Integrating ARI prevention with micro credit programme: experience of BRAC, Bangladesh

Abdullahel Hadi *MS, DrPH*

BRAC
75 Mohakhali
Dhaka, Bangladesh

Correspondence

Abdullahel Hadi
Research and Evaluation Division
BRAC Centre
75 Mohakhali
Dhaka 1212, Bangladesh

Fax: 880-2-8823542
e-mail: shirsha@bangla.net

Summary

The contribution of ARI control project within the framework of micro credit-based development intervention in promoting maternal knowledge of acute respiratory infections (ARIs) in children was assessed. Data came from a cross-sectional survey of 2,814 mothers of under 5 year-old children residing in 200 randomly selected villages in five districts in Bangladesh. Findings revealed that the ARI control project had significant positive effects in raising knowledge of clinical signs and preventive measures. When ARI control project activities were integrated with the credit-based development initiative, maternal knowledge improved even further. The study concludes that the micro-credit programme can be a catalytic agent in raising health knowledge among the poor women in developing countries.

Keywords: ARI, micro-credit, maternal knowledge, clinical signs, prevention

Introduction

Acute respiratory infection (ARI) has been the leading cause of morbidity and mortality in childhood in most developing countries.[1-5] Studies reported that awareness of the signs and severity of ARIs was inadequate in many societies.[6-8] UNICEF and WHO highlighted to promote maternal knowledge about the prevention of ARI at the community level.[9] Educating caregivers in identifying the signs of ARI was possible even in societies where modern medical beliefs and practices were largely absent.[10] It was found that if only the fast breathing and chest in-drawing were timely identified, most ARI deaths could be averted where appropriate services were available.[11] As mothers were the main caregivers in most cases, it was believed that the promotion of maternal knowledge regarding ARI and modifying their health seeking behaviour would significantly reduce case fatality among children from ARI.[11-14]

According to an estimate, nearly 400 children die each day from ARIs in Bangladesh.[15] Both the government and non-government organisations (NGOs) in Bangladesh have been trying to promote ARI prevention through mass media, community health educators and routine counselling services at health care facilities. As the promotional activities have not been designed to reach the poor living in remote villages, the ARI prevention might have been ineffective in producing desired outcome in the rural communities.

BRAC, a non-government development organisation in Bangladesh, tried to develop a simple and sustainable approach to manage ARIs in children in the 1990s following the WHO guidelines.[16] BRAC involved the community health volunteers as the front-line workforce to identify and treat acute respiratory infection. The assumption has been that the community volunteers can be effectively used to identify, diagnose and treat ARIs at the grassroots level if they are provided necessary training and their performance are routinely supervised by the para-professional of BRAC. The main theme of the strategy has been that the volunteers would visit each household in their community to identify and diagnose ARIs using simple signs and symptoms among children. It was expected that the volunteers would be able to diagnose and treat minor ARI cases at the households and refer the severe and very severe cases to the clinics.

The community health volunteers were selected from among the locality. After recruitment, the volunteers received extensive 3-day basic training in BRAC offices where a group of physicians and para-professionals with experience in managing and treating ARIs trained them. The contents of the basic training included the signs and symptoms of ARIs, examination of ARI cases, counting respiration rate using timer and advice on patient care. In addition, they were trained to disseminate relevant information to mothers of young (<5 year-old) children at the household level.[17] Each volunteer was assigned about

100-120 households around her home. Each of them visited their assigned households monthly to identify, diagnose and treat children with ARIs.

ARI control with micro-credit programme

BRAC initiated its micro-credit programme essentially to raise income and employment for the poor women in Bangladesh. The micro-credit programme included not only the collateral-free credit but also a package of support services such as group formation, social awareness, basic education and essential health care. Only poor women are eligible to participate in credit-based income generating activities. NGOs generally select adult women of poor households, who own very small amount (less than an acre) of cultivable land, to participate in the micro-credit programme.

The participation in micro-credit programme has the potential to change the life of poor women in many ways.[18-19] As programme participants, the poor women attend several awareness development meetings and skill development training sessions. The health awareness sessions cover personal hygiene, safe water and sanitation, immunisation, pre and postnatal care, and family planning.[16] Along with these support services, the poor women were organised into small credit groups. The group formation process and the interaction among the group members create solidarity among group members. The participation in income generating schemes provides them opportunities to earn and financially contribute to their families. This new role of poor women raise their mobility, buying capacity and change their role in the household decision-making process.[18-19] As a result, they gain necessary strengths and means to modify their health seeking behaviour become more likely to accept innovation and health intervention than others.

Figure 1 here

Although the ARI control project was aimed to raise maternal awareness in the community in general, it was expected that the social development aspects of the micro-credit programme would add to the process of promoting knowledge among its participants. The hypothesized effects of the intervention on the outcome variables are conceptualised in Figure 1. While each of the ARI intervention and the micro-credit programme has independent positive effects on maternal knowledge, the conceptual framework assumes that the improvement in the outcome (maternal knowledge) will be significantly raised if the ARI control project is jointly implemented with the micro-credit programme. It should be mentioned, however, that other socio-demographic factors such as age and education of women, economic status and their exposure to media will also influence the effects of both ARI and micro-credit programmes on the maternal knowledge.

This paper assesses the role of ARI control project within the framework of micro-credit programme in improving maternal knowledge of ARI. More specifically, the study assumes that the health promotion components of the ARI control project raise the clinical signs and preventive measures of ARI among mothers. In addition, the micro-credit programme reinforces the ARI control project in raising maternal knowledge even further when the influence of age, education and exposure to media is adjusted.

Methods

The survey

BRAC implemented its ARI control project in all villages in the two northern and one central districts of Bangladesh. This study included all three districts as ARI intervention area. In addition, two districts were selected as comparison area (one adjacent to the northern and the other adjacent to the central districts). BRAC had credit-based income generating activities in all villages in both the intervention and comparison areas.

BRAC used community health volunteers to promote health education as part of the micro-credit programme. Once the study villages were identified by the research team, a sample of 200 health volunteers (120 from the ARI villages and 80 from the comparison villages) was selected at random. The health volunteers maintained registers where basic demographic information of the community members was recorded. A sample of 15 women, who had <5 year-old children, were selected at random from the registers of each volunteer. Thus, a total of 3,000 sample women in both the ARI and non-ARI areas were selected for this study. All sampled women were approached, although their participation was voluntary. The selected women were never pressed to provide information. Information from 2,814 women was collected in January and February 1999.

A test instrument was developed for the assessment of maternal knowledge comprising 14 test items in clinical signs and preventive measures of ARI. The test instrument, along with an interview schedule covering the socio-economic characteristics of women, was used to collect information. The ethical issues of the test instrument and the interview schedule were reviewed by an appropriate committee at BRAC.

The credit programmes are generally directed to poor women only. In this study, households that owned less than a half-acre of land and survived on selling manual labour were considered poor. Although eligible, only a segment of the poor women initially participate in any NGO-led credit programmes. Others prefer to wait, observe carefully and decide later to join. Some of them never join because of their choice and involvement in other activities. The study women were, thus, categorised into three groups: non-participants, participants and not eligible women to participate in the credit programme.

Model specification

The contribution of both the ARI project and the credit programme on maternal knowledge was assessed by logistic regression model. The main independent variables were participation of women in credit programme and the ARI intervention. There were other variables in the analytical framework such as exposure to mass media, age and education of women, and land ownership that were assumed to modify the effects of ARI control project and credit programme participation on maternal knowledge. The relationships of these confounding variables with maternal knowledge were analysed. Based on the preliminary analysis, *age* of mothers was dichotomised as <30 and 30± years. *Education* of mothers was coded as some or no education. *Land ownership* was dichotomised as <1 and 1± acre.

BRAC takes several measures to include the hardcore poor women in the credit programme. However, it is still possible that the cross-sectional data used in this study might have generated biased estimates because women who were relatively and better-off innovative might be more likely than others to join the credit programme.[20] The socio-demographic differences between the participants and non-participants in this study were insignificant indicating that the sampling bias is very small. The influence of endogeneity or selection bias was adjusted by employing multivariate analyses.

Table 1 here

Results

Profile of women

The differences in socio-demographic characteristics of sample women by their participation in credit programme are shown in Table 1. The mean age was about 28 years. No significant variation in age among women was found although the proportion of older women was higher among the credit programme participants than others. Illiteracy among women was widespread in the study villages as only 34.2% women went to school. The mean year of schooling was only 1.7 years. No significant difference in education was found between the credit programme participants and non-participants. The mean ownership of land was only 0.08 acres. The credit programme participants had more land than non-participants although the land ownership was highest among the non-poor (not-eligible) women. Exposure to media in rural settings in Bangladesh was very poor as only 9.1% had regular and only 19.5% women had occasional access to electronic media. When compared among poor women, the non-participants appeared to be least exposed than programme participants. In summary, the participants and non-participants of credit programme were similar in terms of their age and education. However, the participants had more land and better exposed to media than the non-participants of the micro-credit programme.

Maternal knowledge by ARI project

Maternal knowledge about the clinical signs and preventive measures of ARI is compared between the study areas (Table 2). Regarding the clinical signs, the mothers were asked, 'How do you know that a child has ARI? Tell us the some signs of ARI that you are aware of.' While the presence of cough and common cold (59.3%) was the most frequently cited, other signs such as fast breathing (46.5%), chest in-drawing (42.9%), noisy breathing (23.3%) and fever (32.1%) were also known to many rural women. On the other hand, convulsion (3.9%), inability to drink (1%) and shrunken eyes (0.8%) were rarely known to most women. When compared, women appeared to be more aware of the clinical signs in the ARI than non-ARI area both at the individual and aggregate levels. The differences in knowledge were particularly high in chest in-drawing and, cough and cold. An aggregate measure of the knowledge of clinical sign was estimated if a woman could correctly mention at least 4 out of all 8 items without prompting. According to that measure, about 25.9% (n=729) of all women had knowledge of clinical signs of ARI. The knowledge level was significantly higher ($P<0.01$) in the ARI (34.4%) than non-ARI (15.8%) areas.

Table 2 here

The knowledge of preventive measures of ARI seemed to be very low compared to the clinical signs. Personal hygiene as a preventive measure was cited by about a third (33.5%) of the sample women. Very few women recognised that safe environment (12.7%) could prevent ARI. The awareness of child immunisation as a preventive measure of ARI was insignificant. Adequate diet (4.3%), breast-feeding during infancy (1.1%) and giving vitamin A (2.3%) were known to a very small proportion of women. An overall preventive knowledge was estimated on the basis of at least 2 accurate answers out of 6 items. Nearly 24% women were aware of the prevention of ARI. The awareness was much higher in the ARI (30.7%) than the non-ARI (15.8%) areas ($P<0.01$).

Influence of socio-economic factors

Maternal knowledge about clinical signs and preventive measures of ARI differed significantly by socio-economic factors (Table 3). The knowledge about clinical signs appeared to increase ($P<0.01$) with age of women although the awareness of preventive measures was much higher among the younger than older women ($P<0.05$). As expected, education of women had positive association with the knowledge of clinical signs and preventive measures. Similarly, land ownership was related to the knowledge level among rural women. Women of large landowners were more aware about the clinical signs and preventive measures of ARI than the women of land-poor (<1 acre) households.

Table 3 here

The women in the ARI project were more aware about the clinical signs and preventive measures than the women of non-ARI villages ($P<0.01$). Similarly, the participation of women in credit-based development programme appeared to be positively associated with knowledge of the signs of illnesses and preventive measures. Exposure to media had a positive and statistically significant ($P<0.01$) impact on awareness of clinical signs and preventive measures among women.

Table 4 here

The net effects of micro-credit programme and ARI control project in raising maternal knowledge level controlling for the other factors are presented in Table 4. Clearly, the credit programme had significant positive association with the awareness of clinical signs and preventive measures although the association with the ARI project was more prominent than the credit programme when the effects of media exposure and other socio-demographic factors were controlled. Media exposure, age and education of women were also strongly associated the level of maternal knowledge of clinical signs and prevention.

Table 5 here

Estimated probabilities of maternal knowledge

The probabilities of knowledge of clinical signs and prevention as outcomes of the effect of various combinations of factors are shown in Table 5. In the study villages, the knowledge of clinical signs is maximum (0.57) in this study when women participate in credit programme, receive ARI knowledge from volunteers, have regular exposure to media, are older, literate and large land owners. The probability becomes 0.49 among non-participants in the credit programme while other conditions remain same. If women participate in the credit programme but are not exposed to ARI control project while other conditions remain similar, the probability is estimated to nearly 0.32. If women neither participate in micro-credit programme nor have the opportunity to get ARI services but have regular exposure to media, the chance of women to be aware of clinical signs of ARI is only 25%. In cases of preventive measures of ARI, the change and distribution of estimated probabilities showed similar pattern.

Discussion

The effects of an ARI control project on raising knowledge among the mothers of under five children were assessed in this research. Also, the study looked at the role of the micro-credit programme through which the poor rural women were able to receive health education in addition to credit support. The electronic media such as radio and television played a role in disseminating health information although the access to such media remains very limited among rural women. Given the presence of multiple sources of health knowledge, the study examined the ARI intervention – maternal knowledge linkage in the presence of credit based development programme. Findings suggest that the community-based ARI intervention, if carefully designed and implemented, can make a difference in raising the health knowledge of rural women.

The improvement in maternal knowledge of childhood ARI was modest in both study areas. Although the health volunteers had regular contact with women, most of them were not able to recognise early signs of ARI to seek prompt care for their children. Besides, the programme efforts in raising knowledge seemed to concentrate in identifying few clinical signs. Even in ARI villages, the mothers were not adequately aware of some important preventive measures. Most mothers had little knowledge of what EPI could do for their children.

Effects on ARI knowledge varied widely by socio-demographic factors. The women involved in credit-based development programme and exposed to media had additional opportunities to know more about ARI and its prevention. Education generally increases the level of understanding and plays as catalytic agent to accept innovations. Thus, education and socio-economic position of women had also important bearing upon the acceptability of ARI information. Promotional activities, therefore, should not only be targeted to poor and illiterate women but the messages should be sensitive to their beliefs and ability to understand.[21-22] While the achievement in raising awareness was modest, the study demonstrated that ARI control project was able to create an enable environment for change among women that justified the continuation of such programme. The probability estimates have shown that the knowledge level of ARI prevention will remain very low among the non-participants, illiterate and poor women when they are not exposed to media and ARI intervention. However, significant improvement is quite possible if appropriate measures such as access to both ARI preventive services and credit-based development programme are taken.

The study argues that the ARI awareness components can be effectively incorporated in micro-credit programme to promote ARI control among the poor. The conventional health information systems often fail to reach the poor as those programmes were targeted to the general public and not specifically designed to the poor. The micro-credit programme, on the other hand, pays more attention to the need of

the poor and their ability to understand. The credit programme participants could freely interact with the health volunteers as they all belonged to the same socio-economic strata. A health improvement strategy within a development framework would be better able to address the problems of the poor in rural communities. The study concludes that ARI control project within the framework of credit-based development programme has the potential to significantly improve knowledge and practice among the poor women in developing countries.

Acknowledgements

This research was a part of the evaluation of *ARI Control Project* of BRAC, Bangladesh. The author is grateful to the respondents who were kind enough to provide information for this research and wishes to thank Mr. Hasan Shareef Ahmed of BRAC for his constructive criticisms and comments of the earlier version of the paper.

References

1. Harrison LH, Moursi S, Guinena AH, Gadomski AM, El-Ansary KS, Khallaf N, Black RE. Maternal reporting of acute respiratory infection in Egypt. *Int J Epidemiol*, 1995; **24**: 1058–1063.
2. Zaman K, Baqui AH, Yunus M, Sack RB, Bateman OM, Chowdhury HR, Black RE. Acute respiratory infections in children: a community-based longitudinal study in rural Bangladesh. *J Trop Pediat.* 1997; **43**: 133–137.
3. Redd SC, Vreuls R, Metsing M, Mohobane PH, Patrick E, Moteeyee M. (1994) Clinical signs of pneumonia in children attending a hospital outpatient department in Lesotho. *Bull Wld Hlth Org.* 1994; **72**: 113–118.
4. Gupta D, Mishra S, Chaturvedi P. Fast breathing in the diagnosis of pneumonia – a reassessment. *J Trop Pediat.* 1996; **42**: 196–199.
5. Harari M, Shann F, Spooner V, Meisner S, Carney M, Decampo J. Clinical signs of pneumonia in children. *Lancet.* 1991; **338**: 928–930.
6. Nichter M, Nichter M. Acute respiratory illness: popular health culture and mothers' knowledge in the Philippines. *Med Anthrop.* 1994; **15**: 353–375.
7. Muhe L. Mothers' perceptions of signs and symptoms of acute respiratory infections in their children and their assessment of severity in an urban community of Ethiopia. *Ann Trop Paediat.* 1996; **16**: 129–135.
8. Saini NK, Gaur DR, Saini V, Lal S. Acute respiratory infections in children: a study of knowledge and practices of mothers in rural Haryana. *J Com Dis.* 1992; **24**: 75–77.
9. Aung T, Tun KM, Thinn K, Thein AA. Knowledge, attitudes and practices of mothers on childhood acute respiratory infections (ARI). *Southeast Asian J Trop Med Pub Hlth.* 1994; **25**: 590–593.
10. Campbell H, Bypass P, Greenwood BM. Acute lower respiratory infections in Gambian children: maternal perception of illness. *Ann Trop Paediat.* 1990; **10**: 45–51.
11. Mull DS, Mull JD, Kundi MZ, Anjum M. Mothers' perceptions of severe pneumonia in their own children: a controlled study in Pakistan. *Social Sci Med.* 1994; **38**: 973–987.
12. Denno DM, Bentsi-Enchill A, Mock CN, Adelson JW. Maternal knowledge, attitude and practices regarding childhood acute respiratory infections in Kumasi, Ghana. *Ann Trop Paediat.* 1994; **14**: 293–301.
13. Khan AJ, Khan JA, Akbar M, Addiss DG. Acute respiratory infections in children: a case management intervention in Abbottabad District, Pakistan. *Bull Wld Hlth Org.* 1990; **68**: 577–586.

14. Bang AT, Bang RA, Tale O, Sontakke P, Solanki J, Wargantiwar R, Kelzarkar P. Reduction in pneumonia mortality and total childhood mortality by means of community-based intervention trial in Gadchiroli, India. *Lancet*. 1990; **336**: 201–206.
15. Government of Bangladesh. *Report on ARI Health Facility Survey*: Dhaka: Government of Bangladesh. National ARI control programme, 1995.
16. BRAC. Annual Report 1997. *BRAC: Reproductive Health and Disease Control Program*, Dhaka, 1998.
17. Hadi A. Diagnosis of pneumonia by community health volunteers: experience of BRAC, Bangladesh. *Tropical Doctor* 2001; **31**: 5-7.
18. Hadi A, Nath SR, Chowdhury AMR. The effect of micro-credit programmes on the reproductive behaviour of women in rural areas of Bangladesh. In Philips, J.F. and Z. Sathar, (eds.) *Fertility Transition in South Asia*. New York: Oxford University Press, 2001 (in press).
19. Schuler SR, Hashemi SM. Credit Programs Women's Empowerment and Contraceptive Use in Rural Bangladesh. *Studies in Family Planning*. 1994; **25**: 65–76.
20. Pitt MM, Khandker SR, McKernan S, Latif MA. Credit Programs for the Poor and Reproductive Behavior in Low Income Countries: Are the Reported Causal Relationships the Result of Heterogeneity Bias?. *Demography*. 1999; **36**: 1–21.
21. Iyun BF, Tomson G. Acute respiratory infections – mothers' perceptions of etiology and treatment in south-western Nigeria. *Social Sci Med*. 1996; **42**: 437– 445.
22. Teka T, Dagnew M. Health behaviour of rural mothers to acute respiratory infections in children in Gondar, Ethiopia. *East African Med J*. 1995; **72**: 623–625.

Table 1 Background characteristics of women by credit programme participation

Background characteristics	Credit programme participant			All women
	Non participant	Active participant	Not eligible	
Age of women (y)				
15 – 29	71.1	64.5	71.3	68.9
30 – 49	28.9	35.5	28.7	31.1
Mean age (y)	*28*	*28*	*29*	*28*
Education				
Illiterate	72.2	71.9	43.4	65.8
Literate	27.8	28.1	56.6	34.2
Mean schooling (y)	*1.2*	*1.3*	*3.3*	*1.7*
Land (acre)				
< 1	96.8	89.9	20.9	77.8
1 +	3.2	10.1	79.1	22.2
Mean land (acre)	*.01*	*.03*	*.30*	*.08*
Media exposure				
Not exposed	77.4	72.6	57.6	71.4
Occasional	16.3	21.7	22.3	19.5
Regular	6.3	5.7	20.1	9.1
N	1238	958	618	2814

Table 2 Proportion of women having knowledge of ARI by study area

Knowledge	ARI		No ARI		All	
	%	N	%	N	%	N
Clinical signs						
Cough and cold	68.4	1011	48.6	648	59.3	1659
Fast breathing	53.2	787	38.6	515	46.5	1302
Chest in-drawing	53.5	792	30.6	408	42.9	1200
Fever	34.4	509	29.4	392	32.1	901
Noisy breathing	28.5	422	17.3	231	23.3	653
Convulsion	5.0	74	2.2	29	3.9	103
Not able to drink	1.2	18	0.8	11	1.0	29
Shrunken eye	0.6	9	1.2	16	0.8	25
Clinical sign (4+ items) [a]	*34.4*	*509*	*15.8*	*211*	*25.9*	*720*
Preventive measures						
Personal hygiene	40.3	596	25.5	340	33.5	936
Safe environment	14.9	221	10.2	136	12.7	357
Proper diet	2.8	41	6.0	80	4.3	121
Vitamin A supplement	2.5	37	2.2	29	2.3	66
Immunization	1.6	24	0.8	11	1.2	35
Breast-feeding	1.4	21	0.7	9	1.1	32
Prevention (2+ items) [b]	*30.7*	*454*	*15.8*	*211*	*23.9*	*665*
N		1480		1334		2814

[a] A woman was considered to have adequate knowledge of clinical signs if she could correctly mention at least 4 out of 8 items without prompting.
[b] Accurate answers of at least 2 out of 6 items in preventive measures were considered adequate.

Table 3 Maternal knowledge of clinical signs and preventive measures by study variables

Study variable	Clinical sign		Preventive measure		N
	Yes	No	Yes	No	
Age of women (y)					
15 – 29	23.2	76.8	24.9	75.1	1936
30 – 49	31.2	68.8	21.4	78.6	878
P	<0.01		<0.05		
Education					
Illiterate	24.9	75.1	20.5	79.5	1851
Literate	27.6	72.4	30.3	69.7	963
P	<0.10		<0.01		
Land (acre)					
< 1	24.6	75.4	22.4	77.6	2189
1 +	30.9	69.1	29.9	70.1	625
P	<0.01		<0.01		
Study area					
No ARI	15.8	84.2	15.8	84.2	1334
ARI	34.4	65.6	32.4	67.6	1480
P	<0.01		<0.01		
Credit programme					
No credit	21.9	78.1	22.4	77.6	1238
Credit	27.1	72.9	23.6	76.4	958
Not eligible	29.6	70.4	30.3	69.7	618
P	<0.01		<0.01		
Media					
Not exposed	23.4	76.6	18.1	81.9	2012
Occasional	30.9	69.1	35.3	64.7	546
Regular	35.0	65.0	47.3	52.7	256
P	<0.01		<0.01		

Table 4 Log odds ratios of selected explanatory variables to predict maternal knowledge about ARIs

Predictor variable	Clinical sign			Preventive measure		
	B	Odds ratios	Confidence interval	B	Odds ratios	Confidence interval
Credit programme						
No credit	0.00	1.00		0.00	1.00	
Credit	0.33	1.39***	(1.14-1.72)	0.17	1.17*	(0.96-1.47)
Not eligible	0.23	1.22	(0.91-1.76)	0.27	1.17	(0.94-1.84)
Study area						
No ARI	0.00	1.00		0.00	1.00	
ARI	1.04	2.83***	(2.34-3.44)	1.12	3.06***	(2.51-3.73)
Media						
Not exposed	0.00	1.00		0.00	1.00	
Occasional	0.39	1.48***	(1.18-1.85)	0.80	2.24***	(1.79-2.78)
Regular	0.51	1.65***	(1.22-2.26)	1.26	3.50***	(2.62-4.76)
Age of women (rc=<30 y)	0.28	1.33***	(1.10-1.61)	-0.31	0.73***	(0.60-0.90)
Education (rc=Illiterate)	0.19	1.21*	(0.99-1.50)	0.41	1.49***	(1.21-1.86)
Land (rc=<1 acre)	0.06	1.12	(0.78-1.46)	-0.23	0.93	(0.58-1.10)
Constant		-2.18			-2.23	
Model chi square		181.6			274.02	
P-value		0.00			0.00	

***Significant at $P<0.01$; **$P<0.05$; *$P<0.10$.

Table 5 Estimated probabilities of maternal knowledge by the combination of predictors

Combination of factors	Estimated probabilities	
	Clinical sign	Preventive measure
1. Participate in credit programme, live in ARI area, regular media exposure, age 30± y, literate and own 1± acre of land	0.57	0.58
2. Not participate in credit programme, live in ARI area, regular exposure to media, age 30± y, literate and own 1± acre of land	0.49	0.54
3. Participate in credit programme, live in non-ARI area, regular exposure to media, age 30± y, literate and own 1± acre of land	0.32	0.31
4. Not participate in credit programme, live in non-ARI area, regular exposure to media, age 30± y, literate and own 1± acre of land	0.25	0.27
5. Neither participate in credit programme, nor live in ARI area, not expose to media, age <30 y, illiterate and own <1 acre of land	0.10	0.09

Note: Above probabilities are calculated from the estimated coefficients of Table 4 by using the following equation:

$$p=\exp(a + \sum bi\ xi) / [\ 1 + \exp(a + \sum bi\ xi)]$$

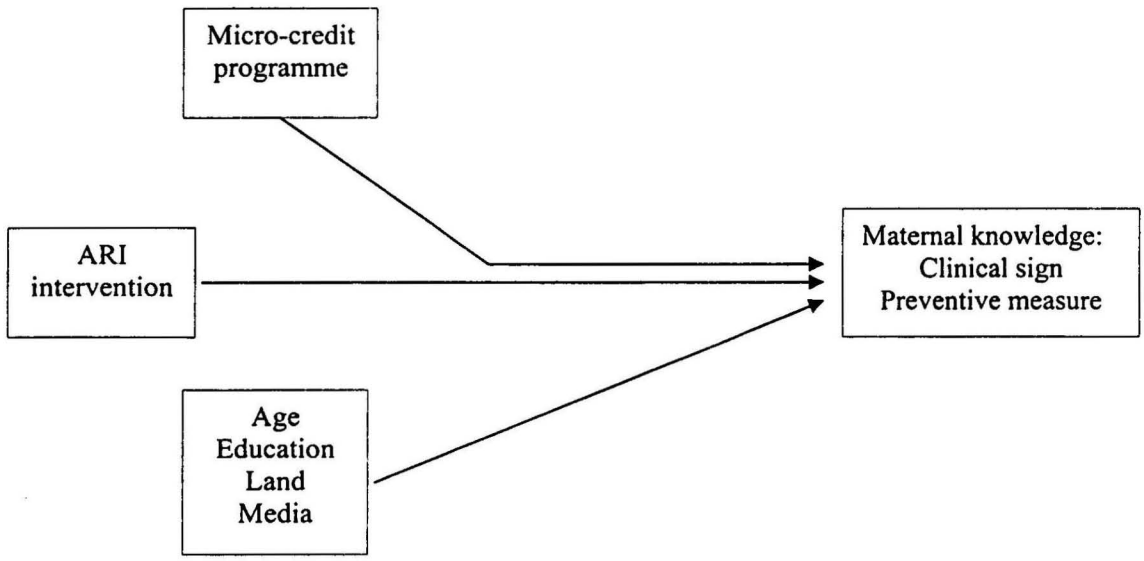

Figure 1 Effects of ARI intervention and micro-credit programme on maternal knowledge