

Identification of model newborn care practices through a positive deviance inquiry to guide behavior-change interventions in Haripur, Pakistan

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A positive deviance (PD) inquiry identifies uncommon, model practices that a follow-on program can spread. PD has been used to rehabilitate malnourished children, but not for improving newborn health. Save the Children Federation/US (SC) conducted newborn PD cycles in communities (total population about 5,000 each) in two project areas in Haripur District, Pakistan among Afghan refugees and among local Pakistanis. Each PD cycle included planning, community orientation, situation analysis, PD inquiries, and community feedback with action planning. PD inquiries were in-depth interviews to identify uncommon behaviors among surviving asphyxiated newborns, thriving low birthweight babies, surviving newborns who had danger signs, and normal newborns. The Afghan caregivers showed better use of services and some household practices than their Pakistani counterparts, consistent with duration of SC presence (15 years vs. 18 months, respectively). The practices of both groups for clean delivery, thermal control, immediate and exclusive breastfeeding, and fathers' involvement were weak. But PD individuals, families, and/or birth attendants modeled good maternal care and immediate, routine and special newborn care. Communities enthusiastically committed to change behavior and form neighborhood support groups for better newborn care, including a demand for hygienic delivery. The PD approach for the newborn is more complex than for child nutrition. Yet this pilot-test proposed a conceptual framework for household newborn care, suggested tools and methods for information gathering, identified PDs in two settings of different risk, galvanized SC staff to the potential of the approach,

mobilized communities for better newborn health, and drafted a newborn PD training curricula.

Key words: newborn care, maternal care, positive deviance, birth asphyxia, cord care, low birthweight, Pakistan

Background

Positive deviance (PD) is an approach to mobilize communities for behavior change. It rests on the observation that in most communities throughout the world, the uncommon behaviors of a few successful positive deviant (PD) individuals enable them and their families to find more effective solutions to pervasive problems than their neighbors with whom they share the same, or worse, resource base. A PD inquiry rapidly identifies, at low cost, with the community, those uncommon practices linked to a good outcome that a follow-on program can help spread more widely in the community. Save the Children/US (SC) has extensive experience with the PD approach in child nutrition [1–5] and preliminary experience in pregnancy outcomes [6].

Pakistan has an infant mortality ratio of 95/1000 live births [7] of which two-thirds is composed of neonatal mortality. Typical of many developing country settings, neither Pakistan's safe motherhood nor child survival programming has yet to focus on the newborn. Indicators for perinatal health are low and include low birthweight (25%), exclusive breastfeeding (16% 0–3.9 months), antenatal care (30%), tetanus toxoid coverage (58% TT-2), and delivery by a trained birth attendant (18%) [8]. Community verbal autopsy studies* [9–12] and facility-based studies [13–17] suggest that the main causes of newborn deaths are birth asphyxia, sepsis, prematurity, and tetanus, with low birthweight as a

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contributing factor.

Save the Children/US (SC) has two large health programs in Haripur District in Pakistan's North-West Frontier Province: Primary Health Care* for 120,000 Afghans in Haripur and Ghazi Refugee Camps and Reproductive Health** for all 700,000 Pakistanis in the district. The Afghan program has supported SC to provide direct maternal and child health services for 15 years. Relevant local perinatal health indicators are good, including use of antenatal care (75%), clean delivery (70%), and postnatal care (60%) (personal communication, T. Ihsan, 2001). The Pakistani program is 18 months into a 3-year government health service support program for safe motherhood, family planning, and sexually transmitted infection treatment through health system strengthening, training, community mobilization, and behavior change. Baseline perinatal health indicators included delivery by a skilled attendant (37%) and tetanus coverage (57% TT-2) (personal communication, A Bari, 2001).

SC launched two global efforts in 2000, the saving newborn lives initiative*** [18] and the positive deviance initiative [19]. We pilot-tested the PD approach for newborn care in Pakistan to inform PD methods and to assess the suitability of the approach for improving household newborn care practices.

Methods

Haripur District (total population 700,000) is 80 km northwest of Islamabad in the North-West Frontier Province. The population is predominantly Hindko-speaking and rural (88%). Haripur District is home to 120,000 Afghan refugees in 11 settlements. In each study site we sought a total population of 5,000 with approximately 50 infants less than three months of age. We selected the contiguous Pakistani agricultural villages of Kholian, Dobandi, and Bagra (estimated total population 6,000) in Bagra Union Council, 7 km east of Haripur City. In the refugee camp, we selected Camp Five of Basic Health Unit Four (estimated total population 5,000 Pashto speakers), 10 km west of Haripur City.

A coordinating team and two field teams conducted this six-day PD cycle (see below) in each site between January 29 and February 6, 2001. The two field teams were comprised of male and female SC staff who lived and worked close to the PD sites and were skilled in community mobilization and qualitative methods. Local community members interested in the process

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provided assistance in scheduling meetings, acted as local guides, and participated in information gathering.

The PD cycle had five steps: planning, community orientation, situation analysis, PD inquiry, and community feedback with action planning. *Planning* oriented the field teams to the PD concept; re-emphasized the community's central role, clarified terminology for "newborn" in four languages, and planned community orientation. Separate *community orientation* sessions for 20 to 50 men and women at each site reviewed SC's work, stated the purpose of the visit (to explore the health of small babies), introduced the PD concept, assessed the community's interest, explored local terminology for "newborn" and common newborn problems, causes, and potential solutions, and planned next steps. The teams introduced the PD concept interactively. For example, villagers made a "hamlet" of five upper (*pucca*) and five lower (*katcha*) class houses, each represented by a brick or dirt-clod, respectively, beneath which unobserved facilitators placed sketches of well- or malnourished children. Other community members lifted up each house. Upon discovering a well-nourished child from a poor household, villagers assented both that this did occasionally occur locally and that the good outcome resulted from "special practices" within the poor family.

The *situation analysis* or "community diagnosis" described community normative newborn care practices. We developed and trained the field teams to use semi-structured interview guides for families (mothers, mothers-in-law, and fathers), sibling caregivers, *dais* (traditional birth attendants), and focus group discussion guides for mothers-in-law and fathers (table 1). Teams used word-of-mouth, birth registries at Afghan basic health units), and *dais* to identify newborns. A SC field worker conducted interviews in the local language. A pair of SC field workers conducted group discussions, one facilitating and one transcribing. Key topics explored were behaviors related to pregnancy, labor,

TABLE 1. Situation analyses by method and community

Inquiry	Pakistani			Afghan
	Bagra	Kholian	Dobandi	Camp Five
FGD, father				2
FGD, mother-in-law	1			1
IDI, father	1	2	3	1
IDI, mother	3	2		5
IDI, sister caregiver				1
IDI, <i>dai</i>	2			3
Total	7	4	3	13

FGD, focus group discussion; IDI, in-depth interview.

and delivery; details (elements, sequence and timing) of immediate newborn care; routine care; appearance of “healthy newborn;” terms for and description of newborn illnesses; home care and care seeking; and trends in newborn health. The coordinating team organized normal practices in a matrix (table 2) that included

prenatal, labor and delivery care, and immediate, special and routine newborn care through day 40. We used 40 instead of 28 days to mark the end of the newborn period since it was meaningful to the community, coinciding with the end of the isolation of mother and newborn. We defined “norm” upon finding consistency

TABLE 2. Situation analysis: Pakistani and Afghan

Concept	Pakistani	Afghan	Difference ^a
Antenatal care			
Birth preparedness	No	Yes	X
Antenatal care	By untrained provider; not considered important by community for health of newborn	By trained provider; not considered important by community for health of newborn	X
Tetanus toxoid	Yes	No	X
Pregnancy diet	No change	No Change	
Clean delivery	Plastic to protect environment; no hand washing	Plastic to protect environment; hand washing by trained attendant	X
Place of delivery	<i>Charpoy</i> (traditional bed)	Floor	
Trained attendant	Not recently	Yes	X
Immediate newborn care			
Room warmed	Yes	Yes	
Baby's placement	Floor	Floor	
Baby dried	Not immediately	Not immediately	
Baby wrapped	Loosely at first	Snugly at first	X
Cord tying and cutting	Tied once with thread; [milked?] toward baby; cut with bamboo; held by assistant after placenta delivers	Tied thrice; cut with new blade by mother after placenta delivers	X
Cord dressing	Initially with <i>desi ghee</i> (clarified butter)	Initially with <i>desi ghee</i> (clarified butter)	
Washing	<i>Dai</i> washes baby, removing vernix	Baby not immediately washed in winter/rainy weather; mother-in-law washes baby on day 2 or 3	X
<i>Azan</i> (prayer)	Senior male relative (not father) briefly administers <i>azan</i> prayer	Usually mullah administers <i>azan</i> (prayer) which may take several hours to arrange	X
<i>Ghutti</i> (liquid pre-lacteal concoction)	<i>Ghutti</i> administered with or without saliva of respected person; bottled <i>Ghutti</i> sometimes given	<i>Traditional home-made ghutti</i> not given; rather purchased bottled <i>ghutti</i> (herbal extract) given 2 or 3 days to purge gut	
Colostrum	Discarded	Fed to baby	X
Breastfeeding	Commences at hour 2, day 2	Commences at 1 to 2 hours	X
Special newborn care			
Response to apnea	None; believed baby to be dead	None; believed baby to be dead	
Recognize low birth-weight	Yes, <i>khas batचे</i> (weak and small)	Yes, <i>khas batचे</i> (small newborn)	
Illness recognition	Recognize <i>kabud-i-laban</i> (cyanosis), a danger sign, and pneumonia, fever, jaundice, and <i>sarishma</i> (translation unclear)	Recognize <i>kabud-i-laban</i> (cyanosis), a danger sign, and pneumonia, fever, jaundice, and <i>golai</i> (a fatal skin infection); apply ash to infected cord	
Care-seeking	Baby, not mother, brought to private practitioners by father, mother, sister	Baby, not mother brought to private practitioners by father, mother, sister	
Supplement	Buffalo milk common; water	Cow and buffalo milk common for “breast-milk insufficiency;” water	

continued

TABLE 2. Situation analysis: Pakistani and Afghan (continued)

Routine care			
Immunization	No	Yes	X
Vital registration	No	Yes	
Mother-baby contact	Limited, even discouraged	?	
Paternal involvement	Not for the first three days; thereafter for first son	Not for the first three days; thereafter for first son	
Mother's postpartum diet	Almonds and <i>kawa</i> (green tea); restricted intake during 40-day seclusion	More food than usual before and after birth by not high quality (no eggs or chicken); little water after birth (enlarged abdomen causing infection of internal wounds)	
Ceremony for baby	Day 7: naming, shaving, circumcision	Circumcision awaits spring; carried out by barber	
Ceremony for mother	Day 40: ritual bath signaling re-entry into society; she leaves for her mother's house	Day 40: respected, but mother may start household chores after <i>wara chilla</i> ("small 40-day period," i.e., 7 days)	

a. Most important differences between Pakistani and Afghan settings.

among different interviews, earlier formative research*, and field team knowledge.

The *positive deviance inquiry* (PDI) obtained details about model care provided for PD cases as defined by either health status or behavior (fig. 1). Common causes of newborn mortality and community input defined these outcomes. Those based on PD health status were thriving newborn (alert, gaining weight) at age 7 to 40 days; non-breathing newborn successfully resuscitated and currently age two days to 1 year; low birthweight (LBW) baby successfully growing at age 40 days or more; or an infant currently age 10 days to six months who had a likely skin or cord infection (newborn danger signs of redness, purulent discharge, and/or fever), which was recognized and treated appro-

priately. PD behaviors included mouth-to-mouth resuscitation and immediate or exclusive breastfeeding, among others. In the local context, breastfeeding began within three hours of birth, and exclusive breastfeeding did not preclude giving *ghutti* (a prelacteal feeding, often honey, sometimes with saliva) in the first hours of life if the infant was breastfed thereafter without supplementation. The field teams sought PDs from high-risk settings to enhance the uptake of desired behaviors in future programming. We defined risk according to socio-economic status and case-specific factors.

The coordinating team developed five questionnaires for the PD inquiries, one for each health status and a generic one for behavioral outcomes. Topics included behaviors related to pregnancy, labor and delivery, newborn resuscitation, immediate care, nutrition, temperature control, infection control, emotional care, maternal care, and infection recognition, and care giving. We encouraged informants to demonstrate specific behaviors with a locally made newborn

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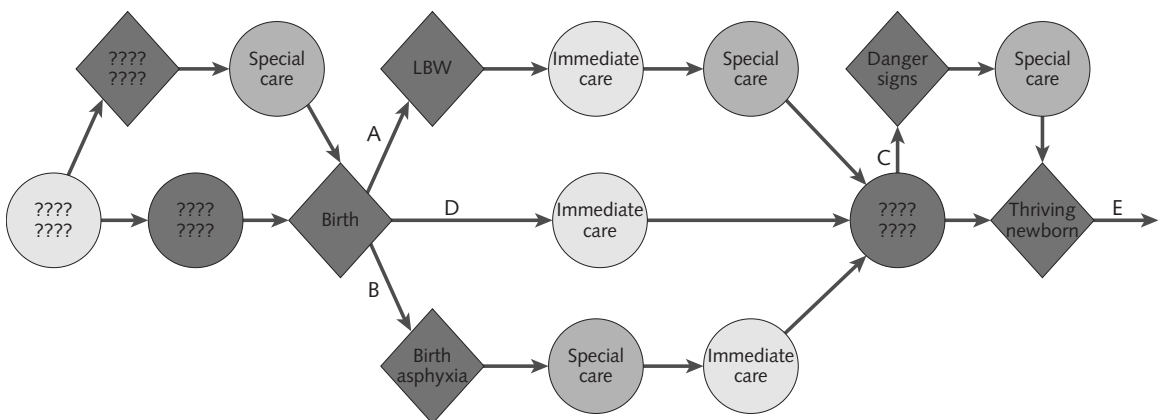


FIG. 1. Pathways for newborn survival. Case definitions for positive deviant newborns: thriving former low birthweight newborn (AE), thriving infant formerly with birth asphyxia (BE), thriving infant formerly with danger signs (CE), or normal throughout (DE)

doll with a detachable cord and placenta. Interviewers sought the enabling factors for selected PD behaviors, such as beliefs about good outcomes from performing the behavior and bad outcomes from not performing the behavior, facilitators and barriers, advisers for and against, and beliefs characterizing doers versus non-doers of the behavior [20]. The teams analyzed the PD inquiries, identifying by consensus those uncommon behaviors and enabling factors that likely explained the PD result.

The field teams facilitated *community feedback and action planning* separately for men and women at each site. Each Pakistani and Afghan meeting of 30 to 45 community members reviewed the PD concept, reassessed the community’s interest, reviewed the week’s work, reported the PD findings, and planned next steps. In advance the coordinating team placed written PD behaviors in a cardboard box decorated as a “village house.” Participants reached through “the door,” read a paper, and sparked a general discussion. A community member facilitated the action plan.

Results

The results are three-fold: the process of the PD cycle, the findings from the inquiries, and the community mobilization that the cycle stimulated.

PD cycle process

The coordinating and field teams maintained an ambitious schedule. Uncertainty characterized each step for each field team since they had no experience with PD, and the coordinating team had no experience applying it to newborn health. The attention of the coordinating team was divided between two field teams. Key methodological steps (i.e., PD case definition) were iteratively refined with experience. The coordinating team rapidly drafted a battery of questionnaires without adequate time to train users and to pilot-test them. Extensive after-hours briefings did not permit complete analysis of all inquiries due to the richness of the findings and the enthusiasm of the field teams’ participation.

Situation analysis and PD inquiry findings

Field teams conducted 13 situation analysis inquiries in the Afghan and 14 in the Pakistani communities, respectively (table 1). Not surprisingly the behaviors identified in the situation analyses from the two communities were similar, but not the same (table 2). More Afghans tended to receive antenatal care including tetanus vaccination and to have birthing plans. Birth attendants reportedly washed their hands more commonly in the Afghan camp. Cord care and initial

washing of the newborn may have been better among Afghans while the more rapid Pakistani administration of *azan* (prayer) may have been more beneficial to focus attention on the infant’s immediate care. On the other hand, Afghans reported more optimal immediate and exclusive breastfeeding, immunization, and vital registration.

Field teams conducted five PD inquiries in both settings (table 3). The coordinating team relaxed the age parameters for case definitions to ease PD identification. PD individuals from both communities included mothers, mothers-in-law, and fathers, and, in the Afghan camp, *dais*. We found PD behaviors in both communities for antenatal, delivery, immediate, special, and routine newborn care (table 4). Some model behaviors (i.e., tetanus vaccination among Afghans) were not PD since they were already norms. On the other hand, we included some imperfect PD behaviors (i.e., antenatal care from an untrained *dai* and plastic covering during delivery to protect the environment, not the mother) since they seemed potentially modifiable steps towards model practices.

Not surprisingly, PD individuals often demonstrated an array of PD uncommon behaviors and other good, more common behaviors. A Pakistani case illustrates several potential PD behaviors (underlined> and the determinants of a specific behavioral outcome, exclusive breastfeeding. An unemployed father from Dobandi had a 45-day old infant girl, his third child. His wife obtained two antenatal check-ups and tetanus toxoid vaccination. He insisted that she *increase her diet during pregnancy* “to get a healthy baby and ensure the life of the mother.” He *arranged 10,000 Rupees* so that “in danger I can go to the hospital.” Late in pregnancy he purchased *desi ghee* (clarified butter) and almonds for the mother’s postpartum nutrition. “If her food is good, her baby will be healthy.” A *dai* delivered his wife

TABLE 3. Positive deviance inquiries by topic and community

PD case	Pakistani			Afghan
	Bagra	Kholian	Dobandi	Camp Five
Apneic newborn				1
Low birthweight	1	2		1
Infection				
Thriving				2
Specific behaviors				
Exclusive BF	2		1	1
Resuscitation			1	1
Cord Care			2	2
DS Recognition				
Birth plan				
Total individuals ^a	5			5

BF = breastfeeding; DS = danger signs.

a. Some identified PD cases fulfilled more than one case definition.

TABLE 4. Positive deviance behaviors among Pakistanis and Afghans

Concept	Pakistani	Afghan
Antenatal care		
Birth preparedness	Husband collected 10,000 rupees during pregnancy for delivery emergency Husband obtained car when the mother went into premature labor	Mother prepared her own delivery kit, and mother-in-law arranged a new plastic sheet and clean cotton sheets
Antenatal care	Husband asked dai to see his wife in her ninth month although she was well	No example found
Tetanus toxoid	Mother went for antenatal and tetanus toxoid injection	No example found
Pregnancy diet	Husband increased the food of the mother during pregnancy, especially in the last 2 months (×2)	Mother given diet of chicken and eggs before and after birth
Delivery		
Clean delivery	Family placed plastic under the mother for delivery	Mother-in-law washed hands with soap before and after cutting cord Mother-in-law put new plastic sheet and clean cotton sheets on floor for delivery
Immediate care		
<i>Room warmed</i>	No example found	The room was kept warm at all times, especially if the newborn was low birthweight
Baby's placement	The family hand-stitched a <i>gadeila</i> (small mattress), a clean and warm surface for baby immediately following delivery.	No example found
Baby dried and wrapped	No example found	Immediate thermal care: dai cleaned the baby dry with a cloth and wrapped it in warm clothes.
Cord tying and cutting	Husband gave the <i>dai</i> a clean blade	Mother-in-law cut cord cleanly with son's new razor blade (purchased from bazaar)
Cord dressing	Nothing immediately applied on the cord	No example found
Washing	No example found	Mother decided not to wash or bathe newborn for several days after birth in cold climate
Ghutti	No example found	Mother did not give ghutti (prelacteal) or green tea, despite dai encouraging her to give <i>ghutti</i>
Breastfeeding	A sick and premature baby was exclusively breast-fed; two small newborns were exclusively breast-fed except for ghutti in the first hours. Mother-in-law promoted breastfeeding: "The baby has no disease in the mother's womb, so milk is safe since it is from the mother's body."	Mother exclusively breastfed. "Exclusive breastfeeding means the temperature of milk is the same all the time. It prevents illness and makes bones strong and fills the bones."

continued

at home on the *charpoy* (bed) cutting the cord with a *new razor blade* that he had purchased for the occasion. The *dai* and the family *applied nothing to the cord*, and it dried in three days. The baby was given *ghutti* (prelacteal feeding) "because of our culture" within two hours of delivery followed by breastfeeding. The

father "made a fuss to *keep the house warm*," wrapping the baby in blanket, socks, and a hat and burning gas and charcoal at night, because two babies in his community died of pneumonia in the last year. He "*played with his daughter*" one hour daily. He registered her birth with the Union Council Secretary to obtain a

TABLE 4. Positive deviance behaviors among Pakistanis and Afghans (continued)

Special care		
Response to apnea	No example found	A <i>dai</i> used mouth-to-nose resuscitation, blowing air through the newborn's nose
Recognize low birth-weight	Father saw his son was <i>khas bathe</i> (weak and small), requiring special care: extra wrapping and changing diapers and exclusive breastfeeding.	No example found
Illness recognition	Family recognized danger signs in a premature baby (stopped sucking, could not lay down, and painful to touch rib-cage).	No example found
Care-seeking	Family of newborn with danger signs took the baby to a private doctor. The mother-in-law did not agree with the diagnosis (<i>hasba</i>), so the family took the baby to another doctor.	Father asked a skilled health provider to examine his newborn daughter who started breathing after she was resuscitated.
Routine care		
Supplement [per table 2 this should be in special care section]	Husband says that giving other food to the baby requires a bottle that might make the baby sick.	Mother frequently breast-fed newborn because she was not producing much milk, and did not supplement with cow or buffalo milk as most mothers do. (2 examples)
Paternal involvement	Father made a fuss to keep his baby warm. Father played with his baby for one hour in the evening (even though female). Father registered his baby at the Union Council to facilitate obtaining a birth certificate, school admission.	Father actively involved with baby girl when home. Father interacted with small newborn daughter, and looked after the other children to give the mother some rest.
Mother's postpartum diet	Father increased the quality and quantity of mother's diet and made her unavailable to the rest of the household so that she could care for the baby. (2 examples)	Both before and after birth her diet was rich in chicken and eggs.

birth certificate. *Breastfeeding had been exclusive* without any water because “mother’s milk is healthy and good for the health of the baby. If we gave other foods, we would have needed a bottle that would make the baby ill because of germs. The baby would be weak if we didn’t breastfeed.” A cousin exclusively breastfed, and her child was fine. He had heard messages about exclusive breastfeeding from television and “reading.” No one advised to the contrary.

Community mobilization

The Afghan Refugee community understood positive deviance (*musbat amaal*). They identified PD behaviors that were new to most of them, and were encouraged to learn that some were already practicing them: “Though we did not know, we are very proud of these Afghans who practice good behaviors that most of us were unaware of” (Afghan male refugee, community feedback session). Men eagerly shared this information with their family members and neighbors at funerals, births, and social visits. Afghan women showed great interest to adopt exclusive breastfeeding and appropriate cord care and to seek delivery assistance from *dais*

who know how to resuscitate a non-breathing newborn. They formed seven women’s groups to discuss neonatal care at monthly meetings without requesting help from SC. One woman said, “I am going to write to my daughter-in-law in Afghanistan about this.”

The Pakistani male and female community members observed that the behaviors were, in fact, not new to them; yet, they admitted that the behaviors were not commonly practiced. Men publicly committed to improve key household behaviors, and women committed to demand clean delivery from local birth attendants and to form neighborhood (*mohalla*) women’s groups to encourage this, again without SC assistance. Within days, one Pakistani family for the first time used a new razor blade, as opposed to a bamboo stick, to cut their newborn’s cord and refrained from dressing the cord, based on the community feedback.

Discussion

The two communities were different, one a refugee camp, the other a long-established agricultural community. The refugee population benefited from 15

years of free preventive antenatal care, including tetanus toxoid vaccination, free delivery kits (since 1996), a prenatal counseling unit, and a network of efficient and trusted female health workers trained by SC. In contrast, SC's Haripur District reproductive health program started 18 months ago, and had not yet fully reached every village within the large district, including the intervention villages. Moreover, the support program provides no direct services. The situation analyses and the PD inquiries for the two settings reflected these different programmatic contexts. The PD inquiry results were similar for exclusive breastfeeding practices, prevention of hypothermia, involvement of the father in delivery and neonatal care, and clean cord care. They differed concerning *dai* practices since SC trained most Afghan *daïs* whereas none of the Pakistani *daïs* had been trained recently. The Afghan PD inquiry identified as PD behaviors mouth-to-mouth and mouth-to-nose resuscitation and cutting of the umbilical cord while the placenta was still in the womb. The Pakistani PD inquiry identified some PD delivery practices that involved the mother-in-law or the father, i.e., cutting the cord with a new blade and the protective maneuver of placing the newborn on a cushion rather than on the floor.

The rationale for this simultaneous, two-site pilot-test was to gain experience in a new approach, not to closely examine subtle differences between the sites. Yet the similarities, as well as the differences, support the validity of the approach (table 2). Moreover, the 21 Pakistani cases reported by Khadduri et al.* were consistent with many of our findings, for example, knowledge but not practice of clean delivery and cord care, knowledge and practice to maintain newborn's warmth, incomplete response of *daïs* to non-breathing newborns, knowledge of, without timely response to, danger signs, and universal prelacteal feeds (*ghutti*) with delayed initiation of and uncommon exclusive breastfeeding. Although some of the same individuals were data collectors for both studies, most team members were not. Moreover, the community input and vetting minimized bias. Also, we discovered localized differences (i.e., use of a bamboo stick to cut cord in Bagra village) not noted in the case series.

The community mobilization was impressive. It occurred despite the accelerated schedule of the pilot-test and the resulting incomplete involvement of the community in each PD cycle step. Moreover, it occurred in Pakistani villages not yet mobilized by and linked to SC's district reproductive health program. The identified next steps seemed feasible, i.e., modest

and consistent with existing social structures. Finally, no community requested assistance from SC.

The pilot study yielded important lessons for future newborn PD applications, especially regarding definition of community, PD case definitions, and significance of PD outcome. Regardless of sample size requirements, initial focus should be at a small scale in a community with moderate or better organization. A demonstrably successful pilot program can later be replicated for scale. Pre-cycle planning must stress community involvement with a preparatory time-line with steps to specify community members' roles (mobilizer, guide, small group facilitator, etc.). PD case definitions generally "worked" in that field teams found examples of each, once age criteria were relaxed. On the other hand, the validity of reported conditions, behaviors, and enabling factors, especially over time, is unknown. Studies validating household behaviors through direct observation and re-interview after several months are needed. Regarding the significance of a PD outcome, the coordinating team repeatedly stressed to field teams that a PD result did not guarantee a surviving, thriving child; rather it increased the chances of it.

A comparison between the PD cycle for newborn health and for child nutrition further highlights some methodological points. *Community selection* involves definitional, epidemiological, and organizational parameters. PD communities for nutrition are defined as meaningful social units, not according to estimated sample size requirements as in Haripur. The level of the community's child nutrition problem must justify the effort, a quantitative assessment of which must be feasible. Accepted methods for assessing the level of newborn ill health do not exist. Our assumption that the newborn problem existed was inferred from national estimates and district studies that have uncertain applicability to specific villages.

The *situation analysis* for PD nutrition is quantitative and qualitative, each supporting the other. Local health system reviews and even cemetery inspections can round out the picture. The newborn situation analysis, although benefiting from the earlier case series, was entirely qualitative. Graveyards were hamlet-based, small, and generally unrevealing. The local health system in the Pakistani community was unlikely to provide insight since it provided no newborn care. The *outcome* for PD nutrition is quantitative and readily measurable: nutritional status as defined by weight-for-age. Outcomes for newborn PD, to date, are a mix of reported health status and behaviors, measured with difficulty from multiple informants, at least the mother, the mother-in-law, and the birth attendant. The validity of reported events and practices is uncertain although consistent information from multiple informants can be reassuring. PD nutrition uses the UNICEF "care" framework [21] as a *cause-effect model*.

* Khadduri R, Marsh DR, Rasmussen B, Bari A, Nazir R, Darmstadt GL, Household knowledge and practices of newborn and maternal health in Haripur District, Pakistan, unpublished document, 2002.

To date, no widely accepted model exists for newborn survival. A PD cycle addressing multiple outcomes is likely to require a complex model, and we propose one here which we have further refined [22].

PD identification for nutrition is straightforward: good nutritional status in spite of risk for the good outcome, usually lower socioeconomic status. Additional selection criteria control for common confounding variables (i.e., rich uncle, first born, or “scavenging personality”). Identification, risk, and criteria for newborn PD are complex. Cases are difficult to find, and risk will vary by outcome. PD inquiry *tools and methods* are well known for nutrition [12]. Well-tested newborn care assessment tools are needed. Finally, regarding a PD-informed *intervention*, PD nutrition projects involve caregivers repeatedly practicing PD behaviors with their peers and observing their children gaining weight. On the other hand, the newborn period is brief and secluded, and most PD behaviors are preventive without a visible outcome. Newborn PD interventions await further experience.

Not surprisingly, the PD approach is complex, in part because it accomplishes so much: community mobilization, fact-finding, and behavior change. As in other settings, the approach catalyzed communities to find viable solutions from within to solve some of their problems. The “facts” found were science-based model behaviors, recognized by the community as true, but

uncommon. The behavior change continues to play out, but involves shifts in internal determinants (knowledge, recognition that norms may not be healthy) as well as decisions to do things differently next time and to tell others to do likewise. Governments worldwide recognize the need to involve communities as full partners for the improved health and survival of women and children. The PD approach provides those communities with a vision of that possibility, a voice to express it, and the confidence to pursue it.

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