	1	39	1	39	1	39
	Punch machine	18.5432	1,076	1	1,076	1	1,076	1	1,076
	Calculator		100	1	100	1	100	1	100
	Scotch tape	2.5388	147	1	147	1	147	1	147
	Kit correction fluid white		70	1	70	1	70	1	70
	Offset paper A4-500/ream	3.5901	208	1	208	1	208	1	208
	Pencil battery	0.0931	5	1	5	1	5	1	5
	Glue stick	0.873	51	1	51	1	51	1	51
	Staples pin box-5000/box	0.51	30	1	30	1	30	1	30
	Pen, ballpoint black	0.1656	10	2	20	2	20	2	20
	Pilot V-5, green pen		70	1	70	1	70	1	70
	Pencil (2B,HB)	0.2401	14	1	14	1	14	1	14
	Eraser	0.4759	28	1	28	1	28	1	28
Feb 02	Databank ring binder		100	1	100	1	100	1	100
	Nutrition counsellor diary		100	1	100	1	100	1	100
Mar 02	Wastepaper basket	2.2223	129	1	129	1	129	1	129
	Kit correction fluid white		70	1	70	1	70	1	70
	Pilot V-5, green pen		70	1	70			1	70
	Yellow marker		28	1	28			1	28
	Pen, ballpoint black	0.1656	10			2	20		
	Pencil (2B,HB)	0.2401	14			1	14		
	Eraser	0.4759	28			1	28		
May 02	Kit correction fluid white		70			2	140		
Oct 02	Wastepaper basket	2.2223	129					1	129
Jan 03	Kit correction fluid white		70					1	70
	Pilot V-5, green pen		70	1	70	1	70		
	Yellow marker	0.873	51	1	51	1	51		
	Pen, ballpoint black	0.1656	10	2	20	2	20		
	Yellow marker		28	1	28	1	28		
Feb 03	Kit correction fluid white		70					1	70
	Pilot V-5, green pen		70					1	70
	Glue stick	0.873	51					1	51
	Pen, ballpoint black	0.1656	10					2	20
	Yellow marker		28					1	28
	Total				4,972		5,355		5,091
	Grand total						Tk 15,418		US\$ 266

Table 9c. Welfare fund expenditure from March 2001 to April 2003

Year	Month	Mirpur 10 (Tk)	Pallabi (Tk)	Tejgaon (Tk)	Total amount (Tk)
2001	March	1,325	711	428	2,464
	April	1,226	231	512	1,969
	May	1,292	1,861	729	3,882
	June	1,030	1,088	1,038	3,156
	July	2,176	1,143	1,944	5,263
	August	2,384	1,457	861	4,702
	September	2,087	2,404	1,496	5,987
	October	3,774	2,602	1,416	7,792
	November	2,382	2,730	1,434	6,546
	December	2,283	1,979	620	4,882
2002	January	2,764	3,198	1,849	7,811
	February	1,158	3,138	1,024	5,320
	March	1,207	456	1,231	2,894
	April	407	300	864	1,571
	May	438	803	844	2,085
	June	1,340	742	959	3,041
	July	1,497	1,131	202	2,830
	August	1,377	1,285	981	3,643
	September	1,196	1,132	739	3,067
	October	1,155	1,117	956	3,228
	November	1,136	1,818	1,185	4,139
	December	1,474	1,323	1,045	3,842
2003	January	1,618	1,898	1,443	4,959
	February	1,147	1,481	1,105	3,733
	March	1,260	2,014	1,742	5,016
	April	1,289	1,758	809	3,856
Total					Tk 107,678 US\$ 1,856.51

Table 10c. Growth cards issued and fee collected by three intervention clinics from Mar 2001 to April 03

Month and year	Mirpur 10			Pallabi			Tejgaon			Total		
	No. of cards issued	No. of cards sold	Taka collected	No. of cards issued	No. of cards sold	Taka collected	No. of cards issued	No. of cards sold	Taka collected	No. of cards issued	No. of cards sold	Taka collected
Mar 01	36	36	345	65	17	165	97	97	960	198	150	1,470
Apr 01	44	44	430	88	14	140	424	339	3,390	556	397	3,960
May 01	45	44	440	188	65	630	168	168	1,680	401	277	2,750
Jun 01	25	24	240	132	48	450	169	169	1,690	326	241	2,390
Jul 01	37	37	365	75	48	474	168	138	1,380	280	223	2,219
Aug 01	24	22	220	81	48	480	273	180	1,800	378	250	2,500
Sep 01	51	45	445	113	31	305	232	172	1,715	396	248	2,465
Oct 01	64	53	530	123	39	380	196	149	1,485	383	241	2,395
Nov 01	65	64	640	90	46	455	190	158	1,560	345	268	2,655
Dec 01	42	38	380	52	21	210	170	132	1,310	264	191	1,900
Jan 02	64	50	495	58	36	225	243	176	1,745	365	262	2,465
Feb 02	36	28	275	107	17	190	148	119	1,190	291	164	1,655
Mar 02	41	33	330	101	24	240	115	89	885	257	146	1,455
Apr 02	46	42	400	68	21	210	125	103	1,030	239	166	1,540
May 02	25	22	220	100	30	300	104	89	880	229	141	1,400
Jun 02	41	32	320	58	8	80	116	79	790	215	119	1,190
Jul 02	61	46	460	129	32	320	169	135	1,342	359	213	2,122
Aug 02	66	53	530	113	36	360	111	186	850	290	175	1,740
Sep 02	71	41	400	146	40	395	95	80	795	312	161	1,590
Oct 02	65	45	415	136	29	290	163	126	1,250	364	200	1,955
Nov 02	47	31	295	127	17	165	119	94	930	293	142	1,390
Dec 02	80	51	470	70	14	140	140	117	1,165	290	182	1,775
Jan 03	83	54	530	120	30	300	158	120	1,188	361	204	2,018
Feb 03	64	32	320	22	19	190	162	119	1,190	248	170	1,700
Mar 03	70	42	420	27	24	235	169	135	1,342	266	201	1,997
Apr 03	62	44	420	46	46	460	169	135	1,342	277	225	2,222
Total	1,355	1,053	10,335	2,435	800	7,799	4,393	3,504	34,884	8,183	5,357	53,018
Total (March 2001 to April 2003)										US\$ 914		

Table 11c. Time spent by Nutrition Counsellor in actual contact of enrolled sub-set children by clinic (n=67)

Staff clinic	Month and year	Total no. of contacts	Total working hours	Total time spent (minutes)	% of time spent	Mean time spent per child (minutes)
Nutrition Counsellor Mirpur clinic	Jan 03	139	8x26=208	5,760=(96 hours)	46.15	41.4
	Feb 03	98	8x26=208	4,020=(67 hours)	32.21	41.02
	Mar 03	108	8x26=208	6,060=(101 hours)	48.56	56.11
Nutrition Counsellor Pallabi clinic	Jan 03	58	8x26=208	3,410=(57 hours)	27.40	58.79
	Feb 03	48	8x26=208	2,360=(39 hours)	18.75	49.16
	Mar 03	71	8x26=208	1,385=(23 hours)	11.05	19.50
Nutrition counsellor Tejgaon clinic	Jan 03	55	8x26=208	1,140=(19 hours)	9.13	20.72
	Feb 03	70	8x26=208	1,465=(24.41 hours)	11.53	20.92
	Mar 03	41	8x26=208	1,265=(21 hours)	10.09	30.85

Table 12c. Average monthly salary of PSKP staff and annual budget (Taka)

Staff	Tejgaon (Tk)		Pallabi (Tk)		Mirpur 10 (Tk)
	Upgrade	Static	Upgrade	Static	
Clinic Manager	15,130 (1)		13,200 (1)		11,808 (1)
Medical Officer	11,200 (1)	8,000 (1)	8,000 (1)		10,400 (1)
Senior Service Promoter	8,521 (1)		7,600 (1)		8,521 (1)
Paramedic	5,600 (4)	6,513 (1)	5,601 (4)	5,601 (1)	6,841 (5)
Service Promoter	5,001 (3)		5,000 (3)	4,630 (3)	5,000 (3)
Annual budget (2002-2003)	2,672,068		1,826,228		1,862,235

Source: PSKP

Table 13c. Nutrition Counsellor's salary and allowances by study clinic

Place of work	Period	% of effort	Basic pay/month	Travel expenditure	Tel and other	Sub-total	Festival allowance	Total (Tk)
Mirpur 10 PSKP clinic	June 2001 to June 2002	100	7,040	1,521	221	114,155	8,880	122,956
	July 2002 to Apr 2003	100	8,000	1,546	277	98,224	-	98,224
Total								221,179

Place of work	Period	% of effort	Basic pay/month	Travel expenditure	Tel and other	Sub-total	Festival allowance	Total (Tk)
Pallabi PSKP clinic	June 2001 to June 2002	100	7,040	1,669	221	1,236,095	8,880	124,895
	July 2002 to Apr 2003	100	8,000	1,500	131	96,315	-	96,315
Total								221,210

Place of work	Period	% of effort	Basic pay/month	Travel expenditure	Tel and other	Sub-total	Festival allowance	Total (Tk)
Tejgaon PSKP clinic	June 2001 to June 2002	100	7,040	1,474	230	113,678	8,880	122,478
	July 2002 to Apr 2003	100	8,000	1,409	271	89,935	-	89,935
Total								212,413

Table 14c. Month-wise time-log showing time spent in protocol-related activities by PSKP clinic staff and Nutrition Counsellor

Designation	Mirpur Clinic		Pallabi Clinic		Tejgaon Clinic	
	No. of contacts	Time (minutes)	No. of contacts	Time (minutes)	No. of contacts	Time (minutes)
January 2003						
MO/CM	5	13	27	207	12	120
NC (Project staff)	139	5,760	58	3,410	55	1,140
Paramedic	39	119	99	548	19	510
SP/SSP	12	48	46	240	40	352
Total	195	5,940	230	4,405	126	2,122
February 2003						
MO/CM	6	14	15	125	2	55
NC (Project staff)	98	4,020	48	2,360	70	1,465
Paramedic	12	39	73	423	7	305
SP/SSP	0	0	25	160	34	97
Total	116	4,073	161	3,068	113	1,922
March 2003						
MO/CM	7	20	22	125	0	0
NC (Project staff)	108	6,060	71	1,385	41	1,265
Paramedic	45	164	65	346	5	155
SP/SSP	2	10	45	235	29	85
Total	162	6,254	203	2,091	75	1,505
MO=Medical Officer, CM=Clinic Manager, SSP=Senior Service Promoter, SP=Service promoter, NC=Nutrition Counsellor						

Table 15c. Mean time distribution per contact in minutes

Clinic	Staff	January	February	March	Total
Mirpur	MO/CM	2.60	2.33	2.85	2.61
	NC	41.43	41.02	56.11	45.91
	Paramedic	3.05	3.25	3.64	3.35
	SP/SSP	4.00	0.00	5.00	4.14
Pallabi	MO/CM	7.66	8.33	5.68	7.14
	NC	58.79	49.16	19.50	40.42
	Paramedic	5.53	5.79	5.32	5.55
	SP/SSP	5.21	6.40	5.22	5.47
Tejgaon	MO/CM	10.00	27.50	0.00	12.50
	NC	20.72	20.92	30.85	23.31
	Paramedic	26.84	43.57	31.00	31.29
	SP/SSP	8.80	2.85	2.93	5.18
Grand total	MO/CM	2.61	7.14	12.50	7.07
	NC	45.91	40.42	23.31	39.04
	Paramedic	3.35	5.55	31.29	7.16
	SP/SSP	4.14	5.47	5.18	5.26

MO=Medical Officer, CM=Clinic Manager, SSP=Senior Service Promoter, SP=Service promoter, NC=Nutrition Counsellor

Table 16c. PSKP medicine price list (RDF items)

Sl. no.	Name of medicine	Presentation	Price per unit (Tk)
1	Nystat drop	Drop	22
2	V-plex drop	Drop	14
3	Panvit drop	Drop	15
4	Nystatin drop	Drop	20
5	Gentian viola lotion	Lotion	20
6	Rice ORS	Packet	10
7	ORS	Packet	3
8	Ferocit	Syrup	15
9	Amoxon	Syrup	36
10	Amoxicillin	Syrup	44
11	Naligram	Syrup	30
12	A-Clox	Syrup	40
13	Cotrim	Syrup	20
14	Fimoxyl	Syrup	44
15	A. Fox	Syrup	60
16	Moxillin	Syrup	44
17	Nalidexic acid	Syrup	30
18	Paracetamol	Syrup	11
19	Pyrin	Syrup	12
20	Salbutamol	Syrup	22
21	Neotrax	Syrup	10
22	Levamisol	Syrup	9
23	Nutramid	Syrup	10
24	Histal/Histalex	Syrup	14
25	Clotrim cream	Cream	18
26	Ascabiol lotion	Lotion	20

Table 17c. Associated illness as found in sub-set children

Disease	1st Visit	2nd Visit	3rd Visit	4th Visit	5th Visit	6th Visit	7th Visit	8th Visit	9th Visit
Diarrhoea	7	10	6	6	4	5	2	1	1
Skin disease	6	6	9	6	5	2	1	2	0
Fever	7	12	9	6	7	5	2	0	1
Cold/cough	8	5	6	6	5	2	0	0	0
Pneumonia	2	1	2	0	0	0	0	0	0
Dysentery	0	1	2	1	1	0	0	0	0
Vomiting	3	1	0	3	0	0	0	0	0
Measles	1	0	0	0	0	0	0	0	0
Ear infection	0	0	2	1	1	0	1	0	0
ARI	0	0	0	1	0	0	0	0	0
Eye infection	0	0	0	1	0	0	0	0	0
Convulsion	0	1	0	0	0	0	0	0	0

Annexure D

Provider's costs for 67 sub-set children

Table 1d. Consultation fees waived for sub-set children by intervention clinics during Dec 2002-Mar 2003

	Recovered children (n=36)			Total amount (Tk)
	Mirpur 10 (Tk)	Pallabi (Tk)	Tejgaon (Tk)	
Enrollment	375 (11)	240 (12)	390 (13)	1,005 (36)
1 st visit	120 (4)	150 (12)	165 (11)	435 (27)
2 nd visit	100 (3)	120 (10)	240 (11)	460 (24)
3 rd visit	125 (4)	110 (10)	300 (10)	535 (24)
4 th visit	120 (4)	70 (7)	240 (8)	240 (20)
5 th visit	100 (3)	50 (5)	180 (6)	330 (14)
6 th visit	0	30 (3)	90 (3)	120 (6)
7 th visit	0	10 (1)	0	10 (1)
8 th visit	0	0	0	0
9 th Visit	0	0	0	0
Sub-total				3,325 (152)
	Un-recovered children (n=31)			Total amount (Tk)
	Mirpur 10 (Tk)	Pallabi (Tk)	Tejgaon (Tk)	
Enrollment	315 (9)	200 (9)	360 (12)	875 (30)
1 st visit	225 (7)	150 (8)	105 (6)	480 (21)
2 nd visit	180 (6)	100 (6)	135 (7)	415 (19)
3 rd visit	180 (6)	40 (4)	150 (5)	360 (14)
4 th visit	185 (6)	30 (3)	150 (5)	365 (14)
5 th visit	60 (2)	30 (3)	12 (4)	210 (9)
6 th visit	65 (2)	30 (3)	60 (2)	155 (7)
7 th visit	65 (2)	0	30 (1)	95 (3)
8 th visit	35 (1)	0	0	35 (1)
9 th Visit	35 (1)	0	0	35 (1)
Sub-total				3,025 (119)
Grand total				6,350 (271*)

*Number of contacts: 271

(Figures in parentheses indicate the number of contacts)

Table 2d. Recurrent costs of non-consumables in sub-set of 67 children

Item	Quantity	Unit price (Tk)	Total cost (Tk)
Growth card	73	5	365
Plastic cup	67	3	201
Plastic container	32	14	448
Total			1,014 (US\$ 17.48)

Table 3d. Recurrent costs of consumables and stationeries in sub-set of 67 children

Item	Quantity	Unit price (Tk)	Total cost (Tk)
Pep-2 (zinc syrup)	170 bottle	20	3,420
Multimix	347 kg	23	7,981
Welfare fund (for drugs and transport cost)*	3 months	-	10,030
Stationeries	3 months	-	647
Consultation fees waived** (271contacts)	3 months	-	6,350
Total			28,428 (US\$ 490.13)

* Spent for reimbursing the cost of prescribed medicines and transport costs to the parents unable to pay for

** Consultation fees were waived by the intervention clinics for the poor families

Table 4d. Total costs for 67 sub-set children

Cost category	Taka	US \$
Capital cost		
Non-expendable materials	29,177.10	503.05
Training (non-recurrent)	176,422.72	3,041.85
Sub-Total	205,599.82	3,544.90
Recurrent costs		
Personnel cost, Jan 03 – April 03	113,878.60	1,963.42
Consumables, welfare fund, stationeries	28,428.00	490.13
Non-consumables	1,014.00	17.48
Sub-total	143,320.60	2,471.03
Grand-total	348,920.42	6,015.93

Above tables (2d-4d) show capital and recurrent costs incurred by the provider's for managing 67 sub-set children who were observed prospectively by the cost study team. Tables 2d and 3d show that the recurrent costs borne by the provider for those 67 children of the sub-set was (US\$ 490.13+17.48)=507.61. Personnel cost equivalent to US\$ 1,963.42 was proportionately estimated for four months for the sub-set. Table 4d shows that the total additional cost for 67 children was (3,544.90+2,471.03) US\$ 6,016. Therefore, the unit cost for 67 children enrolled and managed in the sub-set, irrespective of outcome, was (US\$ 6,016 ÷ 67) US\$ 90.

Provider's unit cost of 36 recovered sub-set children

Table 5d. Recurrent cost for 36 children recovered in the sub-set

Item	Quantity	Unit price (Tk)	Total cost (Tk)
Pep-2 (zinc syrup)	60 ph	20	1,200
Multimix	107 kg	23	2,461
Welfare fund (for drugs and transport cost)*	3 months	-	17,564
Stationeries	3 months	-	647
Consultation fees waived**	152 contacts	-	3,325
Total			25,197 (US\$ 434.43)

* Spent for reimbursing the cost of prescribed medicines and transport costs to the parents unable to pay for

** Consultation fees were waived by the intervention clinics for the poor families

Table 6d. Recurrent cost (non-consumables) for 36 children recovered in the sub-set

Item	Quantity	Price (Tk)	Total cost (Tk)
Growth card	39	39x5	195
Plastic cup	36	36x3	108
Container	18	18x14	252
Total			555 (US\$ 9.56)

Adding proportionate personnel cost (as shown in Table 4d) to other recurrent costs shown in Tables 5d and 6d the total recurrent costs estimated for 36 recovered sub-set children stood at (1,963.42+434.43+9.56) US\$ 2,407.41. Taking the capital cost as fixed for the sub-set, the total provider's cost for 36 children stood at (3,544.90+2,407.41) US\$ 5,952.31. Therefore, the average cost per recovered sub-set child was (2,407.41÷36) US\$ 165.

Table 7d. Annualization factors

	Discount rate																			
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
Expected useful life in years																				
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528
3	2.941	2.894	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326
7	6.729	6.472	6.230	6.002	5.786	5.582	5.389	5.208	5.033	4.868	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837
9	8.566	8.162	7.876	7.435	7.108	6.802	6.515	6.247	5.995	5.759	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192
11	10.366	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327
12	11.255	10.575	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439
13	12.134	11.348	10.635	9.986	9.394	8.853	8.358	7.904	7.487	7.103	6.750	6.424	6.122	5.842	5.583	5.342	5.110	4.910	4.715	4.533
14	13.004	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611
15	13.865	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.061	7.606	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675
16	14.718	13.578	12.561	11.652	10.838	10.106	9.447	8.851	8.313	7.824	7.379	6.974	6.604	6.265	5.954	5.668	5.405	5.162	4.938	4.730
17	15.562	14.292	13.166	12.166	11.274	10.477	9.763	9.122	8.544	8.022	7.549	7.120	6.729	6.373	6.047	5.749	5.475	5.222	4.990	4.775
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.372	8.756	8.201	7.702	7.250	6.840	6.467	6.128	5.818	5.534	5.273	5.033	4.812
19	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.604	8.950	8.365	7.839	7.366	6.938	6.550	6.190	5.877	5.584	5.316	5.070	4.843
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.818	9.129	8.514	7.963	7.469	7.025	6.623	6.259	5.929	5.620	5.353	5.101	4.870
21	18.857	17.011	15.415	14.029	12.821	11.764	10.836	10.017	9.292	8.649	8.075	7.562	7.102	6.687	6.312	5.973	5.665	5.384	5.127	4.891
22	19.660	17.658	15.937	14.451	13.163	12.042	11.061	10.201	9.442	8.772	8.176	7.645	7.170	6.743	6.339	6.011	5.696	5.410	5.149	4.909
23	20.456	18.292	16.444	14.857	13.489	12.303	11.272	10.371	9.580	8.883	8.266	7.718	7.230	6.792	6.399	6.044	5.723	5.432	5.167	4.925
24	21.243	18.914	16.936	15.247	13.799	12.550	11.469	10.529	9.707	8.985	8.348	7.784	7.283	6.835	6.434	6.073	5.746	5.451	5.182	4.937
25	22.023	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.823	9.077	8.422	7.843	7.330	6.873	6.464	6.097	5.766	5.467	5.195	4.948
26	22.795	20.121	17.877	15.983	14.375	13.003	11.826	10.810	9.929	9.161	8.488	7.896	7.372	6.906	6.491	6.118	5.783	5.480	5.206	4.956
27	23.560	20.707	18.327	16.330	14.643	13.211	11.987	10.935	10.027	9.237	8.548	7.943	7.409	6.935	6.514	6.136	5.798	5.492	5.215	4.964
28	24.316	21.281	18.784	16.663	14.898	13.406	12.137	11.051	10.116	9.307	8.602	7.984	7.441	6.961	6.534	6.152	5.810	5.502	5.223	4.970
29	25.066	21.844	19.188	16.984	15.141	13.591	12.278	11.158	10.198	9.370	8.650	8.022	7.470	6.983	6.551	6.166	5.820	5.510	5.229	4.975
30	25.808	22.396	19.600	17.292	15.372	13.765	12.409	11.258	10.274	9.427	8.694	8.055	7.496	7.003	6.566	6.177	5.829	5.517	5.235	4.979

Source: Cost analysis in primary healthcare: a training manual for program managers, edited by Andrew Creese and David Parker. Geneva: World Health Organization, 1994

