

The Long- term Impact of Community Mobilization Through Women's Groups on Child Growth in Rural Bangladesh

GIFTS WP-4



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Background Information :

- ❑ **PCP-GIFTS Survey** represents a part of the 3 year multi- centered **GIFTS study** (**G**enomic and lifestyle predictors of foetal outcome relevant to diabetes and obesity and their relevance to prevention strategies in **S**outh Asian peoples).

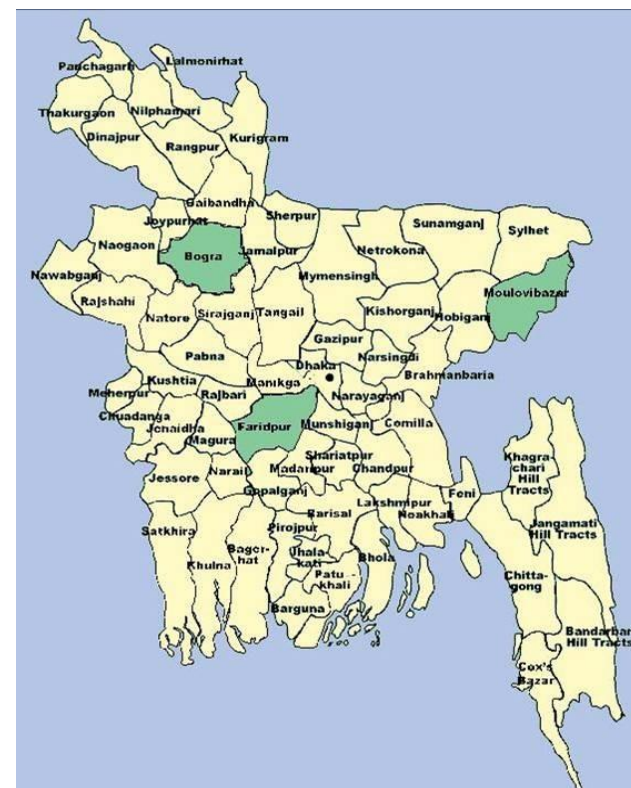
- ❑ We performed this study as part of a multi-country investigation of genomic and lifestyle factors involved in early developmental prediction of diabetes and obesity in South Asians (*EU Seventh Framework Programme. (FP7), project number 278917, <http://www.gifts-project.eu/drupal/>*).

Background Information :

❑ PCP had conducted two trials with women's groups in 18 unions in 3 districts of rural Bangladesh:

1. **To reduce neonatal and maternal mortality.**
2. **To improve child(under 5) and women health.**

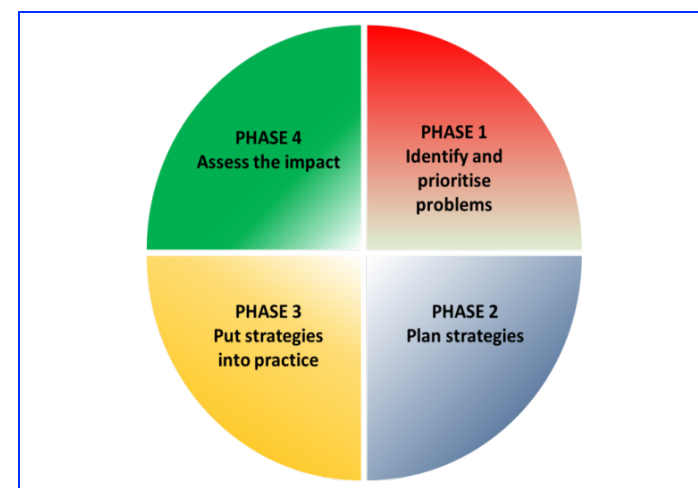
❑ The first showed a *38% reduction* in neonatal mortality and the second showed improvements in hygiene practices and improved dietary practices.



Map of Bangladesh highlighting 3 districts
6 Upazillas, 18 Unions(Clusters)

Women's Group Intervention through PLA:

- ❑ The present trial was a follow up study of these trials.
- ❑ The aim of this study was to evaluate the impact of participation in women's groups on nutritional phenotypes/anthropometry and epigenetics of children born subsequent to exposure to the PCP trial intervention. The epigenetics analysis is ongoing.



PLA Cycle

Study Objectives:

□ The objectives of this study are:

- To compare the anthropometric measures of children born to mothers who received Participatory Women's Group (PWG) Intervention, to children born to mothers in the control areas who did not receive the intervention.



Selection criteria for Intervention and Control areas:

Children born to all women who :

- Permanently reside in intervention and control unions.
- Attended at least six meetings on a monthly basis *before delivering the baby (Intervention)*

Never heard of or attended PCP women's group intervention. **(Control)**
- Gave birth to a live baby between October 2009 and June 2011 (i.e. child would be between 24 and 48 months at the time of data collection)
- Were successfully interviewed for the monitoring and evaluation (M&E) of the cycle 1 intervention.

Data Collection:

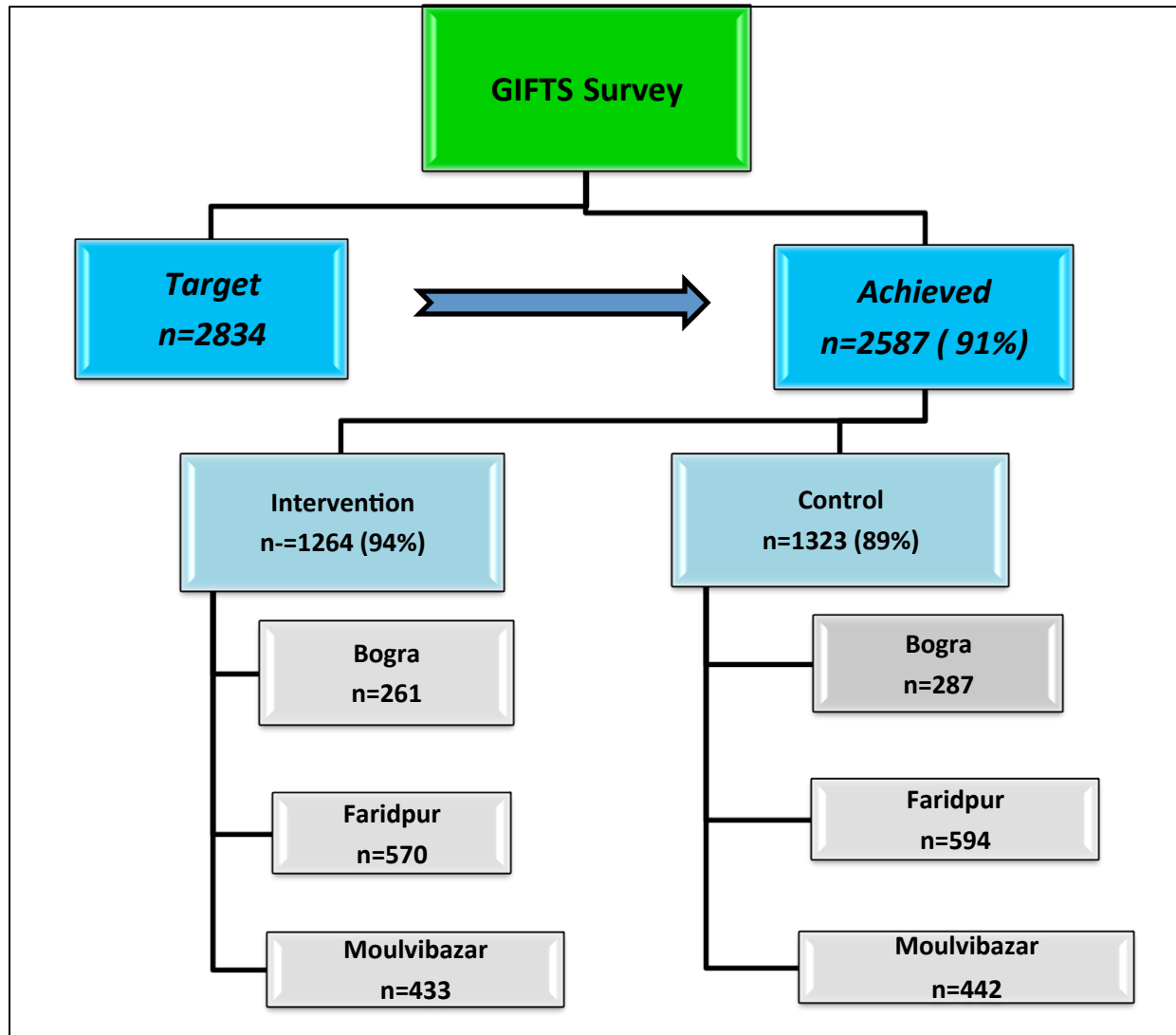


Fig. 1 - Study sample targets and achievement.

Anthropometry:

1. **Child and mother's weight** (to assess size and body composition)
2. **Child and mother's height** (to assess size and body composition)
3. **Child abdominal circumference** (as an index of liver size)
4. **Child head circumference** (as an index of brain size)



Anthropometry:

5. **Child chest circumference** (as an index of skeletal growth)
6. **Child triceps** (as an index of subcutaneous adiposity)
7. **Subscapular skin-fold thickness** (as an index of subcutaneous adiposity)
8. **Mid-upper-arm circumference** (to assess muscle size)



Results:

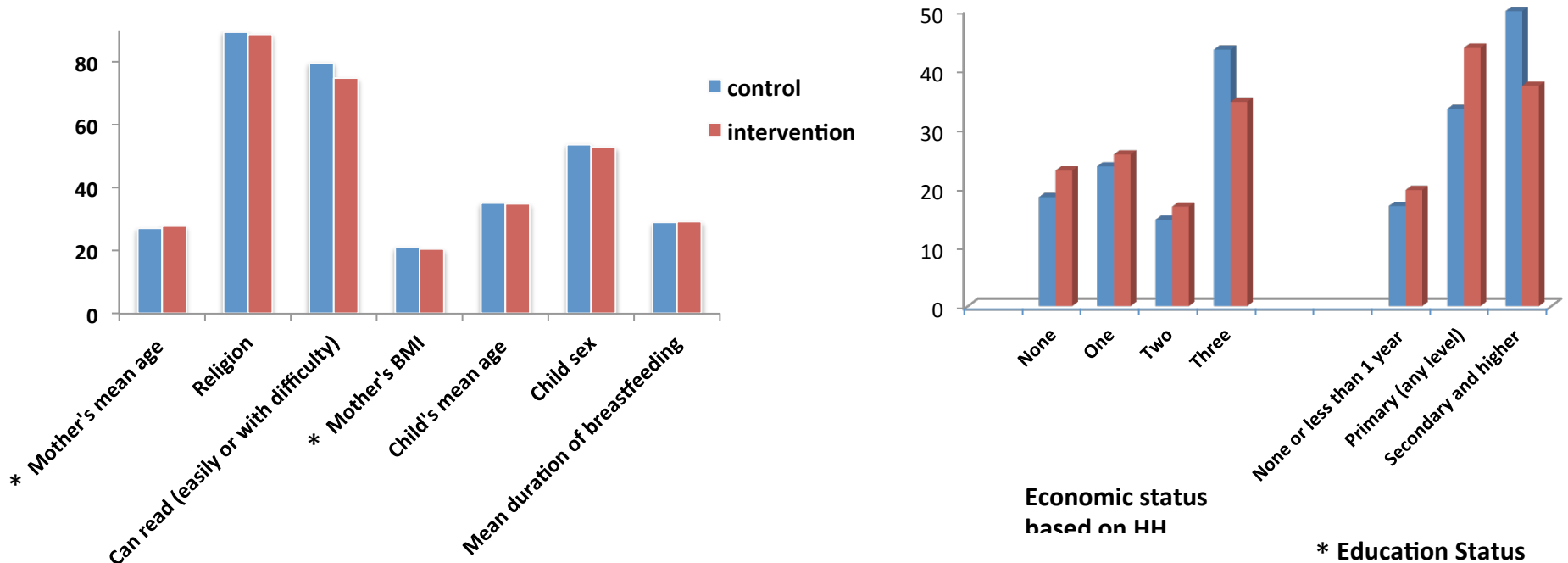


Fig.2 : Cluster level mean socioeconomic and demographic characteristics of the study population by control and intervention arms and random effects regression coefficients

*Mother's mean age($p=0.038$), Education status($p<0.001$), Mother's BMI($p=0.042$)

Table 1 :Overall anthropometric z-scores for children (males and females) aged from 24 to 48 months. Regression coefficients derived from random effects linear regression models intervention effect.

Outcome (z-scores)	Cont. (n=1323)	Int. (n=1264)	Crude*		Adjusted^	
			Regression Coefficient (95% CI)	p-value	Regression Coefficient (95% CI)	p-value
Weight-for-age	-1.73	-1.85	-0.12 (-0.22, -0.02)	0.016	-0.08 (-0.17, 0.00)	0.053
Length-for-age	-1.89	-2.12	-0.23 (-0.42, -0.04)	0.017	-0.18 (-0.35, -0.01)	0.040
Weight-for-length	-0.94	-0.97	-0.02 (-0.11, 0.06)	0.560	-0.02 (-0.08, 0.08)	0.947
BMI	-0.75	-0.65	0.10 (-0.05, 0.24)	0.185	0.09 (-0.03, 0.22)	0.128
Head circumference	-1.69	-1.58	0.10 (-0.06, 0.27)	0.193	0.24 (-0.02, 0.30)	0.092
MUAC	-1.06	-1.01	0.05 (-0.06, 0.17)	0.367	0.07 (-0.01, 0.16)	0.094
Abdominal circumference	-0.04	0.02	0.06 (-0.10, 0.21)	0.475	0.07 (-0.10, 0.24)	0.405
Chest circumference	-0.05	0.04	0.09 (-0.06, 0.24)	0.247	0.11 (-0.07, 0.29)	0.222
Sub-scapular	-0.43	-0.38	0.05 (-0.25, 0.36)	0.736	0.08 (-0.23, 0.38)	0.626
Triceps	-0.42	-0.35	0.06 (-0.16, 0.29)	0.593	0.02 (-0.10, 0.14)	0.745

*Adjusted for stratification and clustering only

^ Adjusted for stratification and clustering and potential confounding effects of maternal age, education and household assets

Table 2 (a): Cluster mean anthropometric z-scores for children (24-48 months) stratified by maternal BMI <18.5

Maternal BMI <18.5 (n=743)						
Outcome (z-scores)	Cont (n=352)	Int (n=391)	Crude*		Adjusted^	
			Regression Coefficient	p-value	Regression Coefficient	p-value
			(95% CI)		(95% CI)	
Weight-for-age	-2.15	-2.11	0.02 (-0.11, 0.16)	0.731	0.05 (-0.09, 0.18)	0.480
Length-for-age	-2.15	-2.28	-0.15 (-0.32, 0.01)	0.069	-0.12 (-0.29, 0.05)	0.164
Weight-for-length	-1.35	-1.21	0.13 (-0.02, 0.29)	0.097	0.14 (-0.01, 0.29)	0.060
BMI	-1.10	-0.89	0.21 (0.02, 0.39)	0.028	0.21 (-0.00, 0.42)	0.055
Head circumference	-1.88	-1.66	0.22 (0.08, 0.36)	0.002	0.22 (0.08, 0.36)	0.002
MUAC	-1.35	-1.20	0.14 (-0.04, 0.32)	0.128	0.13 (0.00, 0.25)	0.045
Abdominal circumference	-0.36	-0.12	0.23 (0.02, 0.43)	0.031	0.23 (-0.05, 0.42)	0.013
Chest circumference	-0.35	-0.15	0.19 (-0.08, 0.45)	0.168	0.21 (-0.00, 0.42)	0.053
Sub-scapular	-0.59	-0.52	0.06 (-0.28, 0.41)	0.718	0.05 (-0.13, 0.23)	0.566
Triceps	-0.51	-0.42	0.07 (-0.17, 0.31)	0.567	0.02 (-0.10, 0.14)	0.745

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**Table 2 (b) :Cluster mean anthropometric z-scores for children (24-48 months)
stratified by maternal BMI ≥ 18.5 & < 23**

Maternal BMI ≥ 18.5 & < 23 (n=1211)						
Outcome (z-scores)	Cont (n=606)	Int (n=605)	Crude*		Adjusted^	
			Regression Coefficient (95% CI)	p-value	Regression Coefficient (95% CI)	p-value
Weight-for-age	-1.73	-1.80	-0.07 (-0.18, 0.03)	0.168	-0.04 (-0.14, 0.06)	0.447
Length-for-age	-1.93	-2.15	-0.21 (-0.44, 0.01)	0.059	-0.18 (-0.39, 0.04)	0.107
Weight-for-length	-0.93	-0.89	0.05 (-0.12, 0.21)	0.576	0.06 (-0.07, 0.19)	0.348
BMI	-0.73	-0.52	0.22 (-0.14, 0.58)	0.225	0.23 (-0.05, 0.52)	0.105
Head circumference	-1.71	-1.55	0.15 (-0.06, 0.37)	0.164	0.18 (-0.00, 0.37)	0.053
MUAC	-1.06	-0.98	0.08 (-0.05, 0.22)	0.242	0.09 (0.00, 0.18)	0.052
Abdominal circumference	-0.05	0.06	0.11 (-0.08, 0.30)	0.271	0.12 (-0.09, 0.33)	0.249
Chest circumference	-0.06	0.10	0.16 (-0.01, 0.33)	0.073	0.18 (-0.01, 0.37)	0.062
Sub-scapular	-0.44	-0.34	0.10 (-0.18, 0.38)	0.487	0.10 (-0.08, 0.29)	0.286
Triceps	-0.40	-0.32	0.07 (-0.16, 0.29)	0.559	0.07 (-0.12, 0.26)	0.464

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Table 2 (c): Cluster mean anthropometric z-scores for children (24-48 months) stratified by maternal BMI >23

Maternal BMI >23 (n=617)						
Outcome (z-scores)	Cont (n=353)	Int (n=264)	Crude*		Adjusted^	
			Regression Coefficient (95% CI)	p-value	Regression Coefficient (95% CI)	p-value
Weight-for-age	-1.29	-1.58	-0.28 (-0.46, -0.10)	0.002	-0.23 (-0.43, -0.04)	0.018
Length-for-age	-1.54	-1.82	-0.26 (-0.49, -0.04)	0.022	-0.22 (-0.49, 0.05)	0.116
Weight-for-length	-0.60	-0.80	-0.20 (-0.35, -0.04)	0.012	-0.17 (-0.33, -0.00)	0.047
BMI	-0.44	-0.60	-0.16 (-0.32, -0.00)	0.043	-0.14 (-0.31, 0.03)	0.116
Head circumference	-1.46	-1.53	-0.06 (-0.28, 0.15)	0.570	-0.05 (-0.27, 0.18)	0.678
MUAC	-0.79	-0.80	-0.02 (-0.16, 0.12)	0.793	0.01 (-0.14, 0.16)	0.909
Abdominal circumference	0.29	0.16	-0.12 (-0.30, 0.05)	0.169	-0.13 (-0.34, 0.08)	0.224
Chest circumference	0.25	0.16	-0.09 (-0.33, 0.16)	0.500	-0.05 (-0.28, 0.18)	0.679
Sub-scapular	-0.23	-0.30	-0.07 (-0.45, 0.31)	0.708	-0.04 (-0.40, 0.32)	0.830
Triceps	-0.30	-0.31	0.01 (-0.27, 0.30)	0.920	0.04 (-0.22, 0.30)	0.781

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Table 3: p-values for interactions between intervention exposure and child gender for each anthropometric outcome.

<i>Interaction</i>	<i>Outcome</i>									
	Wt-for-age	Length-for-age	Weight-for-length	BMI	Head circ.	MUAC	Abdominal circ.	Chest circ.	Sub-scapular	Triceps
<i>Intervention* Female sex</i>	0.829	0.094	0.035*	0.080	0.234	0.655	0.284	0.083	0.432	0.069

* Significant ($p < 0.05$) interaction identified.

Table 4 : Cluster mean weight-for-length z-scores for children (24 to 48 months) stratified by child sex and maternal BMI category. Regression coefficients derived from random effects linear regression models

Maternal BMI	Child Sex	Cluster mean child weight-for-length z-score		Crude*		Adjusted^	
		Cont.	Int.	Regression coefficient (95%CI)	p-value	Regression coefficient (95% CI)	p-value
<18.5	Male	-1.35	-1.15	0.20 (0.01, 0.39)	0.040	0.20 (0.01, 0.40)	0.042
	Female	-1.35	-1.28	0.06 (-0.19, 0.32)	0.625	0.08 (-0.15, 0.30)	0.508
≥18.5 & <23	Male	-1.03	-0.84	0.19 (0.00, 0.38)	0.048	0.22 (0.05, 0.38)	0.012
	Female	-0.83	-0.96	-0.13 (-0.47, 0.20)	0.433	-0.11 (-0.33, 0.10)	0.310
≥23	Male	-0.52	-0.75	-0.23 (-0.46, -0.00)	0.048	-0.20 (-0.44, 0.03)	0.088
	Female	-0.75	-0.91	-0.16 (-0.38, 0.06)	0.148	-0.13 (-0.34, 0.07)	0.209

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Summary:

- *In the most under-nourished mothers, the intervention had it's greatest effect on both these measurements (**MUAC and abdominal circumference**) as well as on **brain growth** (head circumference) **without increasing adiposity** (sub-scapular and triceps measurements).*
- *In the over-weight mothers, children in the intervention group had increased length and decreased adiposity.*
- *Hence these results suggests a beneficial effect on the risk of later **type 2 diabetes**.*

Conclusion :

- ❑ The findings of this study suggests that **PWGs** using a participatory learning and action cycle can have a beneficial effect on the growth of children born to exposed mothers.
- ❑ Given our positive results, it is now important to design a powered study to look at detailed metabolic and phenotypic outcomes in children whose mothers are exposed to a similar intervention.



Thank You

