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Evidence-based training of frontline health workers for door-to-door health promotion: A pilot randomized controlled cluster trial with lady health workers in Sindh Province, Pakistan

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Abstract

Objective: Demonstrate the effective use of community-based evidence for health promotion by Lady Health Workers (LHWs) in Sindh, Pakistan.
Methods: A baseline study on mothers and children provided local evidence for risk communication tools designed and tested by LHWs. The communities were randomized to intervention and control. LHWs visited women before and after childbirth to discuss safe practices in pregnancy, in the intervention group LHW using the new tools and in the control group using their standard procedures. A household survey and focus groups permitted assessment of the impact of the intervention.
Results: Women in the intervention communities were more likely to attend prenatal checkups, to stop routine heavy work during pregnancy, to give colostrum to newborn babies, and to maintain exclusive breastfeeding for four months. Community focus groups confirmed a positive reaction to the tools.
Conclusion: Discussion by lay health workers of local evidence underlying safe motherhood messages improved uptake of protective health practices.
Practice implications: Door-to-door health promotion based on culturally appropriate interaction around relevant evidence can have a positive impact on health practices. Engaging health workers from the onset builds capacities, improves dialogue within the health system and performance of frontline health workers.
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1. Introduction

1.1. Socializing evidence for participatory action (SEPA)

Over the past few years, there has been increasing attention to the role of evidence from research in health promotion [1,2]. Common concerns include policy recognition of its value and use of the evidence in health interventions [3]. Yet some authors have warned against a narrow view of evidence [4] or have pointed to often neglected factors in the use of evidence such as the knowledge, experience, needs and expectations of key stakeholders [5].

For more than 20 years, CIET – an NGO that arose from the Centro de Investigación de Enfermedades Tropicales at the Universidad Autónoma de Guerrero in Mexico (http://www.cie-t.org) – has developed its own approach to production and use of evidence for health promotion. Team members discuss evidence from community-based research in the participating communities and with service providers [6,7]. These stakeholder discussions often point to realistic solutions, as people make sense of the information and link it with their own knowledge. The communities and local health service workers can carry out some of these actions at community level. Other solutions may be referred for policy or programme implementation. Retrained

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health staff often contribute to design and implement interventions, as reflected in this study. We refer to this inclusive evidence sharing as socializing evidence for participatory action.

Socializing evidence with stakeholders is more than just passing on results. It means taking into account people's views, experiences and recommendations, identifying actionable data and alternative courses of action. *Evidence* in SEPA is fundamentally epidemiological in character, but enriched by linkage with institutional reviews, key informant interviews and focus group discussions. Stakeholders key out actionable factors and their input feeds into the analysis. We typically present the mix of qualitative and quantitative evidence in a decision-oriented triad of impact, coverage and costs [7,8] engaging all relevant stakeholders through trusted sources, in ways that make cultural sense.

SEPA activates social *participation* at every step of the research process, from framing the issues to planning and implementation. It brings informed public discussion through all-inclusive workshops and community meetings, fosters dialogue between service users and providers, and sparks initiatives for change. *Action* typically ranges from ground initiatives in the context of existing programmes and resources to new policies or interventions, based on community or institutional engagement. Stakeholders may also take action at household and individual levels.

1.2. Background in Pakistan

The Pakistan government reported a maternal mortality rate of 530 deaths per 100,000 live births for the period 1985–2003 [9]. Only 35% of women received prenatal care in 2002 and as few as 9% of mothers had a postnatal check-up within six weeks of delivery [10]. The situation is worse in rural than in urban sites. Poor access to health services [10] and lack of adequate knowledge and relevant information on part of householders are major contributing factors for this situation.

In an effort to improve access to care for women and children, the Pakistan National Programme for Family Planning and Primary Health Care recruits women and trains them to provide family planning services and primary health care in their own communities [11]. Known as lady health workers (LHWs), they are the front line of health care in many rural villages [10]. As with frontline health workers in many settings, they carry the load of countless responsibilities with limited support.

A 1997–1998 CIET national study on mothers and children in Pakistan noted higher levels of health knowledge in communities serviced by LHWs. These home visitors also had a positive impact on health practices of mothers, including child spacing and family planning, prevention of diarrhoea and dysentery, use of colostrum and exclusive breastfeeding for the first four months. Their work was also associated with more sustained breastfeeding and improved early childhood development milestones [12].

The child of the average woman who had two or more visits to health care providers during her pregnancy was one half as likely to be chronically malnourished, compared with the child of a woman who had one or no check-up. Yet 61% of women in Sindh did not attend doctor's check-ups while they were pregnant. Focus groups suggested that many women think they should only seek prenatal care when something is wrong [12].

Nine out of ten women in the province had not reduced their workload up to their seventh month of pregnancy. Their children were 21% more likely to suffer chronic malnutrition and 49% more likely to suffer acute malnutrition. There was a widely held misunderstanding that colostrum should be discarded, depriving the child of valuable passive immunity. Children of mothers who did not understand the benefits of colostrum were 30% more likely to be acutely malnourished [12].

As a pilot in Sindh Province, we used this evidence to develop training materials and communication tools with and for LHWs. This article reports on the results of this health promotion intervention based on a more inclusive production and use of evidence, and puts forward elements of a theoretical framework grounded in that experience.

2. Methods

2.1. Design

Development of the evidence-based communication tools began with a provincial consultation forum organised with the Sindh technical committee of the National Programme for Family Planning and Primary Health Care. National and provincial coordinators and LHWs attended the forum. Workshop participants identified the three strongest pieces of evidence for the tools: prenatal check-ups, reducing heavy workload during pregnancy and feeding colostrum all had protective effects on the pregnancy and its outcome.

In a consultation forum convened for the purpose, LHWs and government health officials agreed there was a need for targeted materials to guide household discussions—motivation or consultation alone was not enough. They also agreed communication tools should be user-friendly, indigenous, and attractive to both LHW and their clients. They developed a tool based on *ajrak*, a traditional Sindh fabric, with the message in embroidery. This is a traditional skill in the area and people are very proud of it.

The provincial team of the National Programme and LHWs participated in the design of the cloth and the way it portrayed the evidence. The design team also consulted with women in different urban and rural communities, local designers and handicraft experts.

The embroidery depicted maternal practices like attending and not attending antenatal check-ups, giving colostrum after birth and not doing heavy work. Fig. 1 shows the embroidery illustrating the positive impact of colostrum on children's nutrition (the original colour artwork, available in the online version of this article, shows healthy children in red and malnourished children in blue). The top left panel depicts a woman not giving colostrum, associated with 6 out of 10 children visibly malnourished. Giving colostrum was associated with only 5 out of 10 children malnourished. The health

Fig. 1. Embroidery showing the positive impact of colostrum on children's nutrition.

workers showed these panels to pregnant women during their household visits and invited them to describe what was going on in the pictures.

During the discussion, the LHWs were careful to explain that colostrum does not *guarantee* the child's health but it does reduce the risk of malnutrition. Similar embroidery showed how reducing heavy workload during pregnancy decreased the risk of low birth weight babies (Fig. 2, see colour artwork at PEC online).

The team pre-tested the embroidery in five communities not included in this study, ensuring input from LHWs and women in the communities to adjust the tools.

2.2. Participants

We used 10 enumeration areas from three districts in Sindh (Karachi West, Karachi South and Hyderabad) in the 1997–1998 study on mothers and children. That sample made up the southern segment of a stratified random sample drawn from the latest population census that, in the original study, covered the whole province. Eight of the ten sites were rural. We allocated these randomly, using a computerised random number generator, for intervention and control (five communities in each).

2.3. Intervention

The LHWs in control communities did not use the embroidered cloths and received no training in how to use them, but continued their usual work based on the standard training of the LHW programme. We trained all 52 registered LHWs in the five intervention communities, covering an estimated population of 50,000. Training included an explanation of the tools, role modelling and practice in the community. Lady Health Supervisors (LHSs) from the intervention communities participated too, to improve their own understanding of the tools and their use.

The intervention started in June 2000. In intervention communities, LHWs showed the embroidered cloths to all registered pregnant woman during their routine home visits. They encouraged their clients to express their views of the situations depicted on the cloths and discussed any difficulties they might face. To go for prenatal check-ups, for example, the discussion might include when and how the person would go.

Monitoring relied on the existing LHW supervisory structure in both intervention and control communities. LHWs had a monitoring sheet to register all pregnant women, along with the total number of visits they made during their pregnancies. As part of routine control visits, LHSs did random checks to see if LHWs used the tools in intervention communities. LHSs held monthly meetings at district level, where they would get feedback on progress and problems they were not able to rectify on their own.

2.4. Data collection procedures

We completed the impact assessment in April 2001 after the LHWs had used the tools in their communities for 10 months. Field teams participated in a two-day training workshop on field methods, instrument use and quality control, and then

Fig. 2. Embroidery showing how a reduced heavy workload during pregnancy brings down the risk of malnutrition.

completed data collection in one week. Fieldworkers, who did not know which communities were intervention and which were control, collected data from intervention and control sites (Table 1):

- A household survey of women who were either pregnant or had delivered in the three years prior to the survey; interviewers asked about health practices during pregnancy (such as reduction of workload and use of prenatal care), childcare (breastfeeding and colostrums) and exposure to trained LHWs and the communication tools.
- Ten key informant interviews with supervisors, field programme officers, district coordinators and key resource people from the Provincial Programme Implementation Unit.
- Ten gender-stratified focus groups, one in each community (five groups had exposure to the tools).

Table 1
Information base for impact assessment

	Intervention sites	Control sites	Total
Households visited	500	469	969
Women interviewed	529	541	1070
Population covered	4391	3452	7843
Focus groups of women	5	0	5
Focus groups of men	5	0	5
Key informant interviews	5	5	10

2.5. Data analysis

Data entry relied on the public domain EpiInfo software [13]. Operators who were blind of intervention status entered all data twice and verified discordant values with the original record.

Analysis followed the intention to treat principle, with all women in the intervention communities analysed as though exposed, whether or not they had seen the intervention materials.

In a secondary analysis to exclude that baseline or other covariates explained the difference, we did univariate analysis of associations, testing each association sequentially with Mantel–Haenszel procedure to take into account imbalances between the intervention and control groups. Qualitative information from focus groups and key informants confirmed and enriched the findings from the household survey.

3. Results

Interviewers visited 969 households, with almost equal proportion in intervention (52%) and control communities (48%), and interviewed 1070 women who had been pregnant and/or having delivered during the preceding three years, with a slightly higher proportion in control communities.

Table 2 compares the socioeconomic conditions of the intervention and control communities. We used number of

Table 2
Sample characteristics

	Intervention group	Control group
Households with four persons or less per room	68% (340/500)	62% (291/469)
Women with some formal education	49% (245/506)	41% (206/507)
Spouse with some formal education	64% (322/503)	60% (303/505)
Spouse with middle or higher income occupation	63% (315/503)	56% (282/505)
Women having their own source of income	20% (102/504)	14% (68/503)

people and rooms within the household, education level of women and their spouse, household economy based on type of occupation of the spouse and the women having a source of her own income as key parameters for this comparison. As indicated in this table, women in intervention communities were slightly better off compared with the control communities. We balanced the effect of these factors into account through stratification in the secondary analysis.

3.1. Impact of LHW performance

Overall (taking into account the pregnancies reported during three year period for measurement) the average woman in an intervention community was more than three times as likely to be visited by an LHW during pregnancy than one in a control community (OR: 3.60; 95%CI: 2.69–4.83; 470/570 pregnancies in intervention communities compared with 297/553 in control communities). The difference was more pronounced when we analysed for pregnancies reported during the intervention; during intervention period women for 287/315 pregnancies in intervention communities compared with 30/227 in control communities.

3.2. Impact of maternal health practices

The typical woman from an intervention community was more likely to give colostrum to her baby compared with one in a control site (OR: 1.60; 95%CI: 1.17–2.18; 350/442 of those living in intervention communities gave colostrum compared with 297/455 of those living in control sites).

In intervention communities, a woman visited by an LHW was almost eight times more likely to have prenatal check-ups (OR: 8.35; 95%CI: 5.02–13.94; 410/470 of those visited by LHWs had at least one prenatal check-up compared with 45/100 of those not visited by LHWs).

A woman advised by an LHW to reduce routine heavy work was more likely to follow that than someone who was not so advised or who was advised by others (OR: 1.48; 95%CI: 1.01–2.16; 239/310 of women advised by an LHW compared with 471/799 of women advised by others or no-one). There were no differences between intervention and control communities.

3.3. Women's views on the tools

Some 63% (298/470) of women in the intervention communities reported seeing the *ajrak* tool. Of these, 97% (289/297) found it useful. Women in the focus groups were excited about the tools. They said they could easily relate the pictures to their daily life and that messages were clear. Most women remarked the tools improved their interaction with the LHWs and facilitated discussion. The pictures helped them to ask questions.

Some women had initially interpreted the pictures differently and found that discussion with LHWs clarified the message. Participants also said this interaction useful during pregnancy, when most women are well and not necessarily aware of the risks. They found the illustrated contrast between healthy and malnourished children effective. 'The making of these pictures is such that after seeing them, we immediately start talking about pregnancy. These pictures invite a discussion on this topic,' said a woman in a focus group in Karachi West. Most women favoured one-on-one interaction with LHWs over group discussions.

Men were also in favour of the tools and suggested these resources could be effective with other men to create awareness, so women could get adequate support at home. This was particularly the case for the messages about prenatal care and workload, where participants appreciated that often women were aware of the risk but could not adopt safe practices for lack of support.

3.4. Experience of supervisors and programme managers

Prior to this experience, LHWs had not been involved in the development of programme materials. The LHW management team said they found the tool-developing process a useful learning experience for managers, supervisors and LHWs. It brought different levels of management closer, with everyone feeling the value of their work. All team members were keen to see this process and tools integrated into the training curriculum for LHWs at provincial and national levels. They stressed the importance of local engagement. In the words of a district coordinator, 'the process of involving the LHWs and the communities in design and pre-testing has made the tool more effective, as well as acceptable to women and LHWs'.

The tools also boosted the social image of the health workers, as reflected in the words of a field programme office in Karachi South: 'In communities where these tools have been introduced, they have become an identity for the LHWs as they are recognised as the lady who shows the chart. It has given them a distinction.'

4. Discussion and conclusion

4.1. Discussion

It seems reasonable to consider that the training produced a considerable Hawthorne effect. LHWs are probably under-

supported in their work, and the intervention is likely to have been a major motivational factor. Future studies of evidence-based knowledge translation would do well to pay special attention to the intensity of health worker training in the control communities. This would allow focusing on the use of the materials in household visits as the key difference between intervention and control communities.

Despite this caveat, the pilot suggests that evidence-based communication tools and discussion of the evidence between LHWs and pregnant women might have an *additional positive impact* on pregnant women and that this should be measurable. The communication tools facilitated the interaction in the households and probably helped the health workers focus on specific message content, in addition to increasing general enthusiasm. One supervisor said that LHWs who used the embroidery 'tended to forget less about what they were supposed to communicate.'

The study revealed how the evidence-based intervention increased the positive impact of LHWs as health agents, one objectives of the SEPA approach. Several factors explain the effect on LHWs' performance: (a) locally-relevant evidence went into their training and supported their work; (b) they were actively involved in developing evidence-based communication tools; (c) they used these resources in their interaction with the households; (d) there was additional monitoring and supervision from LHSs. Our findings are consistent with other reviews and studies pointing to quality and relevance of training [14], participatory development of learning materials, and support from peers and supervisors [15] as essential to lay health workers performance and impact on health promotion.

The results are also in line with an extensive literature on home visiting programmes and face-to-face counselling aimed to improve maternal care and parenting, in both developed [16–19] and developing countries [20–24], including cultural minorities in the former [25,26]. Some authors have found that most of the positive effects were concentrated in higher risk subgroups [27]. In our study, the impact on key health practices was greater in rural villages and among those with lower socioeconomic status.

Pregnant women in the intervention communities received information about causes and consequences of their problems in a way with which they were comfortable. This helped them recognise the links between their activities and different health outcomes [28]. It also pointed to alternative behaviours and their likely consequence, possibly enhancing perceived response-efficacy and self-efficacy.

Community-based evidence from previous research cycles was pivotal to the approach. It led to identify adequate communication channels (i.e. LHWs) and became the centrepiece of an intervention based on informed dialogue between health service users and providers.

Supportive, culturally appropriate communication materials facilitated successful interaction between health practitioners and their clients, as reported elsewhere [29–31]. Stakeholders' involvement in all stages gave cultural relevance to the communication tools. LHW engagement in the design of the tools created a sense of ownership, which is crucial to the outcome of health promotion and community development initiatives. Intense training, adequate support and close monitoring of LHWs through existing supervisory structures helped to keep momentum and contributed to the results. This confirms the importance of government buy-in and interagency agreement for the successful implementation of participatory health promotion.

The project also highlights the empowering potential of women's participation in health promotion and community development. These frontline health workers developed the tools, engaged other women in an informed dialogue and raised awareness among men, who are key actors when it comes to achieving better health for mothers and children.

We did not measure changes in knowledge, attitudes and intentions, nor did we evaluate changes in people's perception of risks.

4.2. Conclusion

Our study confirms what Pronk and colleagues have noted: 'The use of relevant data can align the interests of multiple stakeholders and, in effect, can be considered a universal language that is understood by all parties and allows for the coordination of their behaviour' [32]. It also bears out a key finding in our field: communication of health risks yields best results when done by well-trained sources, in a culturally relevant way [25,26].

As do others [29,33,34], we recognise there is no single effective tool for communicating risk that will suit all audiences, and that the effectiveness of any approach depends on a complex mix, including the content and purpose of the messages, the audiences and their circumstances. Key to success in this case was door-to-door, face-to-face discussion of local evidence, with input from frontline health workers. As a result, service users and providers could engage in meaningful dialogue, and women could make sense of the findings, evaluate the likely outcomes of different actions, and adopt protective behaviours. This personal interaction around the evidence, as opposed to reciting standardised messages, also implies a meeting of different kinds of knowledge, incorporating people's views and experiences.

A crucial element is to understand evidence as a community resource. Not only policymakers, academics or professionals need to know that intervention A had greater impact than intervention B. When evidence is appropriately socialized, people can relate to it and use it when making health decisions. For this process to unfold with a good chance of success, community members and institutions have to be involved in as many stages of research as possible. The interaction around the evidence grounds the process and provides a common language for decision-making and evaluation.

Our study suggests that community-based evidence can be the centrepiece of effective health promotion, helping to bridge the gap between health practitioners and their clients. It also shows how health worker participation favours dialogue between service providers at different levels, improves frontline performance, and brings innovative ideas from the field. Despite

some successful outcomes even at the pilot stage, we are mindful of labelling this as the best practice for replication in other contexts. Much of what was successful was contextual and cultural.

There is currently no evidence to prove that a single model or intervention will consistently work or outperform other options [16,35]. Instead, it seems reasonable to focus on 'best processes' [36] or 'best strategies'. That is why we suggest the replication of the SEPA strategy as a participatory, culturally sensitive approach to evidence-based health promotion.

4.3. Practice implications

This case study has several elements of wider relevance: (a) participatory methods for developing health promotion materials; (b) evidence from the communities as the foundation of the communication process; (c) training of service workers based on this evidence; (d) community interaction around the evidence; and (e) quantitative and qualitative impact measurement to build upon results.

The study demonstrates that evidence-based health promotion can have a positive impact on health practices if patients and clients engage in meaningful dialogue by trusted sources on issues that are relevant to their lives and their culture. Engaging health workers from the onset improves both dialogue within the health system and frontline performance.

Our study confirms that people engage more with health information when they perceive it to be personally relevant [37,38] and they are involved with the issues [39,40]. It also shows that health service users and providers are more likely to act upon this information if they are involved in the production, interpretation and discussion of the evidence.

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