Urban Health Extension Project

Urban FP/MCH Working Paper No. 8

Mothers' Management of Diarrhoea:

Do Urban Volunteers of Dhaka Have an Impact?

Abdullah Hel Baqui
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International Centre for Diarrhoeal Disease Research, Bangladesh

May 1993

The **International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B)** is an autonomous, non-profit organisation for research, education, training and clinical service. It was established in December 1978 as the successor to the Cholera Research laboratory, which began in 1959 in response to the cholera pandemic in southeast Asia.

The mandate of the ICDDR,B is to undertake and promote research on diarrhoeal diseases and the related subjects of acute respiratory infections, nutrition and fertility, with the aim of preventing and controlling diarrhoeal diseases and improving health care. The ICDDR,B has also been given the mandate to disseminate knowledge in these fields of research, to provide training to people of all nationalities, and to collaborate with other institutions in its fields of research.

The Centre, as it is known, has its headquarters in Dhaka, the capital of Bangladesh, and operates a field station in Matlab thana of Chandpur District which has a large rural area under regular surveillance. A smaller rural and a large surveyed urban population also provide targets for research activities. The Centre is organised into four scientific divisions: Population Science and Extension, Clinical Sciences, Community Health, and Laboratory Science. At the head of each Division is an Associate Director; the Associate Directors are responsible to the Director who in turn answers to an international Board of Trustees consisting of eminent scientists and physicians and representatives of the Government of Bangladesh.

The **Urban Health Extension Project (UHEP)** is a follow-on activity of the Urban Volunteer Program (UVP). In 1981, the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) began training women volunteers in urban Dhaka in the use of ORS packets for diarrhoeal disease on the assumption that community women could play an important role in teaching others about the home treatment of diarrhoea with ORS. The United States Agency for International Development (USAID) began funding the project in 1986 with a mandate to provide primary health care services to the urban slums and conduct research on child survival related issues. UHEP continues to focus on health and family planning issues of the urban slums with an overall goal to strengthen the ability of the government and non-governmental agencies to provide effective and affordable family planning and selected maternal and child health services to the urban poor through research, technical assistance, and dissemination of its research findings.

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Foreword

I am pleased to release these reports on urban health and family planning issues which are based on the activities of the Urban Health Extension Project (UHEP). UHEP is a follow-on activity of the former Urban Volunteer Program, a pilot project funded by the United States Agency for International Development (USAID).

The poor health status and the health needs of the urban poor continues to be an important emerging public health issue in the Developing World. Bangladesh is no exception. Despite the constraints of poverty and illiteracy, there are proven strategies to provide basic health and family planning services to the urban poor. In Dhaka alone, aside from the Government health care facilities, there are numerous NGOs and private sector providers giving needed services to the urban population. The Centre's own Urban Health Extension Project continues to focus on the urban poor, especially the slum populations, in providing basic family planning and health services through outreach activities (viz. health education, ORS distribution and referral services to service points).

However, enormous challenges remain in providing an optimum level of services to the urban poor. The UHEP, with the support of the USAID, will focus on health and family planning services delivery strategies in reaching the needed services to the urban poor. We certainly look forward to learning more about the health and family planning needs of the urban poor, testing sustainable strategies and applying these proven strategies in collaboration with other partners in government, NGOs and the private sector.

Demissie Habte, MD
Director

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This Working Paper is from the baseline information of the Urban Surveillance System (USS) of the Urban Health Extension Project (UHEP). USS is a comprehensive health and demographic longitudinal surveillance of the slum populations of Dhaka. Numerous project staff are involved in the functioning and maintenance of the USS. Sincere acknowledgement is extended for the hard work and dedication of the USS staff, both the field-based staff and the data management and the project management support side of the USS.

Much effort has been put into the analysis and review of the information presented in this report. We would like to acknowledge the valuable input of the following individuals in this report.

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Summary

The Urban Volunteer Program (UVP), the predecessor of the Urban Health Extension Project (UHEP), ICDDR,B provided basic information on diarrhoea prevention and treatment to Dhaka slum mothers and supplied ORS packets to diarrhoea patients through a network of volunteers. To evaluate the impact of these volunteers and non-government organizations' (NGOs) field workers on mothers' knowledge of diarrhoea prevention and management, the project conducted a survey in a sample of its target population. Data were collected from 2,843 mothers with children under five years of age. UVP-served, NGO-served and joint UVP-NGO-served areas were compared with comparison areas. Overall, food hygiene was considered the most important means to prevent diarrhoea (65%), followed by a clean household environment (49%) and hand washing (21%). In general, the knowledge level in UVP-served areas was comparable to NGO health worker areas and higher than comparison areas. The two-week prevalence (19.3%) and point prevalence (9.5%) rates of diarrhoea in children under five years of age were similar in all areas. Compared to comparison areas, the proportion of prevalent cases of diarrhoea that were bloody was lower in the UVP (P=0.07) areas. The ORT-utilization rate in UVP areas was significantly higher than comparison areas (48% vs 37%), but lower than NGO only and joint areas (57%). The impact of UVP and NGO services on the ORT-utilization rate persisted after controlling for children's age and sex, household economic status, mothers' age, mothers' education and seasonality.

This study suggests that urban volunteers can effectively influence mothers' knowledge of diarrhoea prevention and influence mothers to use ORT. This finding has relevance for government and NGO policy-makers and program managers who may consider using volunteers in their programs.

Introduction

Although the Bangladesh Government has a structured health and family planning service delivery system for its rural population, it does not have a comparable infrastructure for its urban population. International and local non-governmental organizations (NGOs) are the primary service providers for this population, but their resources are limited and their services selective. In addition their coverage of the entire urban area is incomplete. Studies have shown, however, that well-designed interventions can reduce fertility, mortality, and morbidity rates in Bangladesh despite the constraints of poverty, illiteracy and underemployment.[1,2,3] The strategies thus far devised, however, have largely focused on rural Bangladesh.

In response to a recognition that existing health facilities could not adequately reach the poorer sections of Dhaka city, the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) initiated an urban health project in the early 1980's. The project was formerly known as the Urban Volunteer Program (UVP) and has recently been renamed as the Urban Health Extension Project (UHEP).

History of Urban Volunteer Program

The Urban Volunteer Program (UVP) of the International Centre for Diarrhoeal Disease Research, Bangladesh is a community-based, health delivery system focusing on the urban slums of Dhaka. The program was initiated in 1981 by Sister Eva, an Australian nurse-midewife, through recruitment and training of volunteer women from urban and peri-urban slum areas of Dhaka. The program's original focus was on diarrhoea prevention education and on use of oral rehydration solution for the home treatment of diarrhoea. Over the years, the training curricula were expanded to include immunization, nutrition and family planning.

Between 1981 and 1986, recruitment and training of the volunteers continued in an informal manner without clear selection criteria, and no effort was made to define service catchment areas. Furthermore, the training curricula were not standardized and there was an inadequate organizational infrastructure for tracking the volunteers, maintaining their skills and documenting their service activities.

In 1986, the ICDDR,B decided to formalize this relatively informal urban volunteer system with the following objectives:

a) to test the feasibility of raising and training volunteer women from urban slum areas to provide basic preventive health education and referral services to slum residents and

b) to evaluate the effectiveness of the volunteer-based urban health services delivery system.

Between 1987 and 1989, the UVP developed the parameters of the urban volunteer system by incorporating the experiences and input of the volunteers themselves. During the same period, urban slum-specific training curricula and educational materials were developed. A supervisory system was developed, a volunteer population ratio was worked out and a simplified data collection system using a symbol calendar was initiated.

Description of the Volunteer Service Delivery System

There are 14 *thana* in Dhaka city (see appendix-I for a sketch map of Dhaka). The project's service delivery is limited to 5 *thana* slums. The service structure is composed of 400 volunteers, each responsible for 30-50 households; 18 field supervisors (FS), each responsible for 25 volunteers; 3 community health coordinators (CHC), each responsible for 6 FSs; and one health services coordinator (HSC) responsible for the supervision of the entire service component of the project.

Volunteer Selection Criteria

Volunteers are self-motivated women between 18 and 40 years of age, preferably housewives from respected families with no more than two children each, who have lived in the target slums for at least one year. They are selected on the basis of their willingness and ability to learn basic health and family planning information and impart that information to others, and their willingness and ability to collect basic service data. Volunteers are recruited by the FS and the CHCs in consultation with the community leaders.

Training

Newly recruited volunteers receive a two-week basic health training course on the project's four focus areas. These are: a) Diarrhoea prevention and treatment, b) Nutrition, c) Immunization and d) Family planning. The basic health training includes a two-day training session on service data collection using symbol calendars. The volunteers also receive a four-day refresher training course every four months. The training techniques used include lectures, group discussions, role playing, demonstrations, videos and film shows, and service point visits.

Volunteers are required to take a pretest and a posttest during the basic health training. If the posttest score is between 75% and 100%, the

volunteer is considered graduated. If the score is between 60% and 75% a trainer follows up the volunteer in the field. If it is less than 60%, the volunteer is required to retake the course.

Target Populations

The target population is made up of mothers and children below five years of age living in Dhaka slums. There are also sub-populations for specific strategies: children below 2 years of age for immunization; children below 5 years of age for diarrhoea/hygiene strategies; and currently married women for family planning.

Volunteer Tasks and Focus Areas

Volunteers provide health education, make referrals, accompany clients to health and family planning centers, and distribute ORS. Their specific tasks within each core area are as follows:

a) Diarrhoeal disease prevention and treatment - preventive health education, ORS distribution, referrals to health facilities;

b) Immunization - education, motivation, referrals to government and NGO immunization centers, accompanying clients to immunization centers;

c) Nutrition - education and referrals to Nutrition Rehabilitation Centers;

d) Family planning - education, motivation, and referral to government and NGO centers and accompanying clients to these centers.

Service Data Collection Procedures

Volunteers collect service data using a symbol calendar (appendix-II). One calendar is used for a month and when completed is submitted to the FS who in turn submits the data collected to the CHCs. The service data are edited and processed by the project's data management section. Monthly reports are generated within one month from the time of submission.

Supervision and Support

The FSs maintain a regular schedule of visits to their volunteers once every two weeks. During these visits the FSs check the quality of information given by the volunteers to their clients, give support in providing health education, assist in the data collection, and replenish the ORS packet supply to the volunteers. The CHCs visit a 10% sample of volunteers each month in order to check the maintenance of the FSs' schedule, the correct distribution of ORS packets, and the quality of the

interaction between the FSs and the volunteers. The CHCs and FSs use standardized quality assurance forms and checklists. Finally, the HSC who is in charge of the service component of the project makes random spot checks.

FSs meet weekly with their respective CHCs in the field offices. In this meeting the FSs submit calendars, discuss problems, identify solutions to the problems, and receive supplies and training updates.

Urban Surveillance System (USS)

The Urban Volunteer Program has developed a comprehensive health and demographic surveillance system, known as the Urban Surveillance System (USS), in a representative sample of the project's 5 *thana* slums. The USS is designed to collect demographic and selected health information on a 3-month cycle. This system also provides a mechanism through which the impact of various public health interventions can be evaluated.

The USS sampling and data collection methods have been described previously.[4] Briefly, the USS sample was selected based on a multi-stage areal sampling technique. The ultimate sampling units are clusters with an average size of 33 households. During the 1990-91 period, the total number of clusters under surveillance was 168 and the total number of households, 4,558.

Evaluation of the Volunteer Service Delivery System

To evaluate the effectiveness of the project's volunteer service delivery system a cross-sectional survey was planned in urban volunteer-served areas and in comparison areas. The survey was designed to assess the effectiveness of urban volunteers on mothers' knowledge and practices in the following areas: a) diarrhoea prevention and treatment, b) childhood immunization, and c) family planning. This report presents the findings of the diarrhoea component of the study.

Study Population and Methods

We used the Urban Surveillance System population for this evaluative study. Due to the presence of NGO services in many of the USS clusters, a simple UVP intervention and non-intervention comparison did not seem feasible. Based on the Urban Volunteer and other NGO activities, the USS clusters were divided into the following **four service cells.**

1) Urban Volunteer activity only
2) Other NGO outreach activity only
3) Joint UVP and other NGO outreach activity
4) No outreach activity (comparison area)

When the USS population was divided into the above four study cells, there were insufficient numbers in some of the cells. To have adequate numbers in each cell, the USS sample was supplemented by drawing 56 additional volunteer clusters, hereafter referred to as Sample Volunteer Clusters (SVCs), using a systematic sampling technique. All the analyses have been done comparing the above four population areas.

Data Collection and Analysis

The survey questionnaire was designed to assess the impact of urban volunteers on mothers' knowledge of causes and prevention of diarrhoea, on two-week diarrhoea morbidity rates in under five year old children, on ORT utilization and on mothers' care seeking patterns for diarrhoea. Information on mothers' knowledge was obtained from all mothers who had at least one under five year old child. Information on diarrhoea morbidity and management was obtained for all under five year old children. The Urban Surveillance System provided information on 2,059 mothers and 2,894 under five year old children. The sample volunteer clusters provided information on 784 mothers and 1,031 under five year old children. Both the USS and SVCs also provided demographic and socioeconomic information required to adjust for confounding factors.

This paper presents basic comparisons of different study cells to assess the impact of urban volunteers and NGO field workers. To divide the population into different service areas, only the NGOs with active

outreach diarrhoeal management and prevention services in the USS and SVC areas were considered. These NGOs were World Vision and the New Life Centre. Mothers (n=1,026) from the UVP service areas, areas with joint UVP and NGO services (n=385 mothers), areas with only NGO services (n=370 mothers), and areas with no outreach activities (n=1,062 mothers) comprised the total sample from the four service areas examined. Areas with only UVP volunteers or UVP and NGO workers were compared with only NGO workers or areas without any outreach services.

Results

Table 1 shows mothers' knowledge of causes of diarrhoea by service area. Overall, about 10% of the mothers reported that they did not know the cause of diarrhoea. This percentage is significantly lower for UVP areas and joint UVP/NGO areas compared to no outreach activity areas.

Only about 20% of the mothers considered not washing hands as a cause of diarrhoea; about a third considered a dirty environment as a cause, and more than two-thirds (70%) considered poor food hygiene as a cause. Only about 7% of mothers considered contaminated water as a cause of diarrhoea.

The specific knowledge of the causes of diarrhoea varied by service area. Compared to no outreach activity areas, the knowledge level was higher ($p<0.05$) in the UVP and the NGO service areas. The percentage of mothers who considered not washing hands as a cause of diarrhoea was highest in the joint UVP/NGO areas (29.4%). This percentage is lower and similar in areas with only UVP and with only NGO activities respectively. The percentage of mothers who considered a dirty environment as a cause of diarrhoea was highest in areas with only NGO input (44.9%), and the percentage of mothers who considered poor food hygiene as a cause of diarrhoea was highest in areas with only UVP (75.0%) activities (Table 1).

Table 1. Mothers' Knowledge of Causes of Diarrhoea by Service Area

Mothers' Stated Causes of Diarrhoea	Service Area				
	UVP Only n=1,026	UVP+ NGOs n=385	NGOs Only n=370	No Outreach Activity n=1,062	Total n=2,843
Not Washing Hands*	21.0**	29.4**	22.2**	14.4	19.8
Dirty Environment*	40.7**	30.4	44.9**	31.5	36.4
Poor Food Hygiene*	75.0**	71.4**	70.8**	64.8	70.1
Flies*	30.0**	41.6**	32.4**	22.0	28.9
Contaminated Water*	8.5**	12.2**	4.6	4.0	6.8
Evil Spirits	4.1	4.4	2.2	5.4	4.4
Did Not Know the Cause*	7.7**	7.0**	11.9	13.0	10.1

Note: Data are percentages of mothers
Total adds to more than 100% as some mothers mentioned multiple causes.

* The overall distribution was significantly different, (X^2 test for 4x2 tables) $p<0.05$

** Significantly different from no outreach activity area, (X^2 test for 2x2 tables) $p<0.05$

Table 2 shows the mothers' knowledge of prevention of diarrhoea. About 20% of the mothers reported that they did not know how to prevent diarrhoea. This percentage varied by area, and was significantly lower in areas with only UVP or joint UVP-NGO services than in those with NGO-only and no outreach services.

Overall, good food hygiene was considered the most important means to prevent diarrhoea (65%), followed by a clean household environment (48.9%) and hand washing (20.7%). The importance of clean water was recognized by only about 7% of the mothers. Compared to the no outreach activity areas, the knowledge of hand washing, clean environment and good food hygiene was significantly higher in the UVP-served areas. Knowledge of hand washing was also higher in the joint UVP-NGO areas and NGO-only areas; knowledge of food hygiene was higher in the joint UVP-NGO service areas. Knowledge of clean environment and food hygiene was highest (53.1% and 70.6% respectively) in areas with only UVP activities.

The reason for the low recognition of contaminated water as a cause of diarrhoea may be that almost 100% of the surveyed households had access to tube-well or tap water as the source of drinking and cooking water. These sources are presumably uncontaminated; however, tap water in urban Dhaka is in fact subject to contamination and is known to be not adequately chlorinated.

Table 2. Mothers' Knowledge of Diarrhoea Prevention by Service Area

Response Categories	Service Area				
	UVP Only n=1,026	UVP+ NGOs n=385	NGOs Only n=370	No Outreach Activity n=1,062	Total n=2,843
Hand Washing*	21.7**	29.4**	25.7**	14.9	20.7
Keeping Household Environment Clean*	53.1**	46.5	48.9	45.8	48.9
Good Food Hygiene*	70.6*	69.1**	64.3	58.5	65.0
Drinking Clean Water*	8.4**	11.7**	5.4	5.0	7.2
Did Not Know*	15.8	14.8	23.0	25.4	20.2

Note: Data are percentages of mothers
Total adds to more than 100% as multiple answers were accepted.

* The overall distribution was significantly different, (X^2 test for 4x2 tables), $p<0.05$

** Significantly different from no outreach activity area, (X^2 test for 2x2 tables) $p<0.05$

Table 3 presents the two-week prevalence and point prevalence rates of diarrhoea in under-five-year old children and the proportion of the prevalent cases that were bloody. The diarrhoeal prevalence was lowest in the NGO-only service areas; the prevalence was similar in the UVP service areas and no outreach activity areas. However, none of these differences was significant. The proportion of bloody diarrhoeal episodes was highest (23.9%) in the no outreach activity areas and lowest (16.8%) in the NGO only areas. Compared to the no outreach activity areas, this proportion was also low in the UVP-only and joint UVP-NGO areas.

Table 3. Prevalence of Diarrhoea By Service Area

	Service Area				
Variable	UVP Only n=1,395	UVP + NGOs n=521	NGOs Only n=564	No Outreach Activity n=1,439	Total n=3,919
2-Week Diarrhoea Prevalence*	20.0	19.0	16.8	19.7	19.3
24-Hour Diarrhoea Prevalence*	9.7	9.8	8.7	9.5	9.5
Blood in Stool**	17.6	18.2	16.8	23.9	20.0

* Percentage of all under-5 year old children who had diarrhoea
** Percentage of all diarrhoeal episodes with the characteristic

None of the above differences was statistically significant.

Table 4 shows oral rehydration therapy (ORT) and other medication use rates for diarrhoea by service area. The ORT utilization rate was highest (about 57%) in the joint UVP-NGO and NGO-only service areas. Compared to the no outreach activity areas, the rate was also significantly higher in the UVP-only service areas. The ORT use rate was then desegregated into packet ORS and home-fluid use rates. The packet ORS use rate was also highest in the NGO only and joint UVP-NGO areas (about 47%); the rate was lowest (28.2%) in areas with no outreach activity and intermediate (36.2%) in the UVP only areas. The use of home-made solutions was between 16% and 19% and similar in all areas. The use of other medications was highest (54.3%) in the NGO-only service areas. The rate was lowest in the joint UVP-NGO service areas. About 32% of the diarrhoea patients did not use any medication. This percentage was slightly, but not significantly higher in the comparison area.

Table 4. Use of ORT (Packet ORS, Home Fluids) and Other Medications for Diarrhoea By Service Area

Variable	Service Area				
	UVP Only n=279	UVP + NGOs n=99	NGOs Only n=94	Comparison Area n=284	Total n=756
Total ORT use rates*	47.7**	56.6**	57.4**	37.3	46.2
Packet ORS*	36.2	46.5**	46.8**	28.2	35.8
Home-Made Solutions	18.3	16.2	17.9	19.4	18.4
Other Medications	46.2	34.3	54.3	47.0	46.0
Did not use any medication	31.2	28.3	27.4	36.4	32.3

Note: Data are percentages of patients

* The overall distribution was significantly different, (X^2 test for 4x2 tables) $p<0.05$

** Significantly different from no outreach activity area, (X^2 test for 2x2 tables) $p<0.05$

Table 5 shows the impact of UVP and other NGO outreach services on ORT utilization rates after controlling for possible confounding effects of age, sex, economic status, mothers' age, mothers' education and seasonality in a logistic regression model. This indicates that both UVP and NGO services were significantly positively correlated with ORT use. Compared to the comparison areas, the ORT use rate was about double in the UVP services areas (OR=1.93), 2.52 times higher in the NGO-only areas, and 2.75 times higher in the joint UVP-NGO areas.

Table 5. Logistic Regression Analysis to Assess the Impact of UVP and NGO Services on Oral Rehydration Therapy[1] (ORT) Use in 670 Diarrhoeal Episodes in Dhaka City Slums

Variable	Logit coefficient (Standard Error)	Odds Ratio	P - Value
Age (Month)	-0.0184 (0.0053)	0.98	0.0005
Sex[2]	0.2100 (0.1614)	1.23	0.1931
Housing material[3]	0.0027 (0.0425)	1.00	0.9490
Mother's age (Year)	0.0061 (0.0145)	1.01	0.6720
Mother's education	0.0552 (0.0404)	1.06	0.1713
Month			
August[4]	0.3820 (0.5542)	1.47	0.4907
September[4]	0.6305 (0.5225)	1.88	0.2276
October[4]	0.3034 (0.5281)	1.35	0.5655
Service Input			
UVP[5]	0.6576 (0.2012)	1.93	0.0011
UVP/NGO[5]	1.0122 (0.3206)	2.75	0.0016
NGO[5]	0.9229 (0.2595)	2.52	0.0004
Residence one year ago[6]	-0.0320 (0.3849)	0.97	0.9338

Notes : 1 Children who used packet ORS/home-made solution
2 Reference category = female
3 An indicator of economic status
4 Reference category = November
5 Reference category = Areas without Outreach activity
6 Reference category = Those who migrated to Dhaka slums within last one year

Table 6 shows mothers' care-seeking patterns by service areas. About 44% of the mothers sought some type of care for the treatment of diarrhoea. Only about 10-12% of the mothers in exclusive UVP areas and joint UVP-NGO areas sought care from the volunteers. In the NGO-only service areas, about 19% of the mothers sought care from the NGOs. In joint UVP-NGO service areas, volunteers were more likely utilized than other NGO workers. Presumably this reflected easy access to volunteers since the volunteers were drawn from communities in which they lived, and could provide early outreach services.

More than 20% of the mothers consulted a private allopathic doctor, 4% consulted a homeopath and another 3.2% sought care from a pharmacy. 5.2% of the children were taken to a health centre or hospital, where payment for services was required.

Table 6. Care Seeking Pattern for Diarrhoea by Service Area

	Service Area				
Care Sought From	UVP Only n=279	UVP+ NGOs n=99	NGOs Only n=94	Compari-son Area n=284	Total n=756
UVP Volunteer	9.7	13.1	0	1.1	5.7
Other NGO	1.4	1.0	19.1	1.8	3.7
Health Centre/Hospital	4.7	1.0	10.6	5.3	5.2
Private Doctor (Allopath)	21.9	18.2	13.8	22.2	20.5
Private Doctor (Homeopath)	5.4	2.0	2.1	3.9	4.0
Pharmacy	4.7	1.0	2.1	2.8	3.2
Others	5.4	11.1	1.1	6.7	6.1
From all Sources Combined	47.7	39.4	46.8	41.6	44.2

Note: Data are percentages of patients

Conclusions and Recommendations

When mothers' knowledge of diarrhoea in different study cells is compared, the data indicate a positive impact of UVP services. Mothers knowledge in the UVP areas is higher than in the non-outreach areas and comparable in the NGO areas. However, when diarrhoea prevalence rates for the period surveyed (August-November, 1990) are compared, they are not lower in the UVP service areas. This finding is rather unexpected. The UVP educational intervention was designed to improve water and sanitation behaviors empirically shown to be associated with high rates of childhood diarrhoea in the urban slums and non-slums of Dhaka.[5] In this reported study, a randomized trial was conducted in 51 urban slum and non-slum clusters, each composed of 58 families, to assess the impact of the intervention on rates of diarrhoea. The study showed a 26% protective efficacy.[6] It is not clear why the diarrhoea prevalence rate was not lower in the UVP service areas. Possible explanations may include differences in environmental conditions or differential reporting by service areas. It may also be possible that the UVP program could not successfully replicate the findings of the controlled trial. Further research will be necessary for program planning.

ORT utilization rates in the UVP areas are significantly higher than in the non-outreach activity areas but lower than in the NGO areas. It is unclear why the ORT use rate is lower in the UVP service areas than in NGO service areas. Perhaps it is because the NGOs use paid health workers as their base-level worker, whereas the UVP program is exclusively voluntary.

It is important to note that despite the availability of free services from the UVP and other NGOs, few mothers appear to have sought care from these sources. It would be important to understand why mothers in the slums underutilized the free services provided by UVP and other NGOs, and sought care from private service providers for a fee. It is possible that the mothers perceive the paid sources of care as better quality. It is also possible that mothers selectively recalled doctor and hospital visits, since these visits involved time and money, and under-reported volunteer/NGO worker consultations. Of the 270 diarrhoeal patients who used packet ORS, 209 (77.4%) reported consulting a health provider (UVP volunteers included); for the remaining 32.6% patients, the source of packet ORS was unknown (data not shown). Most diarrhoeal episodes are self-limiting and adequate rehydration and feeding should be enough for the management of these episodes. Yet, about one-third of the mothers consulted a professional for the management of their child diarrhoea; many of these consultations probably were not necessary.

The data indicate that urban volunteers effectively influenced mothers knowledge of diarrhoea prevention and the ORT utilization rate. The most successful areas were the ones jointly served by urban volunteers and NGO field workers. Based on this finding the UVP concluded that it may be possible to delegate certain health service delivery responsibilities to volunteers. Including a volunteer component in a structured health service delivery system may improve the acceptance and usage of the services provided, extend some basic services to the community level -- such as diarrhoea treatment and preventive health messages -- and improve the overall effectiveness of the system.

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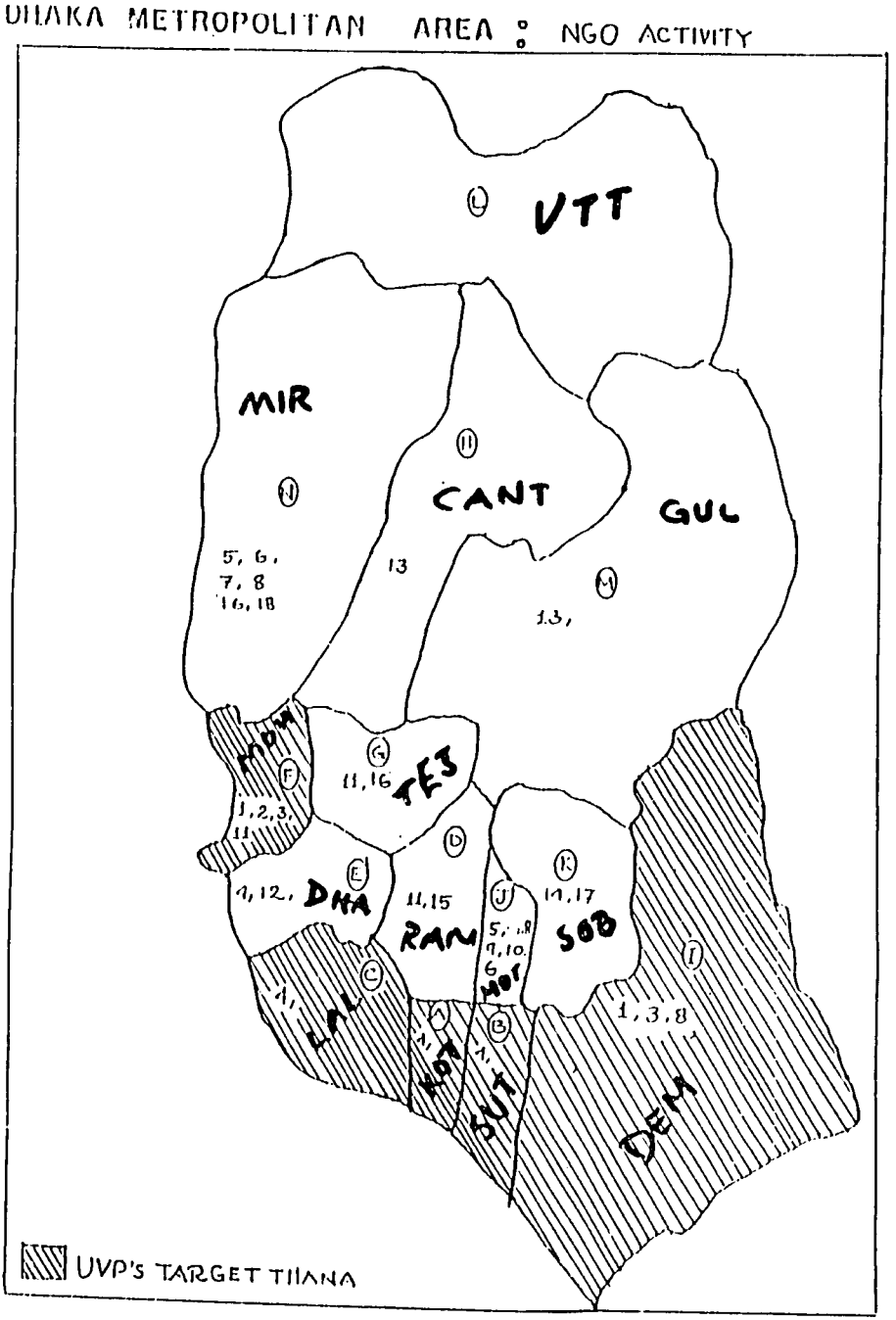
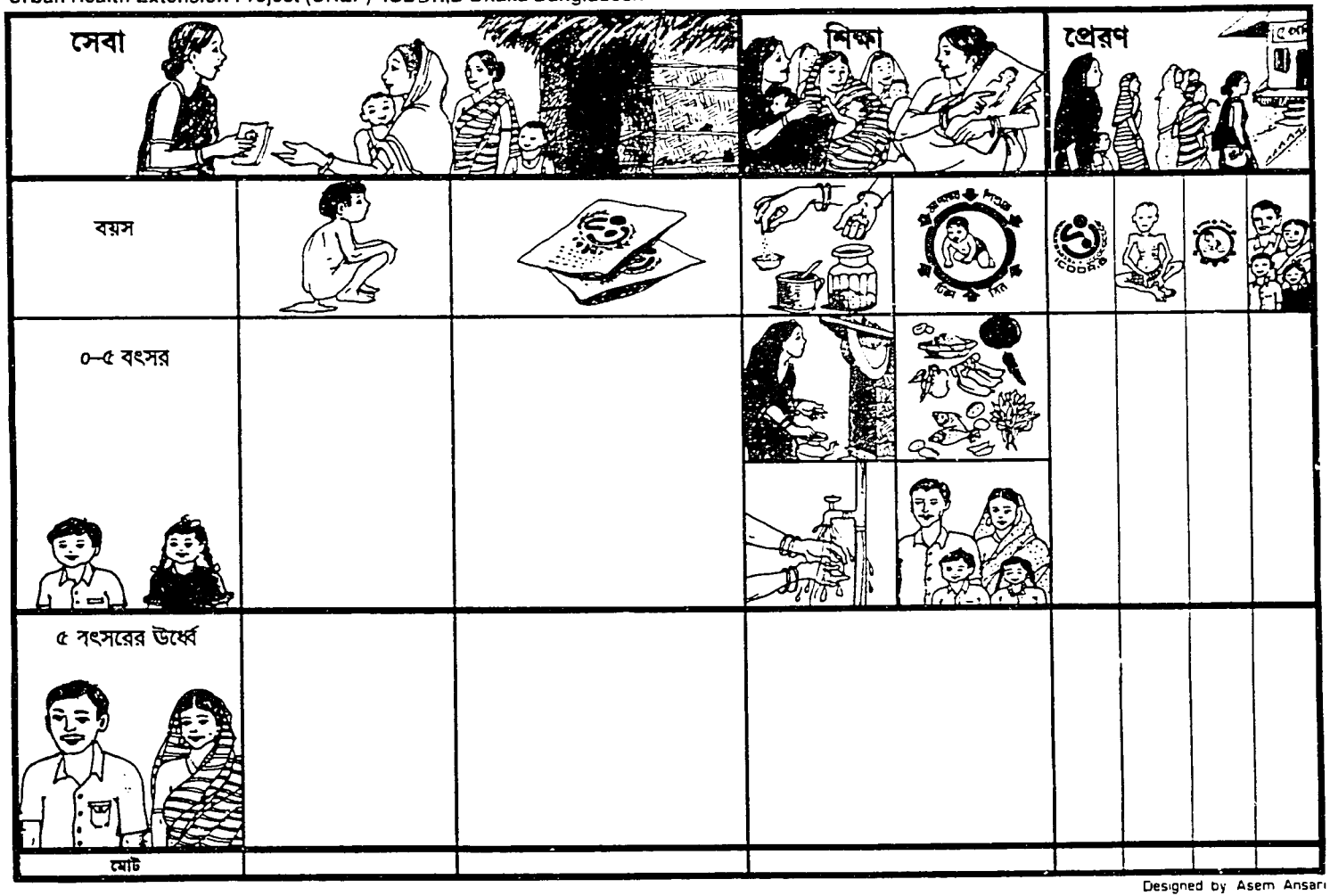
Appendix I. Sketch Map of Dhaka City



Appendix II. Symbol Calendar

Urban Health Extension Project (UHEP) ICDDR,B Dhaka Bangladesh



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Urban Health Extension Project (UHEP) Publications

Jamil K, Baqui AH, Paljor N. Knowledge and practice of contraception in Dhaka urban slums: a baseline survey. May 1993. (ICDDR,B working paper no. 31) (Urban FP/MCH working paper no. 3). *ISBN: 984-551-006-10.*

Baqui AH, Paljor N, Silimperi DR. The prevention and treatment of diarrhoea in Dhaka slums. May 1993. (ICDDR,B working paper no. 32) (Urban FP/MCH working paper no. 4). *ISBN: 984-551-007-8.*

Laston SL, Baqui AH, Paljor N, Silimperi DR. Immunization beliefs and coverage in Dhaka urban slums. May 1993. (ICDDR,B working paper no. 33) (Urban FP/MCH working paper no. 5). *ISBN: 984-551-008-6.*

Baqui AH, Paljor N, Nahar Q, Silimperi DR. Infant and child feeding practices in Dhaka slums. May 1993. (ICDDR,B working paper no. 34) (Urban FP/MCH working paper no. 6). *ISBN: 984-551-009-4.*

Chaudhury N, Mohiuddin QN, Momtaz S, Ghosh KR, Lili FB, Leena MM. Violence in the slums of Dhaka city. May 1993. (ICDDR,B working paper no. 35) (Urban FP/MCH working paper no. 7). *ISBN: 984-551-010-8.*

Baqui AH, Paljor N, Lerman C, Silimperi DR. Mothers' management of diarrhoea: Do urban volunteers of Dhaka have an impact? May 1993. (ICDDR,B working paper no. 36) (Urban FP/MCH working paper no. 8). *ISBN: 984-551-011-6.*

Salway S, Jamil K, Nahar Q, (editors). Issues for family planning in the urban slums of Dhaka, Bangladesh: opinions and perceptions of field-level workers. May 1993. (ICDDR,B working paper no. 37) (Urban FP/MCH working paper no. 9). *ISBN: 984-551-012-4.*

Fronczak N, Amin S, Laston SL, Baqui AH. An evaluation of community-based nutrition rehabilitation centers. May 1993. (ICDDR,B working paper no. 38) (Urban FP/MCH working paper no. 10). *ISBN: 984-551-013-2.*

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