

## **Determinants of Childhood Mortality in Slums of Karachi, Pakistan**

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*Maternal autonomy, appropriate health seeking behavior and child-rearing practices identified in this study clearly indicate the need for intervention strategies that go beyond the usual primary health care initiatives and involve communities in developing social support systems for mothers. These have important implications for evolving global health policies relating to primary health care and health care reform.*

*Key words: Developing countries; maternal behavior; child mortality; primary health care and equity; socio-demographic; use of health services*

### **Introduction**

Pakistan with an infant mortality rate (IMR) of 90.5 per 1000 live births and child mortality of 117.5<sup>1</sup> has fared poorly compared to other South Asian countries. The rapid growth rate of the population together with rural-to-urban migration, has given rise to the formation of urban slums which tend to have a heavier burden of disease than rural populations.

The Department of Community Health Sciences of the Aga Khan University (AKU), took the lead in developing Primary Health Care, PHC, (center) prototypes in six *katchi abadis* or slums of Karachi. The baseline IMR in these slums was 126 per 1000 live births and under-five child mortality rate was 177. Over a period of five years the IMR had decreased by 49 percent and the under-five mortality rate by 54 percent in these sites<sup>2</sup> at an average cost of US \$2.32 per person per year<sup>3</sup>. Diarrhea and acute respiratory infection (ARI) accounted for 37 percent and 12.3 percent respectively of the under-five deaths during the period 1990-1993.

Recently there has been a shift from studying socio-demographic factors influencing infant and child mortality towards exploring their behavioral determinants. In order to further reduce mortality, this study was undertaken to identify risk factors for under-five child mortality. This paper attempts to uncover the role of behavioral issues like restricted maternal autonomy and patterns of health seeking behavior alongside the more conventional 'socio-demographic' predictors for under-five child mortality. The paper also uses the insights derived from this approach for formulating changes in patterns of health care at the community level and considers the policy implications of such changes for both Pakistan, and developing countries more generally.

### **Material and Methods**

This study was initiated in January 1993 in six slums of Karachi where the Community Health Sciences (CHS) department of the Aga Khan University (AKU) has operated Primary Health Care (PHC) Programs since 1985. There have been some changes in the urban health programs pursued by the department since this study was carried out. So, this description will be of the programs as they were at that time. These slums had each a population of approximately 7-10,000 and represented the main religious group, Muslims, and the two largest minorities, Christians and Hindus, and

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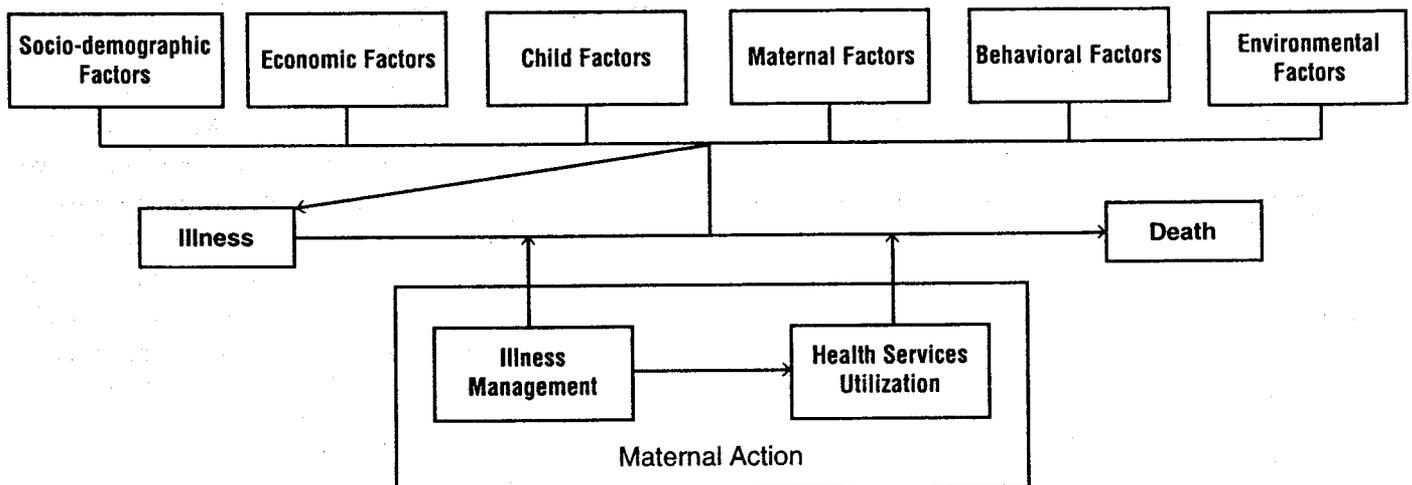
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included a wide variety of ethnic groups. These slums were selected for the study primarily because of a health surveillance system that provided the infrastructure to collect prospective data on every household, especially births and deaths, which were recorded by the community health workers on their monthly visits. A home visit was done, in which events surrounding the child's death were investigated through a series of questions to establish the illness and cause of death.

The PHC programs were operated by a four-tiered manpower system consisting of community health doctors (CHDs) and community health nurses (CHNs), lady health visitors (LHVs), and community health workers (CHWs). The grassroots care providers in the system were the CHWs who are mostly literate women from the *katchi abadis* (slums). They were motivated and trained by the PHC teams. The health status of women and children of these households was monitored through planned monthly home visits in which the CHWs provided selective interventions, which were both preventive and promotive. In addition, they recorded information in family folders, identified individuals at risk and made referrals to the primary health care centers. The theoretical framework for studying child mortality in these slums was a modification of Mosley and Chen's<sup>4</sup> framework (Figure 1). The study design was a population-based matched case control study which was partly retrospective and partly prospective. The matching variables were three important confounders: type of illness, age of the child at death, and the slum area.

The study was carried out during the period 1993-1994. The cases were households which had had a child under five years of age die of diarrhea or ARI in the five-year period 1989 to 1993 (N=222). These illnesses were determined from the child's history provided by the mother at the time of the interview and from the death forms. Only one child death was selected from a household at random for inclusion in the analysis to avoid overrepresentation of a household. Mothers of cases were interviewed during the period January 1993 to April 1994. Children under the age of 1 month were not enrolled in the study because it was difficult to find controls for them. Only deaths due to diarrhea and ARI were enrolled as they formed 50 percent of the child deaths and definite treatments exist for these illnesses. The controls were selected from households with children under five years of age who had experienced ARI or diarrhea of at least three days duration in the month preceding the interview during the period January 1993 to April 1994. CHWs identified these children who matched the three criteria on their monthly household visits during 1993. The duration of illness of at least three days for the control was chosen as a measure of severity to ensure that the mother would have sought some treatment. There were 419 controls matched on age, disease (diarrhea and ARI) and slum. A variable number of controls from one to six were selected for each case to maximize the power of the study. To get an appropriately matched control, at least ten to fifteen potential controls had to be reviewed and those inadequate to serve as control discarded.

Figure 1 Theoretical Framework Used for Studying Child Mortality



Mothers were interviewed through a series of questions relating to socioeconomic, demographic, environmental, behavioral, maternal and child characteristics, autonomy in decision making regarding treatment, and use of health services. Attempts were made to minimize errors in recall by interviewing mothers with child deaths in 1989 and 1990 first, and then moving on to deaths in later years. Interviewer bias is possible, as blinding to the study outcome could not be done. Mothers of controls were interviewed in 1994 as early as two weeks to a month after the child's illness. Mothers of cases were interviewed as early as three months after the death of their children to three years in some cases. Most of the socio-demographic information and health seeking behavior regarding the illness before death were collected a month after the child's death as part of the verbal autopsy, and therefore, this addressed the problem of recall and changes in characteristics that could have occurred over time. It was also possible to examine consistency of information on the cause of death and socio-demographic information like education, parity, age, income, siblings, nutrition and immunization status by comparing it with that recorded on the death forms and family folders.

Severity of illness is an important confounder for maternal autonomy regarding decisions about treatment and use of health services. As the cases had more serious illnesses than controls, this may require joint decision making in the family. To address this issue, two strategies were used: first, examining other aspects of decision making, especially the role of the mother regarding treatment and choice of healers more generally and not only for the last illness episode. Secondly, selecting another variable in which women considered 'joint decision making with her husband' to be more important than 'making decisions herself'. This variable is not confounded by severity of illness, and was used as a proxy variable for maternal autonomy. Health seeking behavior was assessed through a number of questions, for example: first healer, number of healers consulted, type of healer, mother and healer interaction, and hospitalization. General questions relating to health seeking behavior were asked of the mother, like mothers changing healers rapidly, duration of continuing medication, etc.

This study was reviewed by the ethics committee of the Aga Khan University, Karachi, before it was initiated. The study had the classical limitations of a case control study.

Issues of recall, establishing temporal sequence, and control for severity of illness were addressed to some extent in this study by examining maternal autonomy and health seeking behavior generally. One of the main drawbacks of this study that could be addressed through a cohort design would be to have the cases and controls from the same time period.

The analysis was undertaken on all the matched sets and not stratified by disease. Statistical analyses were conducted using conditional logistic regression<sup>5</sup> with the EGRET statistical package<sup>6</sup>. Cases and controls with missing values in any of the variables in the model are excluded. Odds ratios (OR) and 95 percent confidence intervals (CIs) for the associations between risk factors and childhood mortality, adjusted for the effects of potentially confounding variables, were calculated. The likelihood ratio statistic (LRS), significant at the  $p < 0.05$  level, was used for the evaluation of statistical significance as the criterion for a variable to be included in the model. The aim was to combine the socio-demographic, maternal autonomy and use of health services factors in an effort to identify a comprehensive explanatory model for determinants of mortality in children under-five. This paper presents quantitative data derived from answers to questions relating to the illness episode preceding death for the case and the most recent illness (ARI or diarrhea) for the controls. In addition, questions asked generally about health seeking behavior and maternal autonomy were used to validate or complement the former questions.

## **Results**

There were 347 deaths of children under five years of age due to diarrhea and ARI during the period 1989 to 1993, of which 235 mothers were interviewed. Only 14 mothers with a child death in 1989 were interviewed. The cases that were not interviewed were those whose families had moved out (14 percent) or of very young children (10 percent) who were deliberately excluded as it was difficult to find controls for them. There was a difference in the cause of death in 4 percent of the cases on interview as compared with the death forms, and these were not enrolled. The overall refusal rate was 6.4 percent (N=15) with a slightly higher proportion of refusals among the cases. There were 419 controls found for 222 cases and no controls were found for 13 cases. Seventy-six percent of the 222 deaths had taken place before the age of one year and 97 percent had taken place by age three.

According to the theoretical framework the cases and controls were compared with respect to the socio-demographic, restricted maternal autonomy and use of health services factors in the univariate analysis and in separate multivariate explanatory models. Variables from these three models were included in a forward stepwise logistic regression procedure to develop the final model, and Figure 2 illustrates the derivation of this model. The socio-demographic model was developed from six groups of variables i.e. socio-demographic, socioeconomic, child, maternal, behavioral and environmental factors. This procedure was used to reduce the number of variables that went into developing the final model. The final model contains ten variables. It is heavily influenced by the socio-demographic model and includes seven variables from that source. Use of traditional healers and mothers changing healers quickly were two variables from the health service utilization model. The maternal autonomy variable was reflected in the person who decided about outside treatment.

The maternal autonomy variable in the final model could be confounded by severity of illness. To overcome this issue, the variable 'who decided about outside treatment' was replaced by a proxy maternal autonomy variable, 'husband more important than wife in decision making'. All the variables of Model 1 remained significant even when the maternal autonomy variable was replaced by the new proxy variable. Therefore, the variables in the final model are fairly robust as the estimates of risk were approximately the same, and this variable can be used as an alternative maternal autonomy variable.

The other maternal and health services variables from the multivariate models shown in Figure 2 were not significant when added to the final model, and, therefore, were not included. Once the final Model was identified, known risk factors, such as sex of the child, maternal age, parity and ethnicity were introduced to Model 2, but they were not significant. This was done to ensure that known risk factors would not be missed from the final model.

Figure 2 Summary of Development of the Final Model from the Hypothesized Risk Factors for Under-five Child Mortality.

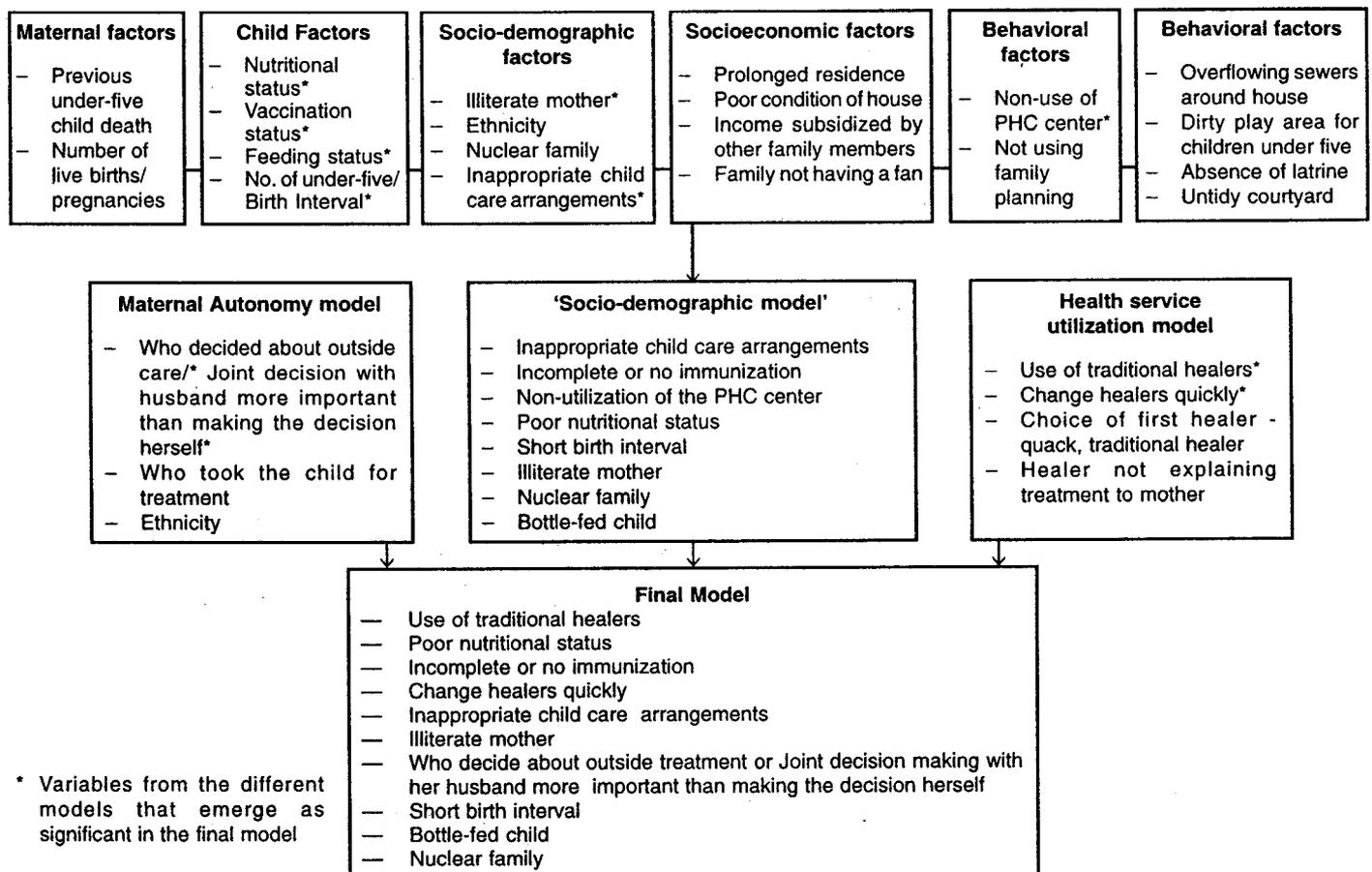


Table 1 Final Multivariate Model for Determinants of Child Mortality in Karachi Slums, Pakistan, 1989-94

Variable	Cases N=136*	Controls N=388*	OR (95% CI) Unadjusted	OR (95% CI) Adjusted Model 1
<b>Education of the respondent (child's mother)</b>				
Grade 5 or more	17	100	1.0	1.0
1-5 grade	10	52	0.99 (0.37 - 2.66)	0.59 (0.11 - 3.18)
Illiterate	109	236	3.25 (1.73 - 6.07)	6.53 (1.84 - 23.15)
<b>Birth Interval</b>				
> 24 months	36	151	1.0	1.0
First birth	20	69	1.23 (0.62 - 2.42)	4.68 (1.26 - 17.44)
18 - 24 months	30	88	1.32 (0.68 - 2.58)	1.24 (0.33 - 4.64)
< 18 months	50	80	2.98 (1.64 - 5.43)	4.08 (1.21 - 13.77)
<b>Nutritional status</b>				
Normal/I degree	75	352	1.0	1.0
II degree	21	24	4.17 (1.85 - 9.38)	7.41 (1.74 - 31.50)
III degree	40	12	15.08 (5.66 - 40.19)	12.90 (3.19 - 52.15)
<b>Vaccination status</b>				
Complete, appropriate for age	55	353	1.0	1.0
Incomplete/None	81	35	15.64 (7.08 - 34.56)	10.34 (2.93 - 36.49)
<b>Feeding status</b>				
Breastfeeding	77	297	1.0	1.0
Breast and bottle	59	91	1.91 (1.19 - 3.06)	3.31 (1.26 - 8.70)
<b>Took to traditional healer</b>				
No	81	332	1.0	1.0
Yes	55	56	3.27 (1.91 - 5.58)	14.52 (4.23 - 49.83)
<b>Wait before changing healers</b>				
24 - 168 hours	96	338	1.0	1.0
<= 23 hours	40	50	2.97 (1.65 - 5.33)	8.00 (2.22 - 28.81)
<b>Who decided about outside treatment?</b>				
Respondent	43	264	1.0	1.0
Respondent/others/husband/mother-in-law	93	124	5.39 (3.02 - 9.59)	4.91 (1.66 - 14.48)
<b>Extended family</b>				
Yes	46	157	1.0	1.0
No	90	231	1.32 (0.81 - 2.15)	3.27 (1.13 - 9.43)
<b>Child care</b>				
Respondent	111	373	1.0	1.0
Siblings or adult family members	25	15	8.08 (2.87 - 22.78)	7.45 (1.15 - 48.27)
Deviance				259.0681
LRS				177.964 14 df
Residual deviance				81.104

\*Note: Cases and controls with missing values in any of the variables in the model are excluded.

Children of illiterate mothers had a seven times higher risk of dying than children of mothers educated five years or more (Table 1). Restricted maternal autonomy delays seeking treatment and a mild illness can progress to a serious one. If the mother was not the main decision-maker about outside treatment, she had restricted autonomy and had a five times higher risk of her child dying. Conditions within a nuclear family could delay seeking treatment for the child, as the mother has to wait for her husband to return from work to accompany her or take decisions. Children in nuclear families had a three times higher risk of death as compared to children in extended families. Living in a joint family may work to the advantage of the child in some situations. Even though the mother is not allowed to take decisions on her own, if the mother-in-law or some other family member is available, this can facilitate a quick decision and the child being taken for treatment while her other small children can be looked after. In a large majority of households children were looked after by their mothers. The mother at times worked for pay in or outside the house and the children were looked after by other adult family members or siblings. The presence of the mother in the house is crucial to child survival in these slum areas, as in the mother's absence, if the child was being looked after by siblings or adult family members, it had a seven times higher risk of mortality (Table 1).

Mothers with children with incomplete or no immunization were the resistant ones who appeared not to have been influenced by the PHC program. The risk of mortality was ten times higher for incompletely or not immunized children compared to those children that were appropriately or completely immunized (Table 1). Mothers want to see quick improvement in their child's condition and therefore did not hesitate to change healers if they did not find improvement, and these mothers had an eight times higher risk of their child dying (Table 1).

The risk of mortality from 'going to a traditional healer' was about fifteen times higher than if the child was not taken to a traditional healer (Table 1). There was a higher use of traditional healers among malnourished children and illiterate mothers (data not shown) but no interaction was found between them. Among cases, the proportions of deaths in the II and III degree malnourished children were 15 percent and 31 percent respectively. The risks of mortality

were seven and thirteen times higher for a second and third degree malnourished child respectively compared to a normal or first-degree malnourished child. The first-born child and a child born with a birth interval of less than 18 months were at five and four times higher risk of dying respectively, compared to children born with a birth interval of more than 24 months. Bottle-feeding being introduced along with breastfeeding had a three times higher risk of mortality (Table 1).

## Discussion

This is the first study, which has looked at such a wide range of risk factors and quantified the contribution of restricted maternal autonomy and health service utilization factors as independent risk factors along with the socio-demographic factors that can be used to target the improvement of health services.

**Grouping the risk factors of the final model** In considering ways in which the risk factors can be addressed through health care, it is helpful to sort the ten risk factors of the final model into three groups. The *first* group is comprised of families, which might benefit from extra support from the PHC teams, including nuclear families, households with restricted maternal autonomy, illiterate mothers and households where adequate childcare arrangements are lacking. The *second* group is families who use traditional healers and where mothers change healers quickly. These families require health education and motivation by the PHC teams. The *third* group consists of potentially remediable risk factors for mortality identified in this study, including short birth interval, bottle-feeding, poor nutritional status of the child, and incomplete or no immunization of the child. The risk factors in all three groups have definite interventions on which PHC teams can focus.

The first group of risk factors — nuclear families, restricted maternal autonomy, illiterate mothers, and inadequacies of childcare arrangements for working mothers — call for diverse approaches to maternal education. Maternal education has emerged as a significant factor associated with child mortality, unlike in a previous study done in these slums by Thaver.<sup>7</sup> Various studies have tried to put forth theories to explain the relationship between education and child mortality.<sup>3,8,9</sup> The relationship between education

and child survival takes place through enhancement of mother's knowledge of effective ways to prevent, recognize and treat childhood illness.<sup>9</sup>

Education is one of the factors likely to influence maternal autonomy.<sup>10, 11</sup> In this study maternal autonomy and education have been identified as independent risk factors for under five mortality. As observed in Karnataka, educated women were more autonomous in decision making, took their children earlier to health centers when they were ill, did not use traditional treatments, and persisted with treatment prescribed by the doctors.<sup>10</sup>

The policy implications of this study relate to the question of how women can be empowered in decision making at the household level. One intervention that would have far reaching effects would be maternal education. Female schooling needs to be pushed beyond the threshold so that positive effects on female autonomy can be achieved.<sup>11</sup>

In these slums, uneducated women who go out to work are usually from the poorest families. This study highlights the adverse effects of working mothers on child survival if they do not have adequate childcare arrangements. Similar results have been documented elsewhere.<sup>12-15</sup> Mothers need childcare arrangements, and childcare centers can be set up in these communities which could be an income generating mechanism for some families.

At the micro or local level, interventions for the first group of factors require mothers in these slums to be helped to make the right decisions in seeking appropriate care early enough in the course of child illness. Mothers or families, especially nuclear families, should be taught to recognize signs of serious illnesses, particularly in diarrhea and ARI, and to take action earlier and persist with treatment, thus preventing a minor illness progressing to a serious one.

Support systems which mothers can call upon in times of need are required in these communities. These systems have to be developed from within the community to be sustainable and trusted by the community. An answer to this is the CHW who has access to every household and can identify high-risk households. CHWs are central to the functioning of the PHC program, and are the cornerstone of the PHC approach.<sup>16</sup> They can provide cheap, easily

accessible care to people to whom healthcare is not available. The households that do not use the PHC center or do not welcome CHWs are probably the households that are at risk for child mortality. CHWs and PHC teams should find ways of building or increasing rapport with the mothers of these families so that they call on them in time of need. The CHWs in turn can help the mothers in decision-making about taking the child for treatment outside the slum area or even to hospital.

The second group of risk factors — using traditional healers, and mothers changing healers quickly — challenges CHWs and PHC teams to encourage families not to change healers too quickly, and to contact a CHW or a modern health provider first rather than a traditional healer in order to avoid delays in obtaining timely and appropriate treatment. Beliefs and health seeking behavior that prevent the use of effective medical services may impede further reduction in child mortality.<sup>17</sup> If families do believe in traditional medicine, they can be encouraged to use modern health providers along with traditional healers. There is a parallel need to monitor the prescribing practices of general practitioners and ensure that they prescribe appropriate medication for an adequate number of days.

The PHC teams could help build rapport and a referral system with the health providers in these communities. In the short term, the unqualified doctors are unlikely to be displaced in these slums, and therefore the PHC teams could train them to recognize signs of danger and refer such cases for further care. If communities use private practitioners even when PHC services are available, efforts should be made to ensure that the services of these practitioners contribute to the PHC efforts, thereby making the optimum use of scarce resources.<sup>18</sup> Although the PHC programs are trying to build self-reliance in these communities and do not want the community to depend solely on the PHC system, it is important that the PHC center is backed up by a functional referral system.

Rapid changing of healers reflects a mother's impatience as she expects a quick cure even if it is physiologically not possible, as has been seen in other studies in Pakistan.<sup>19, 20</sup> It could also be the mother's lack of recognition of a competent provider, or poverty or convenience that leads to her choice of an unqualified practitioner as the first health

provider which does not result in an improvement in the child's condition and therefore she changes healers. Seeking the right health provider early in the course of illness and not changing healers quickly would require behavioral changes in these mothers through motivation, health education, and support from the PHC teams.

The third group of factors — short birth interval, bottle-feeding, poor nutritional status of the child, and incomplete immunization of the child — call for specific interventions like the use of contraception, promotion of breastfeeding, nutritional and weaning advice, and immunization, that are generally provided by the PHC teams, but they may need to focus more aggressively on these components of the program.

Short birth interval has been found to increase the risk of infant and under-five mortality in other studies.<sup>7,21</sup> The birth interval variable in this study also contains primiparous mothers, which suggests inexperienced mothers and probably mothers with limited autonomy because of their youth. To get the women to use contraception for birth spacing is a challenge in Karachi slums. The proportion of women using contraception in this study was 27 percent. Most women use contraception when they have completed their families, most often determined by the number of boys in the family. The PHC teams need to promote family planning more aggressively in these communities and target younger and higher parity women along with their husbands. Short birth interval may also lead to discontinuation of breastfeeding and the introduction of bottle-feeding which was identified as an independent risk factor in this study.

As demonstrated in this study as well as others, breastfeeding has been found to be a protective factor against child mortality, especially against death from diarrhea and respiratory infections<sup>22,23</sup> and has advantages for both babies and mothers in rich and poor nations.<sup>24</sup> Of all other variables, breastfeeding has repeatedly been demonstrated to have a clear effect on child survival,<sup>7,25</sup> and across all educational groups,<sup>26</sup> while early cessation of breastfeeding was associated with higher mortality in lower education groups in Egypt.<sup>27</sup> Breastfeeding provides a sterile, cheap, affordable and effective means of reducing the childhood death toll in developing countries, and this is a health education message to be actively propagated by CHWs. Maximum effort and

resources should thus be directed towards promotional campaigns using both the media and existing medical facilities, especially those providing maternal and child care.

Child mortality in Karachi slums is influenced heavily by the nutritional status of the child which is consistent with other prospective studies.<sup>28,29</sup> A minor illness such as diarrhea or a respiratory infection can precipitate death in a malnourished child.<sup>26, 30,31</sup> Although income did not emerge as an independent risk factor, malnutrition in these slums could be a reflection of poverty.

The lower risk of mortality in children who were completely or appropriately immunized is possibly partly a consequence of immunization itself. In addition, it may also reflect the mother's capacity to use modern health services and her awareness of preventive care for the child, which has a multifaceted effect on mortality. Nutritional status and immunization status are significant predictors of child mortality and have been used as indicators for identifying and monitoring high-risk households by the CHWs and the PHC teams in these communities.

**Special challenges of diarrhea and ARI** Against the background of the ways in which the ten risk factors of the final model can be ordered into three groups, it is important to consider specific approaches to the control of diarrhea and ARI. Most often diarrheal disease control activities are needed at the home level and should incorporate people's (mothers') perceptions and beliefs about diarrhea. It is important, therefore, to understand the behavioral patterns of mothers and families in response to these two illnesses so that education programs can be developed around them. There should be widespread use of oral rehydration salts (ORS) in the community and it should be easily accessible to every household so that mothers can start ORS as soon as a child gets diarrhea. Cases that cannot be managed at home need an effective referral system.

With respect to respiratory infections, early diagnosis and antimicrobial treatment by primary healthcare workers, particularly in rural areas, is a strategy to control acute lower respiratory infection mortality.<sup>32</sup> Field tests of this approach to ARI control have been instituted in a number of developing countries;<sup>33-35</sup> and a meta-analysis of this experience evaluated in a series of quasi-experimental trials

has concluded that this approach is associated with reduced loss of life.<sup>36</sup> Although drug resistance and the need for supervision will be the resultant problems to deal with, CHWs should be allowed to prescribe antibiotics for ARI or keep a supply with them after appropriate training. This would be helpful when mothers have nowhere to go at night or the pharmacies are closed. They could turn to the CHWs who live in the area. This can provide the support mechanism for the mother in these communities. The CHWs have some knowledge of when to refer a seriously ill child and can help the mothers who cannot leave the house.<sup>37</sup> Allowing CHWs to prescribe antibiotics for ARI may be better than the mothers getting them from the chemist or an unqualified 'doctor' who may not prescribe the right dosage or duration. Curative care by a CHW does not necessarily preclude emphasis on preventive care. As seen by Jacobson et al.,<sup>38</sup> CHWs involved in both preventive and curative work were able to maintain an emphasis on preventive activities.

**The place of CHWs in PHC** This study supports the general approach of PHC teams in healthcare, but it is important to be aware of the special strengths of CHWs. Through their monthly household visits they can identify high-risk families by using the additional risk factors identified in this study, including use of traditional healers, mothers changing healers quickly, nuclear family, short birth interval, illiteracy, bottle-feeding, lack of child care and lack of maternal autonomy. CHWs have a great deal of insight into problems within a household and with the mothers, as was established in the focus group discussions with them before the study was initiated. Planners and policy makers should find ways of drawing on their knowledge and experience to improve the management of PHC programs. The risk factors identified by them in the focus groups have now been validated quantitatively in this study. The PHC teams could direct their interventions more selectively to those risk factors that most need attention. Additionally, nurses or doctors could visit selected high-risk households, and have an additional positive effect beyond that of the CHWs in motivating mothers and families and providing health education. This would address the question of equity, that is 'care according to need', which is one of the basic principles of PHC.

### **Policy Implications**

There are several ways in which the findings of this study

can be linked with current policy concerns in Pakistan and beyond.

**The Ministry of Health of Pakistan** It has expressed current concerns for health and healthcare through its recently issued National Health Policy.<sup>39</sup> The Ministry acknowledges that social, health and demographic indicators of Pakistan have lagged behind those of countries of comparable levels of economic development. It intends to provide universal coverage of quality healthcare through an integrated PHC approach. National ARI and Diarrheal Disease Control Programs will be integrated into PHC, with a shift toward integrated management of childhood diseases. This is part of the Ministry's broader approach to the goal of Health for All through PHC, based on the concept of health with its physical, mental and social dimensions where health is an important indicator of quality of life and national development. The Ministry recognizes the importance of research in the health sector, including the importance of facilitating interactions of researchers and policy makers. Over all, it is apparent that the current study can bring useful insights and policy-relevant perspectives that are currently not seen by the Ministry of Health that could have highly practical applications at both local and national levels.

### **International concerns for the current status of PHC**

These have been reviewed at the International Conference on PHC, held in November 1998, in Almaty, Kazakhstan, sponsored by WHO and UNICEF. This was the 20th Anniversary of the Conference on Primary Health Care held at Alma Ata (same city, name has been changed) in 1978. In brief, the conference in Almaty reviewed the gains and losses achieved through PHC over the past 20 years, and remained insistent on the critical importance of PHC for health and wellbeing for both developed and developing countries in the years ahead. The conference emphasized the importance of going beyond vertical and selective approaches to PHC, which have been controversial for many years, to cross sectoral and integrated approaches that involve participation of communities in identifying and addressing critical problems.<sup>40</sup> Of particular importance is the understanding that 'blue print' approaches to PHC are *not* broadly applicable to all countries, and that it is necessary to determine the unique characteristics of local situations, both problems and resources, and to bring communities into collaborative approaches to defining problems and

approaches to priority problems. The present study is supportive of that perspective; indeed it builds on community insights in identifying local risk factors, some of which were apparent and some of which had been largely unseen by the PHC system.

**Evidence-based approaches to health policy** Another set of ideas that is emerging internationally is the importance of evidence-based health policy. As an example, the new organizational structure of WHO includes a Cluster on Evidence and Information for Policy. WHO is addressing the challenge of seeking global measures of burden of disease linked to cost-effective interventions,<sup>41</sup> while simultaneously seeking linkages with local levels of evidence for appropriate applications that will ensure equity at that level. The approach of the PHC programs in these urban slums is reasonable with respect to cost.<sup>3</sup> The present study offers a distinctive approach whereby epidemiological evidence of risk factors for child mortality, including the capacity for defining differential need as required by equity, is generated for use of national health systems and also at the local community level.

### **Conclusions**

The aim of this study was to assess the possibility of combining socio-demographic, maternal autonomy and health services utilization risk factors into a comprehensive explanatory model for determinants of mortality in children under five. The study has achieved that aim, with ten risk factors forming the final model. Of particular importance is the finding that certain behavioral and healthcare utilization factors — restricted maternal autonomy, using traditional healers and changing healers quickly — are distinctive risks for child survival but have not generally been included as targets for PHC programs. Taken together with the other factors of the explanatory model, these risk factors comprise targets for PHC that call for broad and inclusive actions. In particular, the PHC approach must not only focus on the familiar risk factors but also have an intersectoral reach so as to respond to the educational and community support challenges inherent in the factors of restricted maternal autonomy and inappropriate uses of health services. The PHC services must also be broad enough in coverage, essentially population-based, so as to use risk factors in defining differential need, as required by equity.

These findings represent distinctive contributions to the content and process of PHC programs within individual developing countries and also for advancing the effectiveness of international programs. The major drawback of this study is that the cases and controls came from different time periods and some of the differences that were observed between the cases and the controls could be due to the greater exposure of the control mothers to the PHC program.

The findings of this case-control study have validated quantitatively the assertion<sup>42</sup> of the reversible determinants of child mortality. Female autonomy, education, health service inputs, nutrition, immunization, antenatal and postnatal care and support from health visitors can each play its independent role in child survival.

Although the PHC programs in these slums have had success in reducing mortality, they have not succeeded in widespread changes in women's beliefs about disease causation and appropriate care. Some mothers still use a traditional healer as the first health provider and not all mothers accept the value of modern healthcare. According to Mosley,<sup>43</sup> the effectiveness of PHC programs depends upon the degree to which the population accepts the scientific basis of disease causation. This suggests that the primary determinant of a program's success will be largely its effectiveness in introducing relevant social and behavioral change in these village-like settings, rather than the biological effectiveness of the technologies themselves exclusively.

The relatively good nutritional status of surviving controls whose mothers in these slums are uneducated indicates that despite a lack of formal education, mothers can provide an adequate environment for healthy growth. Amidst the apparently homogeneous context of poverty, crowding, illiteracy, restricted female mobility and autonomy, some families are, nevertheless, able to give their children the care they need. What makes one mother able to perform better under similar circumstances? 'Positive risk factors', representing maternal autonomy, appropriate health seeking behavior and child-rearing practices amongst this group indicate the need for interventions that go beyond the usual PHC package and involve the communities in building support systems for mothers to call upon in their time of need.

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