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REPORT OF CONSULTANCY

(SAVE THE CHILDREN - INQUISIVI PROJECT)

MARCH 26 - APRIL 3, 1991

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ACRONYMS USED

DJC	Proyecto de Desarrollo Juvenil Comunitario
JSI	John Snow Incorporated
NGO	Non-governmental organization
PROCOSI	Programa de Coordinación en Supevivencia Infantil
SCF	Save the Children Foundation

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EXECUTIVE SUMMARY

At the request of Save the Children (SCF) Foundation, Bolivia, with the support of the MotherCare Project and with the approval of USAID-Bolivia, the consultant visited Bolivia during the period March 23 - April 2, 1991. The purpose of the visit was to provide technical assistance to the SCF Inquisivi project team in the analysis of data obtained in the case-control study of perinatal, neonatal, and maternal mortality which the consultant had previously supported in the process of study design, instrument development, and planning for implementation. This study is intended to provide important input, along with a community-based women's self-diagnostic study, to the definition of intervention content and strategies under the MotherCare-supported project in Inquisivi.

Data collection, entry, and cleaning procedures were reviewed and found to be satisfactory. Data analysis was conducted in a participatory manner with the project team, using standard epidemiological and statistical techniques. Verified mortality rates were extremely high in this population: for the two year period of study, perinatal mortality was 103/1,000 births, neonatal mortality 69/1,000 live births, and maternal mortality 140/10,000 births.

Case-control analysis found that better general development characteristics of communities and families were not associated with protection from risk of perinatal and neonatal mortality. Presence of womens' groups in the community, and study mothers' participation in several groups, did not modify risk of perinatal or neonatal mortality; in communities where women's groups existed, their coverage among study mothers was fairly low (38%). Certain maternal characteristics - lower educational level,

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illiteracy, and inability to speak Spanish - were significantly associated with risk, but did not account for a substantial proportion of risk. History of a previous stillbirth or neonatal death were significantly associated with risk. Over half of women received no prenatal care. Specific complications during pregnancy and childbirth were significantly associated with risk of perinatal and neonatal mortality. Review of the verbal autopsy component of the study indicated that the majority of perinatal and maternal deaths were associated with a limited number of obstetric complications (infections, trauma, hemorrhage, malpresentations and other obstructed labors). The majority of neonatal deaths were associated with infectious diseases (sepsis, pneumonia, and in some cases tetanus). Review of the "Process Diagnosis" component of the study revealed that families decision - making in the face of life-threatening maternal or neonatal complications was extremely inadequate and ill - informed: only one-fourth of situations were recognized when symptoms of a life-threatening condition appeared, and the majority of families who took some action either tried to treat the problem at home or sought inadequate care sources.

These findings were presented to the umbrella group of non-governmental organizations working in Bolivia, and discussed in detail with the SCF director and MotherCare representative in Bolivia. The results of this study suggest that the intervention will require a strong information, education, and communication component to promote the recognition of and appropriate response to life-threatening complications of pregnancy, labor and delivery, the puerperium, and the newborn. Defining "appropriate response" in the face of the extremely limited health resources in the project area should be the next major step in the process of intervention development.

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I. PURPOSE OF VISIT

A. General

This visit was intended to provide techical assistance to the MotherCare supported maternal/perinatal/neonatal health project being carried out by Save the Children, Bolivia. This visit was designed to review data entry and cleaning procedures and to provide technical assistance in the execution of data analysis of the case-control study which forms one of the principal diagnostic methodologies through which intervention activities will be focused.

B. Scope of Work

1. Ensure that the study data has been properly cleaned and entered into the data base;
2. Analyze the data to determine intrapartum and neonatal mortality rates, causes of mortality and associated risk factors; and,
3. Lead a one-day working group in discussions concerning the process of data analysis, the findings of the case-control study thus far, the next steps to be undertaken in the analysis and the applicability of the findings.

C. Products anticipated

1. Review and discussion of data collection, entry, and analysis processes.

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2. Presentation of key findings from the data analysis including intrapartum and neonatal mortality rates, causes of mortality, and associated risk factors.

3. Summary of workshop discussion and implications for intervention.

4. Observations/recommendations for action and future technical assistance.

III. BACKGROUND

Bolivia is one of the countries with the highest reported rates of maternal, perinatal, and infant mortality in the hemisphere. The recent Demographic and Health Survey identified an infant mortality rate of about 100/1,000 live births, with roughly 40% of this mortality occurring in the neonatal period. It is virtually certain that maternal, perinatal, and infant mortality are substantially underreported.

In general, Bolivia does not have a well developed health care delivery system in the areas outside the capital. The population is extremely disperse, living in wide areas of difficult terrain (dry altiplano areas, subtropical and tropical forest). Many births are reportedly attended at home by family members, including husbands; even empirical midwives are not commonly encountered attending births in many regions of Bolivia. However, especially since the 1952 revolution, Bolivia does have a strong tradition of community organization, especially of men's groups such as sindicatos and cooperativas.

Against this background, the Save the Children Foundation has developed several major integrated development projects in Bolivia, including one in the

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Impact Area of Inquisivi. This area, located about five hours south of la Paz at the margins of the altiplano region, has been selected as the site for a major MotherCare project focused on development of women's groups, trained community birth attendants, and broader community education programs to improve management of pregnancy.

In September-October, 1990, the consultant travelled to Bolivia to assist BCF, and specifically the DJC team working with the MotherCare-sponsored maternal/perinatal/neonatal health project in Inquisivi, in the adaptation of the case-control study methodology used in Guatemala in order, to develop a study protocol, instrument, and analysis strategy for use in Inquisivi. This case-control study was intended to provide information regarding characteristics of the population of women during pregnancy, labor and delivery, and the post-partum period, and of their newborns, and to identify risk factors and causes of mortality. This information in turn would serve, together with the results of a womens' community evaluation of their own health needs, as input to the process of intervention development. The process of developing the study design, protocol, instrument, methodology, and analysis plan are described in detail in the trip report of this previous visit; copies of the study protocol and instrument are included as appendices to that report.

During the period October, 1990-February, 1991, the BCF team executed the case-control study, reviewed, cleaned, and entered the data, and began basic analysis. The consultancy was timed to review this process, work with the team to accomplish substantial progress in the essential analysis (although not to complete all possible analyses), to convert this analysis into useful information for programatic application, and to communicate with

other interested parties regarding the process and preliminary results.

All activities were carried out in La Paz, principally in the SCF headquarters.

IV. ACTIVITIES

A. Review of data collection, entry, and cleaning procedures. Discussions were held with the three field interviewers responsible for data collection from the case and control households, as well as with the SCF data manager, to review all aspects of the data collection and management process.

B. Collaborative analysis of data. This activity represented the major part of the work of this consultancy. On all working days the consultant and the field team worked together to review and analyze data, identify needs for additional analyses, and discuss the implications of preliminary findings.

C. Preparation of summary of important results and implications. The consultant prepared a lengthy (30 page) summary of selected results of the analysis to date, emphasizing those findings which had implications for the MotherCare project in terms of intervention development. The findings summarized were, for the most part, not likely to be subject to modification in the course of additional analyses; in cases where need for additional analysis prior to arriving at conclusions related to intervention

development, these additional lines of analysis were identified. This document was prepared in Spanish, to maximize its usefulness to the SCF/Bolivia team. Pending translation of this summary of results, key results and their implications are briefly presented in this report.

D. Meetings with SCF Director and MotherCare Representative to discuss analysis, results, and utilization of information in intervention development. Two individual meetings were held with the Director of SCF/Bolivia, Mr. David Rogers, and one with the MotherCare representative, Ms. Lisa Howard-Grabman. On the last day of the consultancy, a joint meeting with these two persons was held. These meetings focused on discussion of the analysis process and especially on the results of this analysis in the context of intervention development and future project activities. The final meeting discussed implications of the results in terms of the types of interventions that could address the major causes of maternal, perinatal and neonatal mortality in the context of the resource and activity restraints of DJC in Inquisivi. Approaches to integrating the results of the epidemiologic study with those of the women's self-study were also discussed. In addition, discussions were held of the project supervision and management needs for the complex process of defining, developing, and implementing the intervention activities in the target area.

E. Presentation of data analysis process and preliminary results to representatives of other organizations. On the last day of the consultancy, a workshop was held in the headquarters of the USAID-supported Child Survival Inter-Agency Coordinating group (PROCOSI) to present the case-control study methodology, the process of data analysis, and selected results of general interest or illustrative of the process of developing intervention-oriented information from data.

IV. METHODOLOGY AND APPROACHES

The methodologies used in these activities were the following:

A. Structured analysis and statistical testing.

While other methodologies were used to teach and communicate regarding the process of data analysis and evaluation of results, the analysis itself was conducted according to standard epidemiologic and statistical techniques for analysis of the types of data produced by this study. These included review of frequency distributions and grouping or categorization of variables, comparisons of cases and controls on important variables using non-parametric statistical methods (2 x 2 and R x C chi-square tests, chi-square for trend, Wilcoxon-Mann-Whitney tests of distributions). The verbal autopsy data were analyzed using a case review methodology in which each case was presented systematically by the interviewer responsible for data collection in that case; diagnoses were then assigned if possible, using

criteria established by the group based on recognizable signs and symptoms and clinical course. The process diagnosis data analysis was basically descriptive.

B. Participative methodology. In keeping with the SCF approach to development activities, both the analysis process and the workshop presentation were fully participative. The DJC study team, MotherCare project physician-supervisor, SCF maternal child health physician-supervisor, and SCF data manager participated fully with the consultant in the total process of analysis, including variable selection and definition or categorization, case-control comparison, statistical testing and interpretation, and case review and assignment of diagnoses. In this process, the principles of understanding the implications of data, and of extracting useful information from the analysis process, and the epidemiologic concepts of association versus cause, attributable risk, predictive value, confounding, and multifactor association were bought into focus (although not always using technical names or terminology). The group then communicated this process as well as selected preliminary results in the workshop for other organizations held on the final day of the consultancy.

C. Focused information exchange with responsible decision makers. Personal working meetings with key professionals, particularly SCF/Bolivia Director and MotherCare Bolivia representative.

VI. RESULTS AND CONCLUSIONS

A. Process of data collection, entry, and cleaning.

The data collection process was reviewed with each of the field personnel responsible for interviews with case and control mothers. This review found that extraordinary efforts were undertaken to interview and develop complete data on these mothers; as a result of these efforts, only one of 237 households identified as study subjects (specifically, one control) was not successfully interviewed and had to be replaced. The manner of administering the interview was strictly standardized as to definition of each question and the exact data needed to represent an adequate response; however, the interviewers sometimes used various approaches, changes of language, or family or local intermediaries to assure that the respondent understood and was providing the appropriate response to the questions.

Instruments were reviewed and cleaned in the field by the field personnel and supervisor. They were then forwarded to SCF headquarters in La Paz, where they were entered by an experienced data entry person contracted for this purpose. To reduce entry errors, data entry fields limited to acceptable responses for each variable were used. In addition, each instrument was entered in duplicate and the resulting data compared by program to identify discrepancies; any such discrepancies were resolved by referral to the original instrument. Data were divided into multiple files (e.g., family characteristics; mothers' data and obstetric history; labor, delivery, birth, and newborn; verbal autopsy;

etc.) linked by unique identifier numbers for each record. This separation was required by the space limitations of the EPI-INFO program, as well as by considerations of ease of analysis.

Once data entry was complete, frequencies and tables were produced and reviewed for inconsistencies, illogical values, and outliers. In such cases, the data files were reviewed and compared to original instruments. In addition, in the course of the analysis conducted during the consultant's visit, frequencies of several variables were verified by reviewing the totality of original data forms. These spot checks found consistency between the original data and the data files.

In additional review of instruments during the process of case review, several small errors in coding not identified in data review at the field site were detected, as well as a very small number of corrections which had not yet been entered in the active analysis file. None of these changes affected substantively the analysis results, but these were identified to the data manager and will be entered into a final file.

In summary, the process of data gathering, entry, and cleaning was of very high quality, comparable to that of other similar research activities, and resulted in a data file appropriate for analysis and for the development of conclusions based on such analysis.

B. Results of data analysis.

As noted, an extensive application-oriented summary of results of analysis was prepared for BOF/Bolivia and MotherCare representatives as input to the intervention development process. This document is attached as Appendix 1. A brief presentation of most important results is presented here.

1. Mortality rates. These rates are calculated based on the total number of births detected by the BOF Inquisivi registry system (and by additional case-finding in the newest subarea, Licoma) and the number of cases detected in each category.

The categories of mortality identified in the data collection instrument were:

a. Prenatal fetal demise after 28 weeks gestation.

b. Intrapartum fetal death.

c. Newborn death on day 1 of life.

d. Newborn death during week 1 after day 1.

e. Newborn death during weeks 2-4.

f. Maternal death (pregnancy, labor, delivery, and six weeks post-partum, related to obstetric conditions or exacerbation of other problems by such conditions).

These categories can be used to determine rates according to standard international classifications; they can also be combined in other ways to form the "functional" categories used for analysis.

During the two-year study period, 639 births, 74 infant cases, and 9 maternal cases were detected. These data yield the following rates:

<u>Perinatal mortality</u> ([a+b+c+d] - total births)

66 - 639 = 103/1,000 births

<u>Neonatal mortality</u> ([c+d+e] - live births)

42 - 607 = 69/1,000 live births

<u>Maternal mortality</u> f - total births)

9 - 639 = 140/10,000

These rates are all extremely high, and the rate of maternal mortality extraordinarily high. However, they are felt to accurately represent the situation in this population, in that the birth detection process is felt to be relatively complete, and each of the cases was verified as to actual occurrence, moment of death, and relation to obstetric, post-partum, or neonatal events.

As in the Guatemala studies, to analyze subsets of this mortality in a manner which focuses on potential causes and potential interventions, a different classification was

used to identify subsets of infant cases. This classification and the number and proportion of infant deaths in each category were:

"Prenatal demises" (fetal deaths related to prenatal causes) [a]: 17/74 cases (23%).

"Intrapartum and day 1 deaths" (infant deaths related to problems in labor and delivery) [b+c]: 34/74 cases (46%).

"Neonatal deaths after day 1" (infant deaths related to conditions and illnesses affecting newborns) [d+e]: 23/74 cases (31%).

These functional categories were used in some phases of data analysis in which it was felt that the potential pathophysiological effect of a given risk factor or problem might differ among these categories.

2. Socioeconomic and development characteristics of study families and their communities. [With the exceptions noted, in this and the following sections proportions will be presented with the notation C (cases), c (controls), and T (total). Statistical inference is limited by sample size to perinatal/neonatal mortality; maternal mortality is described separately].

The families of cases and controls lived in communities where community organization was common (eg. "sindicatos" present: C - 88%, c - 75%, T - 80%; neighborhood "juntas": C - 81%, c - 88%, T - 86%). Indicators of community development in these communities were also prevalent: schools were present in the majority of communities (C - 93%, c - 90%, T - 91%) and in-house piped water in almost half (C - 43%, c - 43%, T - 43%).

Pertinent health resources in these communities included health promoters (C - 93%, c - 87%, T - 89%), trained midwives (C - 74%, c - 64%, T - 67%), and empirical midwives (C - 40%, c - 47%, T - 45%).

The families themselves of cases and controls also did not differ in socioeconomic indicators including family size, type and size of house, land holdings, crops produced/sold, paternal occupation or membership in community organizations or paternal literacy, schooling, or ability to speak Spanish (indeed, many of the socioeconomic characteristics of the case families were "better" than the controls). The most striking aspect of these findings, and perhaps the most important from the perspective of SCF, is that none of these important resources and products of development was associated with any modification of risk of perinatal and neonatal mortality. This finding indicates that reduction of such mortality cannot be hoped for from

general development activities, but will require specific, focused, interventions.

These data do have other implications: they identify potential channels for information dissemination to the communities and families, including the community organizations, health promoters, and midwives. It was noted that, despite their presence in many communities, promoters and midwives participated in a very small proportion of births (promoters - 1%, midwives - 23%). The majority of births were attended by family members (55%), with husbands actually attending 38% of births and present in 78%. Thus the husband becomes a potentially very important target audience, at least for raising awareness of problems that can occur during labor and delivery and of appropriate responses.

Distance from "health services" was not associated with difference in risk. However, 41% of families lived over two hours by foot from such services. This finding has implications for the appropriate response of families to the sort of life-threatening emergencies which result in perinatal, neonatal, and maternal mortality: instead of the usual practice of "sending for help" (which in most cases will require subsequent transport of the patient to some other location where intervention can be delivered, with many extra hours lost in coming and going), the families should be told to take the patient to the services, sending

someone ahead to seek and notify help but not waiting for someone to arrive and evaluate the situation.

3. Women's Organizations. Since these organizations are an important element of the planned interventions, the analysis of their potential association with protection from risk of perinatal/neonatal mortality and their presence in the impact area communities is presented separately. Two distinct and reportedly mutually exclusive types of women's organizations exist in the study area: "Mothers' Clubs" and "Women's Organizations". "Mothers' Clubs" were less common (C = 11%, c - 20% T - 17%) than "Women's Organizations" (C - 36%, c - 30%, T - 32%); one or the other type of organization was present in almost half of communities where study families lived (C - 47%, c - 50%, T - 49%). These data reveal no tendency to reduced risk associated with presence of such an organization in the community. Actual membership of the study mothers, both cases and controls, in such organizations was substantially lower (C - 13%, c - 19%, T - 19%). Since these study mothers are women who had children in the past two years, they represent an important sample of the potential target audience of women. Combining these data on participation by study mothers with the data from the same mothers on presence of an organization in their community permits us to calculate that for both cases and controls, the "coverage" of women's organizations among

study mothers in communities where such organizations exist is exactly the same for both cases and controls: 38%. These sets of findings indicate that: 1) during the study period, neither the presence of women's organization nor belonging to such an organization were associated with protection from risk of perinatal/neonatal mortality, and, 2) the coverage of such organizations (where they exist) among this sample of target women is relatively low.

These findings imply that, if the intervention includes a substantial component related to women's organizations, both the coverage of these organizations, and their effectiveness in addressing reproductive risk, will have to be substantially improved.

4. Maternal characteristics and obstetric history.

Case and control mothers were comparable on many characteristics. Certain characteristics were, however, significantly associated with increased risk. These included illiteracy (C - 27%, c -12%; p = 0.025), lower level of education (none: C -24%, c -10%; primary: C - 66%, c - 66%; intermediate: C - 10%, c - 24%, p = 0.002) and not speaking Spanish (C - 15%, c - 4%; p < 0.01).

These high-risk characteristics identify segments of the target audience which need to be considered in intervention development. However, in terms of attributable risk and etiologic function, the effect of these

"significant" factors is not great: 73% of mothers of cases were literate, 76% had primary or greater education, and 85% spoke Spanish. Therefore, the intervention approach should not neglect the majority of mothers for a high-risk minority.

Single mothers and mothers outside the "ideal" (18-34 year) age group had non-significant tendencies to higher risk ($p = 0.10$ and $p = 0.151$ respectively). The 17% of mothers who were primagravidas did not have increased risk relative to multigravidas in this population.

Certain obstetric antecedents were associated with risk of perinatal/neonatal mortality. Strongest among these were history of a previous stillbirth ($p = 0.03$) or of a previous neontal death ($p < 0.01$). History of child deaths of children outside the perinatal/neonatal period was not associated with risk, suggesting the specific character of perinatal/neonatal risk in this population.

5. <u>Pregnancy, labor, and childbirth</u>.

Over half of study women received no perinatal care (C - 54%, c - 51% + - 52%). Only 54% of mothers had an opinion regarding prenatal care, but in virtually all cases the opinion was positive. This forms a basis for augmenting effective coverage of such care.

Reported presence of symptoms during pregnancy yielded potentially important information. One symptom - bleeding

during pregnancy - was significantly associated with risk ($p < 0.02$). The prevalence of symptoms potentially associated with hypertensive diseases of pregnancy (third trimester edema of face and hands and persistent headache) and the fact that 3% of mothers (nine mothers) had well described convulsions (one had pre-existing epilepsy, the remainder were apparently pregnancy - related) suggests that there may be a substantial amount of hypertensive disease associated with pregnancy in this population. This possibility should be subjected to screening of a sample of women.

No practice during labor was found to be associated with risk. The use of medications (including injected oxytocics) was quite low, consistent with the virtual absence of pharmacies and medical care in this setting.

Several events during labor were significantly associated with risk. These included prolongation of labor, malpresentation, hemorrhage, and maternal fever during delivery. These findings are similar to those of case control and prospective studies in Guatemala (both in Santa María de Jesús and Quetzaltenango) and suggest that these common high-risk problems of labor and delivery should be foci of intervention. Recognizing the controls to be a 27% sample of births and newborns without mortality in the preceding two years and projecting their experience to the rest of the normal births, estimated case-fatality rates for these high-risk events were calculated. These rates ranged

from one in five (bleeding during labor and delivery) to one of one (cord prolapse).

6. Post-partum attention to mothers and newborns.

The focus of post-partum attention appeared to be delivery of the placenta. Newborns were often not attended to until after the placenta was delivered. Cord cutting and care were generally non-hygienic, although the concept of desinfection does appear to exist in the population. Depressed newborns were practically never stimulated or resuscitated.

7. Breast-feeding.

Just under half of well infants (controls) reportedly received colostrum. Only 25% of infants were nursed immediately; the majority were nursed the first day, while the remainder nursed on the second day. Of note is the fact that 17% of control mothers reported ceasing breast-feeding for some reason in the first month. Whether this was true, whether it was temporary or permanent, and what the reasons for doing so might be, need to be verified and explored further to discourage such a harmful practice in this very high-risk population.

3. Evaluation of conditions associated with and causes of perinatal/neonatal mortality (verbal autopsy). Based on systematic review of each case's data and the narrative history recorded by the field interviewer, conditions associated with, and (where possible) probable causes of, mortality were assigned by the analysis team. These are presented by functional category:

a. Prenatal fetal demises: Associated conditions

-Symptoms of hypertensive disease of pregnancy	3
-Uncontrolled epilepsy	1
-Significant trauma (with immediate subsequent absence of fetal movement)	5
-Maternal death (infant never born)	2
-None	4

b. Intrapartum/Day 1 death: General causes (probable)

-Asphyxia	18
-Asphyxia and/or trauma (only infants born with signs of trauma)	6
-Intrapartum hemorrhage	3

-Lack of care at birth, hypothermia	3
-Amnionitis	1
-No probable cause detected	3
-<u>Associated conditions</u>	
-Malpresentation:	
-only	5
-plus prematurity	1
-Prolonged (> 12 hours) labor	
-only	5
-plus prematurity	2
-plus amnionity	1
-plus trauma	2
-Intrapartum hemorrhage	
-from placenta previa	1
-from placenta separition	2
-Lack of care at birth, hypothermia	1
-resulting from probable	2
intentional neglect	2
-Amnionitis, plus birth trauma	1
-Large for gestational age infant	1
-Twins	2
-Nuchal cord (multiple loops)	1
-Prematurity alone	1

Review of the associated conditions and probable causes associated with these prenatal and birth-related infant deaths indicates the extremely poor level of basic obstetric care and knowledge available to this population (with deaths resulting from non-detection or inadequate management of common obstetric complications). These results provide a compelling complement to the study findings regarding risk events during pregnancy, labor, and delivery, and provide one very clear and urgent area on which the intervention activities will need to focus to realize impact.

It should be noted that these problems and associated conditions related to fetal and infant mortality also affect the health and risk of the mother: hypertensive diseases of pregnancy, intrauterine fetal demise, malpresentation and other difficult labors, intrapartum hemorrhage, and amnionitis and other infections are among the principal threats to maternal health and survival (see section 9, "Maternal Mortality").

c. <u>Neonatal deaths after day 1: Probable causes</u>

-Sepsis only	4
-Sepsis plus congenital deformity	1

-Sepsis and/or pneumonia	2
-Pneumonia	3
-Tetanus	3
-Tetanus or sepsis (equivocal symptomatology)	1
-Hemorrhage (associated with low birth weight; possibly disseminated intravascular coagulation accompanying infection or vitamin K deficiency)	4
-Sudden infant death	1
-Unwanted child, history suggestive of active neglect or infanticide	2
-Cleft lip/palate with inability to suck	1
-persistent diarrhea	1

These findings indicate the potential importance of prevention, recognition, and adequate management of infectious diseases of newborns. Clinical findings consistent with tetanus were encountered only in cases in the lower altitude communities of the Inquisivi area. However, the findings regarding cord-cutting and care suggest that these practices need to be improved in all areas.

3. Maternal Mortality. As noted, as in any geographically restricted study the number of cases of maternal mortality is too small for meaningful case-control analysis, and the causes and risk factors are likely to be different and therefore not susceptible to identification of maternal cases if combined with infant cases. Therefore, the cases of maternal mortality were evaluated separately, and the results are basically descriptive.

All cases of maternal mortality were reviewed and verified to be pregnancy or childbirth-related according to the clinical history. However, only eight of nine cases were reviewed during the consultant visit, since one record apparently had been left in Inquisivi.

One characteristic noted to be probably strongly associated with maternal mortality was advanced maternal age: in contrast to the general population of study mothers, the range of ages of cases of maternal mortality was 30-43 years; the mean age of these cases was 38 years, d the median 40 years.

a. Moment of death in relation to pregnancy, labor and delivery:

-Pregnancy	3
-Childbirth	2
-Puerperium	
-Immediate	2
-Intermediate	0

-Late	1

b. Diagnoses (probable causes):

-Sepsis associated with undelivered dead fetus	3
-Puerperal sepsis	1
-Hemorrhage associated with placenta separation during pregnancy	1
-Hemorrhage associated with retained placenta (1 case with uterine atony)	2
-Malpresentation with prolonged labor	1

Again, these diagnoses indicate the extremely low level of knowledge and care available for obstetric problems in this populations. The three cases of sepsis associated with undelivered fetal demises are especially compelling: these women spent one week or longer carrying fetuses which they and their families knew to be probably dead, without seeking help, until ultimately they became massively infected.

10. Process diagnosis. This part of the study was intended to define the decision-making process of families of cases in the face of life-threatening situations. The results of

this study component are consistent with these of the other components in indicating the low-level of appropriate basic knowledge regarding identification and response to common complications of pregnancy, childbirth, newborns, and the puerperium.

In the infant cases, recognition of life threatening situations reportedly was distributed as follows:

-At the moment of appearence of the life-threatening situation	27%
-After substantial delay	30%
-Problem not recognized	25%
-Problem recognized but not considered life-threatening	16%

Thus, in only one-quarter of cases was the problem recognized in the moment when response was most likely to be life-saving. The same pattern was observed in maternal mortality cases.

In those families that took some action in response to the situation (whether immediately or after some delay), the pattern of response was as follows:

-Sought "adequate" care	28%
-Sought other ("inadequate") care	12%
-Tried to manage the problem at home	44%
-Other	15%

Thus, fewer than one-third of families that took any action sought care from some source with at least some appropriate knowledge and resources. More families tried to manage the problem themselves, often with teas and herbal remedies.

The overall conclusion from this study component is that, if there is a pathway to survival in the face of these life-threatening situations, the majority of cases either never got on that pathway, or immediately turned off in a wrong direction. The overall conclusions from these analyses have strong implications for the intervention: to have impact in reduction of perinatal, neonatal, and maternal mortality, the intervention must address the common obstetric and neonatal conditions and illnesses which result in this mortality. In doing so, the intervention must effectively provide the target population with clear, focused, and operational information on the recognition and appropriate response to these situations. Given the low level of resources and health services available in this setting, defining the appropriate response (at the level of family, community, and "health system") will be a major challenge. However, the very high rates of potentially preventable mortality in this population suggest that <u>any</u> effective steps taken to <u>address any</u> of the principal causes of mortality may have notable impact.

11. Workshop for presentation and discussion of results.

This workshop included representatives of the various non-governmental organizations participating in PROCOSI, including CARE, USAID, and the Ministry of Health. The majority of the four-hour session was dedicated to presentation and discussion of methodology and preliminary results; the focus was on demonstrating how the study and analysis process could contribute meaningful information for programs and interventions. The fact that most of this was new information to the audience resulted in most discussion being limited to questions or clarifications. However, the level of interest expressed suggested that follow-up discussions with members of the group may provide useful input to the intervention development process.

12. Meetings with SCF/Bolivia director and MotherCare representative.

These meetings were generally focused on three areas: discussion of study results and implications for intervention; strategies to integrate these results with those of the womens' self-diagnosis activity; and potential responses to the situations principally responsible for perinatal, neonatal, and maternal mortality.

The results and implications for intervention discussed are those presented in this document and in more detail in the summary prepared and left in Bolivia. In

regard to integration of these results with those of the womens' self-diagnosis, it was noted that preliminary findings of this process suggested that the results would focus more on the problems of the mother herself than on the more frequent morbidity and mortality of fetuses and infants. Suggestions for integrating these two lines of study (community self-diagnosis with public health/epidemiologic diagnosis) included:

a. The intervention should include information on and response to the more common, although infrequently lethal, problems identified by mothers (common infections, vaginal discharge, etc). Such response will be essential to give the intervention the sense that it is responding to the needs and perceived problems of <u>most</u> women.

b. The fact that whole most women do not experience potentially lethal complications, most women are aware that they could occur to any of them, provides a basis for including these complications in an intervention along with more common problems.

c. Linkage of the mother's focus on their own problems with the epidemiologic perspective is facilitated by the fact that, as noted, many of the potentially lethal complications which threaten the fetus and

infant also threaten the woman herself (hypertensive disease, hemorrhage, infection, malpresentation and other difficult deliveries). Only after delivery do the courses of the mother and newborn substantially diverge.

In terms of responses to these problems with resources available, the visit provided time only to identify this as the next important area to be addressed in the evolution of the intervention, and to discuss same examples of responses to most common emergencies and complications (e.g., screening for and management of hypertenseive disease by auxiliary health personnel under norms; prenatal detection of malpresentation, with use of passive maneuvers and, if necessary, active external version to promote cephalic delivery; simple protocols for management of post-partum hemorrhage, including manual extraction of placenta, uterine massage, and use of oxytocin, methergine, or prostaglandin by local personnel under special indications; injection of loading doses of appropriate antibiotics in the case of severe infection of pregnant or post-partum women or of newborns).

In addition, the management and supervisory needs of the intervention development and implementation phase were discussed (see "Recommendations", below).

VII. RECOMMENDATIONS

(All recommendations are offered for consideration by BCF and MotherCare central and Bolivia staff).

a. The intervention should include a strong focus on identification, response, and case management of the most common complications and illnesses associated with perinatal, neonatal, and maternal mortality.

b. In addition to women's groups, other organizations including men's groups and community health personnel including promoters should be considered audiences for the intervention. As a medium-term strategy, the formation and problem-oriented training and promotion of midwives should be considered.

c. The intervention will require a strong, clear, focused, and action-oriented information, education, and communication component.

d. Local and international experience should be reviewed to identify potential responses to specific obstetric, post-partum, and neonatal emergencies in the context of resources available or potentially available (as in the examples cited above). The definition of "what to do in case of _____", in addition to increasing awareness of and ability to recognize the common life-threatening situations, must form an essential element of the intervention.

e. The development and assessment of case management options, the integration of the two diagnostic approaches, the development and coordination of IEC activities, and the supervision and problem-solving required in these intervention activities, will require full-time attention by one or more professionals fully aware of the technical issues, oriented toward the community and resources available, and having a clear vision of the essential direction of the intervention. It is not clear how the supervision will be provided given the present staffing of the project. This staffing should be reviewed critically.

VII. SUPPORTING INFORMATION

Persons met:

JSI/MotherCare

-Lisa Howard - Grabman, Bolivia Representative

Save the Children:

-David Rogers, Bolivia Project Director

-Robert Grabman

-Dr. Adolfo Martínez, Maternal-Child Health and Child Survival Advisor

-Dra. Lila Cespedes Claure, MotherCare Inquisivi Project Coordinator

-Ing. Joaquín Flores, Data System Manager

PROCOSI:

-Dra. Ana María Aguilar

-Meri Sinnitt

USAID-Bolivia:

-Charles Llewellyn, Public Health Advisor, Div. of Health and Human Resources

APPENDIX I

PROJECT "WARMI" - DJC
CASE-CONTROL STUDY

Summary and Description of Outstanding Findings
(Dr. Alfred Bartlett, Johns Hopkins University/MotherCare)

The following items present several aspects from the preliminary data analysis from the case-control study on Maternal, perinatal, and neonatal mortality in the Impact Area of the Community Youth Development (DJC) Project at Inquisivi. Although the analysis is preliminary in the sense that there are some complex analytical aspects that are still pending (multivariate analysis), the results herein summarized represent reliable information that will not be modified through further analysis, except in a few instances that are clearly pointed out throughout this document. This and the facts that the data files are sufficiently clean and complete and that the information on the problems and symptoms associated with mortality cases seems complete and clinically valid, indicate that the results can at this moment be used as input for the implementation of the intervention.

Because of the aforementioned reasons, the following items offer pertinent and illustrative data for discussing the population implications derived from the data itself as well as for the DJC and for the "WARMI" project.

1. **Mortality Rates**

To make comparison with international and national statistics possible, the perinatal, neonatal and maternal mortality rates of the study are presented according to the standard WHO definitions.

Definitions

Perinatal Mortality

Fetal/child mortality from 28 weeks of pregnancy until the first seven days of life. The denominator in this proportion is the number of births (not necessarily life births). In the case-control study, the perinatal deaths include the "obit", "stillborn", "dead during the first day of life" and "dead within the first week, after the first day of life".

Neonatal Mortality

A child's death that occurs during the first 4 weeks of life; the denominator in this proportion is the number of live births (with any sign of life, regardless of the fact he (she) dies immediately afterwards. In the case-control study, the neonatal deaths include the "dead during the first day of life", "dead during the first week, after the first day of life", and "dead during the first month, after the first week" categories.

Maternal Mortality

Maternal death during pregnancy, labor and the first 40 days after delivery (or abortion) from a cause that is associated with pregnancy, labor and/or delivery. This rate's denominator (which is really and index) is the number of births, because, practically, the number of pregnancies or abortions cannot be measured.

To apply these definitions, we use the following data which represents all the births registered during 2 years in the total area of impact in Inquisivi:

Births	639
Obits	17
Stillbirths	15
Live births	607
Dead during 1st. day	19
Dead between 2nd.-7th. days	15
Dead between 2nd.-4th. weeks	8
Maternal deaths	9

With this information, the following rates for the Inquisivi area are calculated:

Perinatal mortality = 66/639 = 103/1000 born not "alive".
Neonatal mortality = 42/607 = 69/1000 live births.
Maternal mortality = 9/639 = 140/1000 born not "alive".

Separated by sub-areas, these data give the following figures:

Sub-area		
Inquisivi:	Perinatal Mortality	94/1000 births
	Neonatal Mortality	38/1000 live births
Circuata:	Perinatal Mortality	148/1000 births
	Neonatal Mortality	96/1000 live births
Licoma:	Perinatal Mortality	95/1000 births
	Neonatal Mortality	63/1000 live births.

During the interpretation of these results it is important to remember tht, in general, this information is based on a death registration system that is much better than the majority of those existing in many places in Bolivia or, for that matter, in other underdeveloped countries. Furthermore, they represent a process of active seeking of births and deaths (like during the Health and Demography survey). These differences have to be considered before making any comparison between these mortality rates and those from other places where different methodologies have been used. It must also be taken into account that in the Licoma sub-area, the identification of cases (specially during the first year) was carried out through active seeking methodology because of the complete lack of adequate records for the years before 1990.

Considering these commentaries, it is pertinent to make some observations. First, the perinatal, neonatal, and maternal mortality rates in the area of impact, are quite high in comparison to international criteria. Second, even though this is not the most recently introduced area to the project, the Circuata sub-area has the highest mortality rates among the sub-areas of interest.

An important aspect to be mentioned about the international definitions, is that they are statistical definitions which do not necessarily follow an operational or intervention-oriented approach. This is best illustrated by the "perinatal mortality" definition, which includes both intrauterine deaths of fetuses that have been affected by pregnancy problems (like hypertension, intrauterine infection, trauma, etc.), as well as deaths of children who died during labor or immediately after from causes related to clinically obstetric cases (problems proper to labor and to inadequate management), and deaths of children who have been

born healthy and die later from conditions that affect neonates during the first week of life (like prematurity, infections such as tetanus, etc.). Because of this "all including definitions", the "perinatal mortality" category is really a "tossed salad" of problems that does not allow for an intervention oriented approach. Likewise, including children who die during the first week of life, the "perinatal mortality" overlaps importantly with "neonatal mortality".

Because of the aforementioned reasons, the analysis of this study's results is based on a mutually excluding classification that focuses strongly on the identification of intervention areas. This classification and its relationship with the study's sub-categories and with the internationally accepted categories is displayed in the following table:

STATISTICAL CATEGORIES	CASE SUB-CATEGORIES (QUESTIONNAIRE)	OPERATIONAL CATEGORIES
	Obits	"Obits" (perinatal factors)
Perinatal Mortality	Stillborn	"Stillborn and 1st. day deaths" (factor related with labor, delivery and their management)
	Deaths during the First day deaths	
Neonatal Mortality	Deaths during the week following the first day	
	Deaths during the month following the first week	
Maternal Mortality	Maternal Mortality	"Maternal Mortality"

Applying this operational classification, the mortality found during the two years in the Inquisivi area of impact is as follows:

PERCENTAGE

CATEGORY	NUMBER OF CASES	OF THE PERI-NEONATAL MORTALITY
Obits (Perinatal factors)	17	23%
Stillborn and deaths during the first day (labor factors)	34	46%
Neonatal deaths after the first day (neonatal problems)	23	31%
TOTAL	74	100%

Examination of this mortality distributions lets us assess the contribution of several groups of factors and see more clearly the potential impact of interventions oriented towards one or another mortality category.

In the following analysis only peri and neonatal mortality cases are considered; maternal mortality is not subject to inferential statistical analysis. Its descriptive analysis is presented elsewhere.

2. **Data about the communities where the cases and controls resided**

The following are sets of selected data that give us relevant information about the DJC project's activities and about the development of interventions for the reduction of perinatal, neonatal and maternal mortality rates.

2.1. Community development indicators

2.1.1. Presence of community organizations

Community Organizations	Cases (n=74)	Controls (n=152)	Total
Syndicate	89%	75%	80%
Cooperative	11%	14%	13%
Neighborhood Committee	31%	38%	36%

The majority of communities have community organizations. Their presence is not associated with a smaller mortality risk.

2.1.2. Services

Presence in the Community	Cases	Controls	Total
Schools	93%	90%	91%
Intradomiciliary Water supply	43%	43%	43%

The great majority of the communities where the cases and the controls live have a school, and an important percentage has water supply systems with intradomiciliary installations. However, these indicators are not associated with a smaller risk for being a case. It should be noted that, considering the families to which the cases and controls belonged (not the communities where the cases and controls lived), there was no association between the fact that there was an intradomiciliary water installation and a lesser risk of being a case:

	Cases	Controls	Total
Water supply within the family's house	37%	40%	39%

2.1.3. Health Care Resources

Presence of the resource	Cases	Controls	Total
Promoter	93%	87%	89%
Trained TBA	74%	64%	45%
Untrained TBA	41%	47%	45%

Upon contemplation of the intervention phase, it will be noticed that practically all the communities have a promoter and that the majority of communities have a trained empirical birth attendant. The participation of these persons in prenatal care and labor assistance, shall be considered below. However, it is important to note that the presence of these individuals is not associated with a lesser risk of being a case.

It is important to recognize that these individuals played very important roles for establishing communications channels with their communities.

2.1.4. **Women organizations**

Organization Presence	Cases	Controls	Total
Mother's Club	11%	20%	17%

Women Organization	36%	30%	32%
Either of the two	47%	50%	49%

The presence of female organizations within the communities is of special interest, because these organizations are oriented towards improving the situation of women in the community, specially women in reproductive age. However, these data show that their presence in the community has not been associated with a lesser risk of peri- and neonatal mortality.

Interestingly, examination of maternal participation in any of the above organizations, shows the following:

	Cases	Controls	Total
Maternal participation any female organization	18%	19%	19%

The combination of these results with those for presence of any organization, allows one to calculate an approximate "coverage" of these organizations in regards to the sample of mothers who had a pregnancy/labor during the two years that are represented by the study.

	Cases	Controls	Total
a. % of mothers who participated in female organizations	18%	19%	19%

b. % of these women's communities that had female organizations	47%	50%	49%
c. "coverage" of the female organizations (a/b)	38%	38%	38%

These results suggest the following conclusions:

For the two years subject of study,

- Neither the presence of female organizations, nor the direct participation of a women in one of these organizations were associated with smaller risk of having a baby that were peri- or neonatal mortality case.
- The coverage of these women who have had pregnancies and labors in the two years subject of study is moderate.

This analysis suggest several intervention possibilities:

- To increase the coverage of the organized female groups and their effectiveness as a means to confront the perinatal, the neonatal and the maternal mortality problem.

2.2 Other characteristics of the communities

These results were handled in a standardized manner to assess the "distance" (measured in hours) to reach a center with some health service from the family's home.

Time to reach a center	Cases	Controls	Total
< 2 hours on foot	59%	59%	59%

< 1 hour on another means of transportation	79%	83%	82%

It is important to notice that, by itself, the time necessary to reach a center (with health serve) from a case or a control home was not different. Hence, it is inferred that distance is not associated with the risk of being a case.

The implications of this information is worth considering: once a family detects a problem, the intervention has to define specifically what to do. If more than 40% of the families lived at least 2 hours away from a center, and if (as frequently happens) a person is sent for help afoot, it will take this individual two hours or longer to reach the center, an indeterminate amount of time to find assistance, 2 hours to return, and then, approximately 3 or more hours to take the patient to the health services (because the vast majority of potentially lethal complications cannot be treated at home). These "idle" 7 hours can make the difference between life and death for a mother or a baby.

Because of this, the intervention must aim to instruct the families to take the patients directly to the center instead of sending someone else fetching for help. It is possible to send someone ahead to warn about the problem or to look for a means of transportation, but this should always be done while someone else takes the patient to the center.

2.2.2. Size of the community

Based on estimates for population information for the cases, a perinatal and neonatal mortality index was

calculated. This mortality index is shown below:

Approximate size of the community (No. of inhabitants)	Estimated Total Population	Number of Deaths	Mortality Index (No. Dead/ Population)
< 100	1,287	13	0.10
100 - 199	3,300	22	0.007
200 - 499	10,500	30	0.003
> 500	4,500	9	0.002

This index indicates a greater risk at the smaller communities, independent from the distance to the health services. However, it must be pointed out that even though the smaller communities have a greater risk, the greater number of registered does not occur in these communities but rather at the larger communities.

3. Data about the families of the cases and the controls

3.1. Number of families and person living within the house

Families Living at the house	Cases	Controls	Total
1	73%	74%	74%
2	22%	21%	21%
> 2	5%	5%	5%

No. of individuals living at the house		
Cases	Controls	Total
5.9	5.9	5.9

In conclusion, these data demonstrate that the families of the cases are similar to the controls' families in regards to these characteristics.

3.2. Socio-economical characteristics (Percentages)

Indicators	Cases	Controls	Total
Dirt floor	84	82	83
Land ownership:			
- Legal	76	61	66
- Dependent	20	25	23
Father's Occupation:			
- Farmer	83	82	82
- Merchant	11	16	14
Farm production:			
- Cereals	82	78	80
- Vegetables	49	55	53
- Tubers	92	83	86
- Fruits	78	73	75
- Forage	23	7	12
Products sold:			
- Cereals	46	35	39
- Vegetables	19	30	26
- Tubers	45	44	44
- Fruits	65	62	63
- Forage	1	4	3
Father belongs to:			
- Syndicate	70	60	63
- Neighborhood committee	19	34	28
- Cooperative	4	12	10
- Credit	8	14	13

Indicators	Cases	Controls	Total
The father:			
- Is not illiterate	94	94	94

The father has:			
- basic formal education	80	56	64
- greater than intermediate education	16	36	29
The father speaks Spanish	91	94	93

The data on the families suggests that the families of the cases are at least comparable with the controls' families in relation to economical indicators. The controls' parents tend to participate more in more community activities other than the syndicate (in which the cases' parents participate more) and tend to have more advanced instruction (above basic education). However, the majority of the parents in both groups have some formal education, are literate and speak spanish. These findings, together with the data over the father's participation during labor can suggest important communication channels with the families.

A more general commentary is that, besides the really impressive indicators of the families' and the communities' development in the Inquisivi area, <u>this general development does not seem to be associated to a decrease in the risk of peri- and neonatal mortality</u>. And the mortality rates are indeed high.

This observation has very important implications for DJC: it implies that in order to have impact on the high perinatal, neonatal and maternal mortality rates, it will be necessary to

develop and implement specific interventions focusing on the specific causes of the observed mortality cases.

4. Maternal characteristics and obstetric history

4.1. Maternal general characteristics

Occupation	Cases	Controls	Total
Domestic chores	100%	97%	98%
Helping with farm work	58%	63%	61%
Artisan	28%	26%	27%
Merchant	11%	11%	11.%

In terms or work and responsibilities, both groups are similar.

	Cases	Controls	Total
Illiterate mother	27%	12%	17%
	(X^2 = 5.026; p = 0.025)		
Education level:			
None	24%	10%	14%
Basic	66%	66%	66%
Intermediate	10%	24%	20%
	(X^2 = 12.42 [2 degrees of freedom]; p = 0.02)		
Does not speak spanish:	15%	4%	7%
	(X^2 = 7.03; p < 0.01)		

These results show certain maternal characteristics that are associated with the risk of perinatal and neonatal mortality. Mothers without formal instruction (illiterate and

without speaking knowledge of spanish) are at greater risk of losing their babies during the latter part of pregnancy and during the first month of life. Even without the final statistical analysis of the association between these variables it is safe to say that they are related.

These findings have obvious implications for the intervention, but the implications' limitations must also be recognized. It is true that the less educated mothers' babies are at greater risk of perinatal and neonatal mortality. Because of this, the development of the information and communication intervention must take special consideration in reaching these particular group of women. However, it must be acknowledged that 73% of the cases' mothers know how to read, 76% has basic or higher education, and 85% speaks spanish. Hence, the importance of <u>including</u> mothers with these same characteristics must not exceed the importance of developing an intervention that is pertinent to the rest of mothers, among whom occurred the majority of registered deaths. (In epidemiology characteristics like these emphasize the difference between the <u>risk factors</u> and <u>risk attributable to a factor</u>, which is basically the proportion of events that would be eliminated if the effect of the factor were eliminated.

Maternal Civil Status	Cases	Controls	Total

Formal union or legally married	81%	90%	87%
Single	18%	9%	12%

(X^2 = 2.560; p = 0.10)

Despite the small number of single mothers (a total of 27 among cases and controls), the data demonstrates a statistical tendency towards greater risk among single mothers.

Maternal Age	Cases	Controls	Total
< 17 years	10%	5%	7%
18 - 34 years	65%	76%	73%
> 35 years	25%	13%	21%

The greater the proportion of mothers outside the "ideal age range", the greater the risk of having a mortality case. Upon examination of this statistical tendency, using the "ideal" against "risk" categories (or "young" against "older"), we obtain the following results:

Maternal age categories	Cases	Controls	Total
"Ideal"	65%	76%	73%
"Risk"	35%	24%	27%

(X^2 = 2.206; p = 0.15, not significant)

This table shows that with the number of mothers that were studied, there is no significant association between maternal age and the risk of perinatal and neonatal mortality. However, the tendency does exist and it could be that with a greater sample of mothers this tendency turned statistically significant. Once more we have to note that two thirds of the

cases occurred in mothers considered within the "ideal" reproductive age. Furthermore, the possibility that maternal age was better associated with one of the sub-categories was analyzed:

Maternal Age Categories	Obits	First day Deaths	> 1st. day Deaths
= "Risk"	44%	30%	35%

Again, with the relatively small numbers of subjects these proportions showed neither significant differences nor important tendencies.

4.2. Maternal Obstetric History

Number of Previous Pregnancies	Cases	Controls	Total
0 (primipara)	19%	17%	17%
1 - 3	27%	39%	35%
4 - 6	28%	29%	29%
> 7	26%	15%	19%

The first pregnancy babies did not have greater risk of perinatal and neonatal mortality. Separating by mortality sub-categories, a tendency of association between primiparity and intrapartum mortality was found. This was related to obstetrical problems (26% of the cases in this category were babies from primiparous women, in contrast to 12% of intrauterine deaths prior to labor ("obits") and 13% of neonatal mortality after the first day of life). The analysis of other past obstetrical events should consider only those mothers who had had one or more pregnancies prior to the

pregnancy under study. It is for this reason that this analysis of the obstetrical history excludes primiparous women and focuses on multiparous women (60 for the cases and 126 for the controls).

	Percentages according to each group		
Obstetrical history	Cases	Controls	Total
> 1 abortion	17	7	10
	(X^2 = 2.582; p = 0.12)		
> 1 stillbirth	25	10	15
	(X^2 = 5.200; p = 0.03)		
> 1 premature baby	10	4	6
> 1 Low birth weight baby (mother's estimate)	18	16	16
> 1 abnormal fetal presentation	7	4	5
> 1 Cesarean section	3	2	25
> 1 Neonatal death	38	18	25
> 1 death between	(X^2 = 7.223; p < 0.01)		
2 - 11 months	15	18	17
> 1 death after one year of age	32	28	29
Intrapartum interval:			
< 15 months	0	12	8
< 18 months	6	16	13
< 24 months	36	38	37

Several important points come out from this analysis. One of the more relevant ones is the fact that in this

population, certain past obstetrical factors are significantly associated with a greater risk. Of these, the more influential factors are the antecedent of having had one or more previous stillbirths and/or neonatal deaths. The mothers with these characteristics deserve special attention. This study's information does allow for calculating the factors' predictive values. However, since the program's interventions are only beginning, it would be worth while to suggest teaching the community and the health care personnel about the importance of these characteristics. Nonetheless, it must not be forgotten that an important proportion of the deaths occur in mothers that do not have these characteristics.

Another important aspect about these characteristics, is that despite their association with a greater risk, the majority of the families and mothers have not directly experienced the complications the past obstetrical events represent. For that reason, a family will not necessarily have the basis to recognize the risk associated with these events. Even thus, the results indicate that in these communities there is some experience in this regards among the mothers. Therefore, the intervention must seek a way to take advantage of the communities' experience in order to inform all the mothers, families and health care personnel about the risk associated with these conditions.

5. Prenatal care and problems during pregnancy

5.1. Prenatal Care	Cases	Controls	Total
"Adequate" (physician, medical post, sanitary			

post, health officer, supervisor, promoter, trained TBA)	34%	45%	41%
"Inadequate" (untrained TBA, other types)	12	3	6
No prenatal care	54	51	52

These results show that less than one half of the mothers have any type of prenatal care from an "adequate" source. The difference between cases and controls is not significant.

When the question was asked: "What do you think of prenatal care?" only 54% of the mother could even give an opinion. However, of these mothers, 96% had a positive opinion about prenatal care. This result seems to be the basis for an increment in prenatal care coverage within the population under study. It is worth pointing out that at this moment the participation of (trained and untrained) traditional birth attendants in prenatal care is not very important, even though they are present in almost all the communities. Only 13% of the study's mothers had any prenatal care done by a TBA. The most important source of prenatal care was the field supervisor, almost 20% of the mothers attended prenatal care provided by the supervisor.

5.2. Remedies and Immunization

Use of remedies	Cases	Controls	Total
- Iron	15%	16%	16%
- Vitamins	10%	12%	11%
- Others	1%	6%	4%
- Herbal infusions	14%	10%	11%

Total Number of Tetanus shots (before/

during this pregnancy)	Cases	Controls	Total
- 0	27%	28%	28%
- 1	27%	20%	22%
- ≥ 2	46%	52%	50%

One half of the mothers were adequately vaccinated against tetanus; 48% had received at least one doses during this pregnancy. Apparently, this immunization coverage is the result of immunization campaigns organized by DJC. The absence of immunization against tetanus, or an inadequate number of shots, was not associated with greater risk of perinatal or neonatal mortality. Neither could it be demonstrated there were any association tendencies in regards to the absence or inadequacy of immunization with sub-categories of mortality (47% of deaths in utero before labor, 59% of stillbirths or deaths during the first day of life, and 52% of neonatal deaths after the first day, either did not receive any shots at all or received only one doses of tetanus toxoid).

5.3. Other practices during pregnancy

Practice	Cases	Controls	Total
Handling with mantle	43%	40%	41%
Massage	50%	45%	47%
Fetal external Version	26%	15%	18%
Intended abortion	7%	7%	7%

"Mantling" the abdomen is not harsh but rather a gentle

maneuver; it is like lying on a hammock. This practice, like massaging, is perceived by the mothers as beneficial for them. The lack of association with risk suggest that these elements of traditional prenatal care should be preserved. An excess of attempts to try to rotate the fetus were noticed; the difference in proportions between cases and controls is not significant but there is a statistical tendency towards increased risk. Intended abortion is relatively common, according to the information given by mothers: 7% in both groups. The more common reported forms are using herbal infusions, that are supposedly oxytocic, and purposefully doing excessive physical efforts (carrying heavy loads, jumping). Two control's mothers reported having received medicines and injections. None reported an intent of abortion done by introducing foreign objects into the uterine cavity.

5.4. Problems during pregnancy

Problems	Cases	Controls	Total
Hemorrhage	18%	7%	10%
	(X^2 = 5.432; $p < 0.02$)		
Bloating (hands and face during 3rd. trimester)	16%	18%	17%
Constant headache (3rd. trimester)	32%	21%	25%
	(X^2 = 2.472; $p = 0.13$)		
Urinary Tract Infection Symptoms	7%	9%	8%
Seizures	4%	3%	2%

Fever	16%	9%	11%

The presence of hemorrhage during any part of pregnancy was significantly associated with perinatal and neonatal mortality risk. The other symptoms were not associated with a greater risk, even though a symptom that is probably related with pre-eclampsia (constant third trimester headache) hints towards a tendency towards the expected association. This observation becomes more important when one considers that 3% of all pregnancies (8 mothers) had seizures. The interviews confirmed these information and served to identify the fact that one of the mothers was an epileptic. The other seven mothers apparently suffered from a severe hypertensive disease associated with pregnancy. This percentage of frank eclampsia suggests a possibly high prevalence of pregnancy toxemia in this population. The results deserve an in depth study about the real prevalence of hypertension induced by pregnancy among this people.

Other relatively frequent problems were also found that are not associated with mortality risk. The intervention must take into consideration the prevalence of these problems in order to offer mothers appropriate treatments for the more frequent problems they are subject to experience.

6. Care and traditional practices during labor

6.1. Persons involved during labor and delivery

Relatives present during birth	Cases	Controls	Total
Mother's mother	21%	20%	20%
Mother's father	6%	9%	8%
Husband's mother	11%	13%	12%
Husband's father	7%	4%	5%
Husband	70%	82%	78%

These results identify two very important groups that must be taken in consideration when the intervention is developed. The husband is the persons present more often during labor (approximately 80% of the times). The data about labor also indicates that the husband is the individual who more frequently helps attend the baby's delivery. It would seem adequate information delivered to the husbands could play an important role in the detection of problems during pregnancy, labor and delivery. The grandmothers are also frequently present during this time and could represent a very important "secondary audience", depending on their inclination towards accepting new "untraditional" information.

Who attended labor and delivery	Cases	Controls	Total
TBA	22%	24%	23%
Mother's mother	15%	12%	13%
Father's mother	4%	4%	4%
Husband	40%	38%	38%
Nurse/Nurse's aid	5%	9%	7%
Physician	4%	6%	5%
Promoter	1%	2%	1%
Someone else	7%	9%	8%
Nobody	3%	>1%	1%

Once more the importance of the husband and relatives is put in evidence. The TBA attends less than one quarter of the births, according to the mothers.

Place of birth	Cases	Controls	Total
Home	90%	96%	94%
Grandmother's home	5%	<1%	2%
Medical Post	0%	3%	2%
Another place	5%	<1%	2%

6.2. Practices of labor and delivery care

Practice or Treatment	Cases	Controls	Total
"Mantling"	40%	51%	48%
Massage	48%	53%	51%
Girdle	53%	47%	49%
"Placing the fetus in position"	28%	19%	22%
Vaginal examination	11%	14%	13%
Herbal infusions	62%	70%	67%
"Pushing down remedies:			
Tablets	10%	9%	9%
Injections			
Pituitina	1%	3%	3%
Methergine	0%	3%	2%
Does not know	0%	3%	2%

These results provide useful information about the practices during labor in this population. The majority of mothers were treated with mantles, massage and girdles; according to the information provided by the project's personnel, these practices, with some exceptions, are carried out in a very gentle manner, and are not associated with greater mortality risk. The greater number of mother took different types of herbal infusion during labor which were not associated with greater mortality risk either.

Vaginal examinations are done practically only when births are attended by physicians, nurses or nurses' aids.

This is not a common practice among the TBA's or the relatives that attended births.

One practice that can by preoccupying is "putting the fetus in position". According to one TBA's report, this is carried through vigorously and its only purpose is to inspire confidence in the mothers. It is not only practically impossible to turn the baby around once the presenting fetal part has entered the pelvic canal, but such vigorous manipulations can be dangerous to the mother (fetal death) and the baby.

The use of remedies is still not highly prevalent. The same thing occurs with the injections; their use is only slightly more common among controls (which used more medical services for birth assistance). At this moment, this practice does not have to be a very important part of the intervention but must be denounced and monitored.

6.3. Labor and delivery characteristics and problems

Labor duration (hours)	Cases	Controls	Total
< 6	39%	47%	41%
7-12	32%	20%	31%
> 12	38%	33%	28%

(X^2 = 7.48; [2 degrees of freedom]; p = 0.02)

This table shows a significant tendency of association in the cases group with longer labor periods. This analysis does not consider the fact tht the primiparas tend to have longer labors; however, it must be remembered that being a primipara was not associated with greater mortality risk. Because of these reasons, the association between prolonged labor and

the risk of perinatal and neonatal mortality seems to be independent from the mothers' number of previous pregnancies. Labors lasting longer than 12 hours are seen more frequently in the intrapartum and first day death categories (44%) than in previous to labor deaths (35%) or than neonatal deaths after the first day (30%).

Time elapsed since membrane rupture	Cases	Controls	Total
During labor	58%	71%	67%
< 12 hours	28%	23%	21%
> 12 hours	14%	6%	8%

(X^2 = 2.367; p = 0.14)

Membrane rupture longer than 12 hours before labor was significantly associated with the risk of being a case. With the small numbers available, this tendency came out statistically significant.

Problems during labor	Cases	Controls	Total
Abnormal presentation	13%	4%	6%
(X^2 = 4.433; p < 0.05)			
Hemorrhage	15%	0%	5%
(X^2 =21.259; p < 0.001)			
Maternal fever			
Cord around baby	8%	7%	7%
Cord prolapse	1%	0%	<1%
Meconium staining	7%	1%	3%
Seizures	0%	2%	1%

These results show the significant association of some

obstetrical problems and perinatal and neonatal mortality. Intrapartum hemorrhage and maternal fever are associated principally with children dying during labor or during the first day of life; two cases of hemorrhage and two of maternal fever were identified among the intrauterine deaths before labor and a like number of neonatal mortality cases after the first day.

The abnormal presentations category includes breeches (the more frequent, amounting up to two thirds of all abnormal presentations), transverse lies, and complex presentations (prolapse of a leg, usually).

Lethality rates secondary to these complications can be estimated making projections of the information on controls on the total control population (multiplying the number of events in the controls sample by the 3.65 factor, recognizing that the sample represents 27% of the total control population [1/0.27 = 3.651]). With these calculations we reach the following results:

Problems	Approximate number of events	Number of events in cases	Approximate Lethality by event
Membrane rupture > 12 hours	43	10	0.23
Abnormal Presentation	30	8	0.27
Intrapartum Hemorrhage	42	9	0.21
Maternal Fever	15	8	0.53

Cord Prolapse	1	1	1.00

These estimates of lethality suggest that 1/5 and 12 complications will result in perinatal or neonatal mortality. The lack of recognition and proper response to these complications of labor contribute significantly to perinatal and neonatal mortality: more than half the intrapartum deaths and first day deaths are associated with on of these complications. One factor that could have contributed to perinatal mortality related with labor is the lack of knowledge about the adequate management of labor and delivery: more than 10% of the children who were apparently alive when labor began were born with signs of trauma impinged during labor (bruises, fractures, etc.). This finding indicates basic obstetric practices which is very deficient, since most of the time they are performed by unexperienced relatives with purely empirical knowledge. These finding suggest there is a broad field for improvement and positive impact.

7. IMMEDIATE POST NATAL MATERNAL CARE

Time before placental delivery	Cases	Controls	Total
< 1 hour	77%	88%	85%
> 1 hour	23%	12%	15%

Post partum hemorrhage	Cases	Controls	Total
"None"	42%	28%	33%
"A little"	45%	52%	50%
"A lot"	13%	20%	18%

What was done when case the placenta was retained?	Total
Pull the cord	8%
Make the mother blow/cough/have nausea	17%
Tried to remove	4%
Something else	22%
Nothing	48%

What was done to control the hemorrhage when it occurred?	**Total**
Abdominal massage	205
Nipple stimulation	6%
Methergine administration	12%
Something else	17%

8. NEONATAL CARE

(Because of the distorting effect of children who were born dead on the evaluation of neonatal care practices, this section only describes the controls).

Neonatal Care	Controls
Immediate	33%
After delivery of the placenta	64%
Pharyngeal aspiration	29%
Bathing the baby	99%
Wrap baby up	98%
Putting baby next to mother	79%

Feeding	Controls
Fed colostrum	49%
Breast fed:	
Immediately	25%
First day	40%
Second day	22%
Quit breast-feeding during first month	17%

Half the neonates were not fed their mothers' colostrum (first milk). A low percentage of newborn controls (not sick) were immediately put to their mothers' breasts. However, practically all the babies received maternal milk during the first or second day of life. The survey did not determine why 17% of the mothers of control children reported having quit breast feeding their babies during the first month. this information should be verified and if it proves to be real, then the reasons for this potentially dangerous practice should be identified.

9. ASSESSMENT OF ASSOCIATED CONDITIONS AND CAUSES OF MORTALITY

The following assessment is based on a revision of each case's history (obstetrical history, the subject pregnancy's evolution, as well as labor and post partum history). and the data and verbal autopsy narratives.

8.1. Intrauterine deaths prior to labor (n = 15)

Associated conditions	Number
Hypertensive disease symptoms	3
Uncontrolled epilepsy	1
Considerable trauma (without fetal movements afterwards)	5
Maternal death (unborn child)	2
None	4

Among this group's mothers, 3 had persistent symptoms of hypertensive disease during the third trimester; if this disease was actually present and whether it contributed to

fetal mortality could not be determined. In 5 cases there was a history of strong traumatism and the women felt fetal movements stopped afterwards. Some cases were accidental, but there was also one intended abortion and another case where the pregnant women was attacked by her relatives who did not accept her being unmarried and pregnant. One woman was hit by lightning (electrical-atmospheric discharge) and survived. However, the fetus died.

8.2. Deaths after the beginning of labor and during the first day of life

General Causes	Number
Asphyxia	18
asphyxia and/or trauma	6
Intrapartum hemorrhage	3
Carelessness/hypothermia	3
Amniotitis	1
No probable cause identified	4

These diagnoses, as any retrospective diagnosis, are limited by the absence of direct observation. However, the quality of the information seems very similar to a study currently being developed in Guatemala, where a prospective study verified the validity of such retrospective diagnoses. It is noticed that most of the children who died from obstetrical causes (the presence of fetal movements immediately before the beginning of labor was verified) received the diagnosis of asphyxia; these children were born without signs of life or evidently depressed and were not able to recuperate. In the latter cases the lack of stimulation or resuscitation techniques application could have resulted in the loss of the opportunity to save these children. The

diagnosis of "asphyxia and/or trauma" was assigned only to those babies who were born with physical evidence of trauma or with a clinical history of vigorous manipulation.

Conditions associated with Intrapartum/1st. day mortality	Number
Abnormal fetal presentation	5
Abnormal presentation with prematurity	1
Prolonged labor (PL)	5
PL with prematurity	2
PL with amniotitis	1
PL with trauma from manipulation	2
Intrapartum hemorrhage	
Placenta previa	1
Abruptio placenta	2
Carelessness/hypothermia	2
Intentional carelessness	1
Amniotitis with trauma	1
Baby's size greater than normal	1
Twins	2
Multiple cord rings	1
Prematurity	1

These results point out the probable importance of infectious disease among neonates in regards to perinatal mortality. Tetanus was observed mainly at the communities located at higher altitude. In two cases there was history of unwanted pregnancies, doubtful paternity and unexplainable neonatal mortality.

The timely detection of and immediate response to early signs of sepsis or pneumonia in the newborn has been made effective in reducing neonatal mortality in other similar communities. The prevention of tetanus is always important and possible through immunization and the promotion of hygienic cord handling habits.

9. MATERNAL MORTALITY

Because of the small number of cases and due to the fact that the problems associated with maternal mortality cases might be different than those associated with perinatal and neonatal mortality, only a brief descriptive analysis of maternal mortality will follow.

9.1. Maternal characteristics

Among these mothers' characteristics, there was one clearly different than those found among women who did not die from causes associated with reproduction: maternal age. The cases were older than the majority of mothers, ranging from 30 to 43 years of age; the maternal mortality cases average age was 39 years while the median was 40.

9.2. Moment of death (8 cases)

Pregnancy	3
Labor	2
Puerperium:	
immediate	2
intermediate	0
late	1

9.3. Probable cause of death

Sepsis associated with intrauterine death	3
Puerperal sepsis	1
Abruptio placenta with uterine atony	1
Abruptio placenta	1
Abnormal presentation and prolonged labor	1
Hemorrhage during pregnancy (placental marginal sinus)	1

Once again, the results point out towards a very low level of obstetrical knowledge and care among the population members. The 3 cases of intrauterine fetal death are evident examples of this declaration: each one of these women carried a baby which they and their relatives knew might be dead, without doing ever taking any action until the mother suffered from complications (infection) and died.

10. PROCESS DIAGNOSIS

Process diagnosis was based on a model of problem detection, decision making, care seeking (care being classified as "adequate" and "inadequate" in regards to its capacity to solve the problem that caused the fatal event), the process of reaching and finding this care and the response from the health services. This diagnosis was applied only to the cases.

Inquisivi's basic status can be defined by the following tables:

At what moment was the problem detected?	Percentage
At an adequate moment	27
Too late	30
Problem went unnoticed	25
Problem detected but deemed unimportant	16

This table indicates that only in 1/4 of the events the problem was detected as such by the family at an "adequate" moment ("adequate" being defined as the moment of apparition of the symptoms that pointed out the possibility of death). Thirty per cent detected the problem when it was already too

late, and in many cases the problem was detected only when the patient was expiring. In 41% of the cases the family either did not recognize the problem or thought it was not important.

By mortality sub-category, it can be seen that there was a tendency to recognize the problem early among the neonatal (45%) and maternal (38%) deaths than in cases of deaths that occurred during labor or during the first day of life (22%). This suggest once more that this communities' knowledge about labor and delivery are very limited. In general, the fatal problems recognition step was very deficient. For those families which took any kind of action (be it at the adequate moment or when it was already too late), the following table shows the manner in which they tried to deal with the problem.

What was done when the problem was detected?	Percentage
An "adequate" source of care was sought out	29
An "inadequate" source of care was sought out	12
The problem was tried being solved at home	44
Something else was done	15

The most common response among those families that tried to do something about the problem was administering home-made remedies to the sick mother. Less than one third of those families which did react looked for supposedly adequate services to solve the situation. This diagnosis has important implications for the program: it suggests that there are basic deficiencies in regards to the recognition of potentially lethal problems during pregnancy, labor, the neonatal period and puerperium. It also indicates that the population does not have a clear definition of what an

adequate response is in regards to the decisions that are made when these problems are confronted.

These findings serve to inform the intervention process so that solid information, education and communication elements are included to upgrade the communities' knowledge about the recognition of and proper responses before potentially fatal obstetrical and medical problems.

However, it is important at this stage to look forward and consider the other steps of the process that are involved in adequate health care to reduce the high rates for maternal, perinatal and neonatal mortality. One would have to take into consideration what can really be done with existing and available resources at the homes, the communities and the health services, which must support the communities and care for the complicated cases that arise. This process would be another fundamental element in the development of the project's intervention.

APPENDIX 1

PROYECTO "WARMI" - D.J.C.
ESTUDIO DE CASOS Y CONTROLES

Resumen y Descripcion de Hallazgos Sobresalientes del Estudio
Dr. Alfred Bartlett, Johns Hopkins University/MotherCare)

Los incisos siguientes sirven para presentar varios aspectosdel analisis preliminar de losdatos del estudio de casosy controles sobre mortalidad materna, perinatal y neonatal en el Area de Impacto del proyecto de Desarrollo Juvenil Comnitario en Inquisivi. Aunque el análisis si es "preliminar" en el sentido de que hay algunos aspectos del analisis que están mas complicados (incluso el analisis multivariable) y por esta razónestan pendientes, en realidad, con las excepciones anotadas en los incisos aqui presentados, los hallazgos presentadosen este resúmen representan información confiable y que no va aser modificada en analisis posteriores. Este hecho, y los hechos de quelos archivos de datosestán bastante limpios y completosy que la información de las entrevistassobre los problemas y sintomasasociados con la mortalidad de loscasos parece bastante completa y clínicamente válida, indican que los resultados aqui presentados y aquellos desarrollados por el equipo de análisis pueden en este momento servir como insumos al proceso de desarrollo de la intervención.

Porestas razones, en los incisos siguientes,se ofrece los datos pertinentes oilustrativos, tanto para discusiónde lasimplicaciones de estos datos para la población, como para el programa de D.J.C. y el proyecto "WARMI".

1. Tasas de Mortalidad

Para fines de comparación con otras tasas internacionales y nacionales, aqui se presentan las tasas de mortalidad perinatal, neonatal y materna, según las definiciones estandard de la OMS:

Mortalidad Perinatal

Mortalidad del feto/infante desde las 28 semanas de gestación hasta los 7 días de vida; el denominador en esta tasa es el número de nacidos (no necesariamente vivos). En el estudio de casos ycontroles, las muertes perinatalesincluyen las categorías "óbitos","mortinatos", "muertosen el 1er. día devida" y "muertos en lala. semana despues del 1er. día".

Mortalidad Neonatal

Mortalidad del niño en las primeras cuatro semanas de vida; el denominador en esta tasa es el número de nacidos vivos (con cualquier manifestación de vida, aunque mueran inmediatamente después denacer). En el estudio decasos y controles, las muertes neonatalesincluyen las categorías "muertos en el 1er. día de vida","muertos en la primera semana despues del 1er. día", y "muertos en el 1er. mes despues de la primera semana".

Mortalidad Materna

Mortalidad de la madre durante el embarazo, parto o hasta los 40 dias posteriores al parto (o aborto), por causa asociada con el embarazo, parto o post-parto. el denominador para esta tasa (en realidad es un indice) es el número de nacimientos (porque no se puede medir el numero de embarazos o abortos).

Para aplicar estas definiciones, usamos los datos siguientes, que representan todos los nacimientos registrados durante 2 años en la totalidad del área de impacto de Inquisivi:

Nacimientos	639
Obitos	17
Mortinatos	15
Nacidos Vivos	607
Muertes en el 1er. día	19
Muertes en el 2o-7o día	15
Muertes en la 2a.-4a. semana	8
Muertes Maternas	9

Con estos datos, se calcula las tasas siguientes para el área de Inquisivi:

Mortalidad perinatal = 66/639 = 103/1000 nacidos no "vivos"

Mortalidad neonatal = 42/607 = 69/1000 nacidos si "vivos"

Mortalidad materna = 9/639 = 140/10000 nacidos no "vivos"

Los datos desglosados por sub-área dan las siguientes tasas:

Sub-Area

Inquisivi:	Mortalidad Perinatal	94/1000 nacidos
	Mortalidad Neonatal	38/1000 nacidos vivos
Circuata:	Mortalidad Perinatal	148/1000 nacidos
	Mortalidad Neonatal	96/1000 nacidos vivos
Licoma:	Mortalidad Perinatal	95/1000 nacidos
	Mortalidad Neonatal	63/1000 nacidos vivos

En la interpretación de estas tasas, es importante recordar que, en general, estos son datos basados en un sistema de registro de nacimientos y defunciones mucho mejor que la mayoria de aquellos existentes en muchos lugares de Bolivia o en otros paises en vias de desarrollo. Sin embargo, no

representan un proceso activo de búsqueda de nacidos y muertos (como en la encuesta de Demografía y Salud). Estas diferencias tienen que tomarse en cuenta en cualquier comparación que se haga entre estas tasas y tasas de otros lugares basados en otras metodologías. También se debe tomar en cuenta que en la sub-area de Licoma, la identificación de los casos (especialmente del 1er. año) se realizo a traves de una metodología de búsqueda activa, debido a la inexistencia de registros adecuados anteriores a 1990.

Tomando en cuenta estos comentarios, es pertinente presentar algunas observaciones. Primero, las tasas de mortalidad perinatal, neonatal y materna en el Area de impacto, son bastante altas según criterios internacionales. Segundo, la sub-area de Circuata (aunque no el el área más recientemente introducida al progrma de DJC) tiene tasas sustancialmente más altas que aquellas de las otras sub-áreas.

Un aspeto importante respecto a las tasas presentadas según las definiciones internacionales, es que son definiciones estadísticas que no están necesariamente orientadas hacia un enfoque operativo ó intervencionista. Sobre todo, la categoría de "mortalidad perinatal" incluye muertes intrauterinas de fetos afectados por problemas del embarazo (enfermedades hipertensivas, infecciones intrauterinas, traumatismos), tanto de infantes que mueren ó durante el trabajo de parto ó inmediatamente depues por causas relacionadas a problemas clínicamente obstétricos (problemas del trabajo de parto y su manejo inadecuado), como de niños que nacen sanos y fallecen debido a condiciones que afectan a los neonatos en la primera semana de vida (prematurez, infecciones, tétanos, etc.). Por eso, la categoría de "mortalidad perinatal" es "una ensalada" de problemas que no permiten el enfoque específico de intervenciones. Asimismo, al incluir a los niños que mueren en la primera semana de vida, la "mortalidad perinatal" tiene un traslapo importante con la "mortalidad neonatal".

Por estas razones, en el analisis de los datos del estudio, se ha aplicado una clasificación de la mortalidad que está más orientada hacia la identificación de áreas de intervención que está basada en categorías mutuamente exclusivas. Esta clasificación, y su relación con las sub-categorías del estudio y las categorías estadísticas internacionales, se presentan en el cuadro siguiente:

CATEGORIAS ESTADISTICAS	CATEGORIAS SUB-CATEGORIAS DE CASOS (FORMULARIO)	CATEGORIAS OPERATIVAS
Mortalidad Perinatal	Obitos	"Obitos" (factores perinatales)
	Mortinatos Muertos en 1er Día	"Mortinatos y muertos en el el 1er día" (factores relacionados con el trabajo de parto y su manejo)
Mortalidad Neonatal	Muertos en la semana después del 1er día Muertos en 1er mes después de la la semana	"Muertos Neonatales después del 1er Día" (Condiciones y enfermedades que afectan al recién nacido)
Mortalidad Materna	Mortalidad materna	"Mortalidad Materna"

Aplicando esta clasificación operativa, la mortalidad de los infantes casos que se indentificó en los dos años sujetos al estudio en el área de impacto de Inquisivi, tiene la siguiente distribución:

CATEGORIA	Número de Casos	Porcentaje de la Mortalidad Peri y Neonatal
Obitos (Factores perinatales)	17	23%
Mortinatos y Muertos en el Primer Día (factores de trabajo de parto)	34	46%
Muertos Neonatales después del Primer Día (problemas del RN)	23	31%
TOTAL	74	100%

El examen de esta distribución de mortalidades nos permite evaluar la contribución de varios grupos de factores, y ver con mayor claridad el impacto potencial de intervenciones orientadas a una u otra de las categorías de mortalidad.

En los siguientes análisis se considera solamente los casos de mortalidad peri y neonatal; la mortalidad materna no esta sujeta a analisis estadístico su análisis se presenta aparte.

2. Datos sobre las comunidades en que residen los casos y controles

Los siguientes son datos seleccionados que nos dan información relevante de las actividades de DJC y del desarrollo de intervenciones para la reducción de la mortalidad perinatal, neonatal y materna:

2.1. Indicadores de desarrollo comunitario

2.1.1. Presencia de organizaciones comunitarias

Organizaciones Comunitarias	Casos (n=74)	Controles (n=152)	Total
Sindicato	89%	75%	80%
Cooperativa	11%	14%	13%
Junta Vecinal	31%	38%	36%

La mayoría de las comunidades tienen organizaciones comunitarias. Su presencia no está asociada con un menor riesgo de convertirse en caso.

2.1.2. Servicios

Presencia en la Comunidad	Casos	Controles	Total
Escuelas	93%	90%	91%
Agua a domicilio (grifo)	43%	43%	43%

La gran mayoría de las comunidades en que viven los casos y controles, tienen escuela y un importante porcentaje tiene sistemas de agua con instalaciones domiciliarias. Sin embargo, estos indicadores no están asociados con un menor riesgo de ser caso. Se nota que, considerando a las familias de los casos controles (no las comunidades en que ellas viven), tampoco había asociación entre el hecho de que exista una instalación domiciliaria de agua y un menor riesgo de ser caso:

	Casos	Controles	Total
Agua en el domicilio de la familia	37%	40%	33%

2.1.3. Recursos de Salud

Presencia del recurso	Casos	Controles	Total
Promotor	33%	37%	39%
Partera empirica capacitada	74%	64%	45%
Partera empirica no capacitada	40%	47%	45%

Al contemplar la fase de intervención, se nota que prácticamente todas las comunidades cuentan con la presencia de un promotor y la mayoria de ellas con la presencia de una partera empírica capacitada. La participación de estas personas en el control prenatal y la atención de partos, se considerará más adelante. Sin embargo, es importante notar que la presencia de estas personas no ha estado asociada con menor riesgo de ser caso.

También es importante reconocer que estas personas fueron canales muy importantes para lograr comunicación con sus comunidades.

2.1.4. Organizaciones de mujeres

Presencia de Organización	Casos	Controles	Total
Club de madres	11%	20%	17%
Organizacion de mujeres	36%	30%	32%
Alguno de los dos	47%	50%	49%

La presencia de agrupaciones de mujeres en las comunidades es de interés especial, porque estas organizaciones están orientadas a lograr mejorar la situación de las mujeres de la counidad, principalmente aquellas de edad fértil. Sin embargo, estos datos demuestran que su presencia en la comunidad no ha estado asociada con un menor riesgo de mortalidad peri y neonatal.

Al examinar la participacion de las madres de los niños casos y controles, encontramos otro hallazgo de interes:

	Casos	Controles	Total
Participacion de las madres en alguna organización de mujeres	18%	19%	19%

Combinando estos datos con los datos sobre la presencia de alguna organización, se puede calcular una estimación de "cobertura" de estas organizaciones en la muestra de madres que tuvieron un embarazo/parto durante los dos años que están representados en el estudio.

	Casos	Controles	Total
a. % de madres que participan en organizaciones de mujeres	18%	19%	19%
b. % de comunidades de estas madres c/organizaciones de mujeres	47%	50%	49%
c. "cobertura" de las organizaciones de mujeres (a % b)	38%	38%	38%

Estos datos nos sugieren las siguientes conclusiones:

En los dos años sujetos al estudio,

- Ni la presencia de una organización de mujeres, ni la participación directa de una mujer en una de estas organizaiones, estuvieron asociadas con riesgos menores de tener un bebé que sea caso de mortalidad peri o neonatal.

- La cobertura de estas mujeres que han tenido embarazos y partos en los dos años comprendidos en el estudio, es regular.

Este analisis sugiere varias posibilidades de intervención:

- aumentar la cobertura de los grupos de mujeres y su efectividad como medio de enfrentar el riesgo de mortalidad perinatal, neonatal y materna;

- buscar otros canales para conversar con mujeres de edad fértil.

2.2 Otras Características de las Comunidades

Estos datos se desarrollaron de una manera estandarizada para evaluar la "distancia" (medida en horas) para llegar del hogar de la familia a un centro donde hay algún servicio de salud.

Tiempo para llegar a un Centro	Casos	Controles	Total
2 horas a pie	59%	59%	59%
1 hora en movilidad	79%	83%	82%

Es importante notar que, por sí mismo, el tiempo para llegar a un centro no era diferente entre casos y controles, y por eso se deduce que no está asociado con el riesgo de ser caso.

También es importante considerar las implicaciones de estos datos en la intervención: una vez que una familia detecte un problema, la intervención tiene que decidir específicamente que hacer. Si más del 40% de las familias viven por lo menos a 2 horas de distancia de un centro y si (como frecuentemente sucede) mandan a una persona para buscar ayuda, le tomará dos horas o más para llegar, un tiempo no determinado para encontrar ayuda, 2 horas de regreso y después probablemente 3 o más horas para llevar a la paciente a los servicios (porque la gran mayoría de las complicaciones potencialmente letales no se pueden tratar en la casa). Estas 7 o más horas pueden hacer toda la diferencia entre la vida y la muerte de una madre o un bebé.

Por esta razón, la intervención debe instruir a las familias que, al identificar una complicaion específica, deben llevar a las pacientes a un centro y NO mandar a alguien para buscar ayuda. Es posible mandar a alguien para avisar que hay un problema o para buscar movilidad pero siempre mientras alguien más traslada a la paciente hacia el Centro.

2.2.2. Tamaño de la Comunidad

Se calculó un índice de mortalidad peri y neonatal basado en los datos de los casos sobre población estimada de su comunidad. Este índice se presenta a continuación:

Tamaño estimado de la comunidad (Número de Hab.)	Estimación de Habitantes en Total	Número de muertos	Indice de Mortalidad (Muertes/ Habitantes)
< 100	1.287	13	0.010
100 - 199	3.300	22	0.007
200 - 499	10.500	30	0.003
> 500	4.500	9	0.002

Estos índices indican un mayor riesgo en las comunidades más pequeñas, independientemente de la distancia a servicios de salud.

Sin embargo, se debe notar que aunque las comunidades más pequeñas tienen mayor riesgo, el mayor número registrado de muertes no ocurre en estas comunidades, sino en las comunidades mas grandes.

3. Datos sobre las Familias de los Casos y Controles

3.1. Número de familias y personas en la vivienda

Familias en la vivienda	Casos	Controles	Total
1	73%	74%	74%
2	22%	21%	21%
> 2	5%	5%	5%

Número de personas en la familia (promedio)	Casos	Controles	Total
	5.9	5.9	5.9

Estos datos nos demuestran que las familias de los casos son comparables con aquellas de los controles con respecto a estas características.

3.2. Indicadores Socio-Económicos

Indicadores	Casos	Controles	Total
Piso de tierra	94%	82%	88%
Tenencia de tierras:			
- Propietario	76%	61%	66%
- Dependiente	20%	25%	23%
Ocupación del padre:			
- Agricultor	83%	82%	82%
- Comerciante	11%	18%	14%
Producción de:			
- Granos	82%	78%	80%
- Hortalizas	49%	55%	53%
- Tubérculos	92%	83%	86%
- Frutas	78%	73%	75%
- Forraje	23%	7%	12%
Venta de:			
- Granos	46%	35%	39%
- Hortalizas	19%	30%	26%
- Tubérculos	45%	44%	44%
- Frutas	65%	62%	63%
- Forraje	1%	4%	3%
El padre pertenece a:			
- Sindicato	70%	60%	63%
- Junta Vecinal	19%	34%	29%
- Cooperativa	4%	12%	10%
- Crédito	8%	14%	12.9%
El padre:			
- no es analfabeto	94%	94%	94%
Tiene:			
- instrucción básica	80%	56%	64%
- instrucción > intermedia	16S	36%	29%
- habla castellano	91%	94%	93%

Los datos sobre las familias sugieren que las familias de los casos son por lo menos comparables con las de los controles con relacion a indicadores económicos. Los padres de los controles tienden a participar más en actividades comunitarias diferentes de los sindicatos (en los que los padres de los casos participan más) y tienden a tener instrucción más avanzada (más que basica). Sin embargo, la gran mayoria de los padres, en ambos grupos, han recibido educación formal, saben leer y hablan castellano.

Estos hallazgos, junto con los datos sobre la participación del padre en el trabajo de parto, pueden sugerir canales importantes de comunicación con las familias.

Un comentario mas general, es que, a pesar de los indicadores realmente impresionantes sobre el desarrollo de las comunidades y las familias en el área de Inquisivi, este desarrollo general no parece asociado con la disminución del riesgo de la mortalidad peri y neonatal, y las tasas de esta mortalidad son bastante altas.

Esta observación tiene implicaciones muy importantes para DJC: implica que, para tener impacto en las altas tasas de mortalidad perinatal, neonatal y materna, se necesitaran intervenciones especificas enfocadas en las causas especificas de esta mortalidad.

4. Características y antecedentes Obstétricos de las Madres

4.1. Características Generales de la Madres

Ocupación	Casos	Controles	Total
- Labores domesticas	100%	97%	98%
- Colabora en la Chacra	58%	63%	61%
- Artesania	28%	26%	27%
- Comercio	11%	11%	11%

En términos de trabajo y responsabilidades, los dos grupos de madres son bastante similares.

	Casos	Controles	Total
La madre es analfabeta	27%	12%	17%
	(X^2 = 5.026; p = 0.025)		
Instrucción:			
- ninguna	24%	10%	14%
- básica	66%	66%	66%
- ≥ intermedia	10%	24%	20%
	(X^2 = 12.42 [2 grados de libertad]; p = 0.002)		
No habla español:	15%	4%	7%
	(X^2 = 7.03, 15% p < 0.01)		

Estos datos nos muestran ciertas características de las madres que estan asociadas con el riesgo de mortalidad peri y neonatal de sus niños. Las madres sin instrucción formal, analfabetas y/o que no hablan castellano, estan en mayor riesgo. Aunque un análisis final de la asociacion entre estas variables sería útil, es seguro que estan inter-relacionadas.

Estos hallazgos tienen implicaciones obvias para la intervencion, pero tambien se debe reconocer las limitaciones de estas implicaciones. Es cierto que las madres analfabetas, sin instruccion o que no hablan castellano, estan en mayor riesgo de mortalidad peri y neonatal.

Por eso, el desarrollo de medios de informacion y los mensajes de la intervencion deben tomar en cuenta la importancia de llegar a estas mujeres.

Sin embargo, se debe reconocer que, de las madres de niños casos, el 73% saben leer 76%, tienen instruccion básica o más que básica, y el 85% hablan castellano. Por lo tanto, la importancia de incluir a las madres con estas caracteristicas no debe sobrepasar la importancia de desarrollar una intervencion que sea pertinente a las demas madres, entre ellas la mayor parte de las muertes ocurren (en la epidemiologia tales caracteristicas enfatizan la diferencia entre los factores de riesgo y el riesgo atribuible a un fator [básicamente la proporcion del evento se eliminará si el efecto del factor se elimina]).

Estado Civil de la Madre	Casos	Controles	Total
Unida o casada	81%	90%	87%
Soltera	18%	9%	12%

(X^2 = 2.560; p = 0.10)

A pesar del pequeño número de madres solteras (un total de 27 entre los casos y controles), se demuestra una tendencia estadística de mayor riesgo entre estas madres.

Edad de la Madre	Casos	Controles	Total
< 17 años ("joven")	10%	5%	7%
18-34 años ("ideal")	65%	76%	73%
> 35 años ("vieja")	25%	19%	21%

Se ve una tendencia de mayor porcentaje de madres de casos que están fuera de la edad considerada "ideal". Examinando esta tendencia estadisticamente, con las categorias "ideal" versus "riesgo" ("joven" o "vieja"), tenemos los siguientes datos:

Categoria de Edad Materna	Casos	Controles	Total
"Ideal"	65%	76%	73%
"Riesgo"	35%	24%	27%

(X^2 = 2.206; p =0.15 [no significativo])

Este cuadro nos muestra que, con el número de madres estudiado, no existe una asociación significativa entre la edad de la madre y el riesgo de la mortalidad peri y neonatal. Sin embargo, la tendencia existe y podría ser que con mayor número de madres esta tendencia se demuestre significativa. Una vez más, tenemos que notar que dos terceras partes de los casos ocurren en madres consideradas en edad "ideal".

Se realizó un examen de la posibilidad de que la edad de la madre estaba mas asociada con una de las sub-categorias de mortalidad:

Categoria de Edad de la Madre	Obitos (n = 17)	Mortinatos y 1er Día (n = 34)	Neonatal >1er Día (n = 29)
= "Riesgo"	44%	30%	35%

Con los números relativamente pequeños de cada sub-categoria, estas proporciones no demostraron diferencias significativas ni tendencias importantes.

4.2. Antecedentes Obstétricos de las Madres

Número de Embarazos Anteriores	Casos	Controles	Total
0 (primagesta)	19%	17%	17%
1-3	27%	39%	35%
4-6	28%	29%	29%
> 7	26%	15%	19%

En esta población, los bebés de primagestas no tenían mayor riesgo de mortalidad peri y neonatal. Desglosado por sub-categorias de mortalidad, se encontró una tendencia de asociación entre las primagestas y la mortalidad intraparto en el primer día, relacionada con problemas obstétricos (26% de los casos en esta categoría eran bebés de madres primagestas, en comparación con un 12% de casos "óbitos" y 13% de casos de mortalidad neonatal despues del primer día).

El examen de otros antecedentes obstétricos debía considerar solamente a aquellas madres que habian tenido > 1 embarazo anterior al embarazo sujeto del estudio.

Es por eso que, en este análisis de antecedentes obstétricos, se excluye a las primagestas, analizando solamente a las madres multigestas de los casos (n = 60) y de los controles (n = 126).

Antecedentes	Casos	Controles	Total
1 Aborto	17%	7%	10%
	(X^2 = 2.582; p = 0.10)		
1 Nacido muerto	25%	10%	15%
	(X^2 = 5.200; p = 0.03)		
1 Prematuro	10%	4%	6%
1 Niño de bajo peso (estimacion de la madre)	18%	16%	16%
1 Malpresentación	7%	4%	5%
1 Cesárea	3%	2%	2%
1 Muerto neonatal	38%	16%	25%
	(X^2 = 7.223; p = < 0.01)		
Muerto entre 2-11 meses	15%	18%	17%
Muerto > 1 año	32%	23%	29%
Intervalo entre partos:			
< 15 meses	0	12%	8%
< 18 meses	8%	16%	13%
< 24 meses	36%	38%	37%

Varios puntos importantes salen de este analisis. Uno de los mas importantes es que en esta población ciertos antecedentes obstétricos están significativamente asociados con un mayor riesgo. De estos, los factores más influyentes son el antecedente ee un niño nacido muerto o de un muerto neonatal. Las madres con estas características merecen especial atención. Los datos de este estudio de casos y controles no permite el cálculo del valor predictivo de estas características. Sin embargo, puesto que el programa está apenas comenzando con sus intervenciones, vale la pena educar a la comunidad y al personal de salud sobre estas características. No obstante, no se debe olvidar que una importante proporción de muertes ocurre en madres que no tienen estas características.

Otro aspecto importante de estas características, es que, aunque estén asociadas con un mayor riesgo, la mayor parte de las familias y de las madres no han experimentado directamente las complicaciones representadas por estos antecedentes. Por tanto, una familia no tendrá necesariamente la base para reconocer el riesgo de estos eventos. Aún así, los datos indican que en las comunidades sí existe una base de experiencia entre las madres. Por lo tanto, la intervención debe buscar una manera de aprovechar la experiencia de la comunidad para informar a

todas las madres, familias y personal de salud, sobre el riesgo de estas condiciones.

5. Atención y Problemas durante el Embarazo

5.1. Control Prenatal

	Casos	Controles	Total
"Adecuado" (médico, puesto médico, sanitario, posta sanitaria, supervisor, promotor, o partera capacitada)	34%	45%	41%
"Inadecuado" (partera no capacitada, otro)	12%	3%	6%
Ninguno	54%	51%	52%

Estos datos nos demuestran que menos de la mitad de las madres tienen algún control prenatal por una fuente de evaluación "adecuada". La diferencia entre casos y controles en esta proporción no es significativa.

Cuando se preguntó a las madres "Qué piensa Ud. del control prenatal?" solo el 54% de las madres pudieron opinar. Sin embargo, de estas madres, el 96% tuvieron una opinión positiva acerca del control prenatal. Este resultado parece ser la base de un incremento de la cobertura del control prenatal entre esta población.

Vale la pena notar que, en este momento, la participación de las parteras (capacitadas o no capacitadas) en el control prenatal no es tan importante, aunque están presentes en la mayoría de las comunidades. Solamente el 13% de las madres del estudio tuvieron algún control realizado por una partera. La fuente más importante de control prenatal es el supervisor de campo, casi un 20% de las madres acudieron al control prenatal realizado por el supervisor.

5.2. Medicamentos e Inmunización

Uso de medicamentos:	Casos	Controles	Total
- hierro	15%	16%	16%
- vitaminas	10%	12%	11%
- otros	1%	6%	4%
- mates	14%	10%	11%

Dósis de Vacuna Anti-Tetanica (Total antes y durante este embarazo)	Casos	Controles	Total
- 0	27%	28%	28%
- 1	27%	20%	22%
- 2	46%	52%	50%

La mitad de las madres fueron debidamente vacunadas contra el tétanos; un 48% habia recibido por lo menos una dósis durante este embarazo. Aparentemente, esta cobertura es el resultado de campañas organizadas por D.J.C.

La ausencia de inmunización contra el tétanos, o un número inadecuado de dósis, no estaba asociado con un mayor riesgo de mortalidad peri y neonatal. Tampoco se demostró tendencias de asociación de la ausencia o inadecuacion de esta inmunización con sub-categorias de mortalidad (47% de los "óbitos", 58% de los "mortinatos" o muertos en el primer día, y 52% de los "muertos neonatales después del 1er día", o no recibieron ni una dósis o recibieron una sola dósis de TT).

5.3. Otras prácticas durante el embarazo

Práctica	Casos	Controles	Total
Manteo	43%	40%	41%
Sobado	50%	45%	47%
Rotacion del feto	26%	15%	18%
Intento de aborto	7%	7%	7%

La práctica de manteo, según informe del personal de campo, no es violento, sino suave; es como estar en una hamaca. Esta practica, al igual que el sobado, están percibidas por las madres como beneficiosas para ellas. La falta de asociación con el riesgo, sugiere que estos elementos de atención prenatal tradicional deben preservarse.

Existe un exceso de intentos de hacer rotar al feto; la diferencia, en proporción, entre casos y controles no es significativa, pero existe una tendencia estadistica.

El intento de aborto, segun informe de las mismas madres, es relativamente comun: 7% en ambos grupos. Las formas más comunes reportadas por las madres, son el uso de mates supuestamente oxitocicos y excesivo esfuerzo físico (cargando peso, brincando). Dos madres de controles reportaron haber recibido medicamentos o inyecciones. Ninguna madre reporto un intento de aborto por introduccion de algún objeto en el útero.

5.4. Problemas durante el embarazo

Problemas	Casos	Controles	Total
Hemorragia	13%	7%	10%
	(X^2 = 5.432; p = 0.02)		
Hinchazón (cara y manos-3er trimestre)	16%	18%	17%
Dolor de cabeza constante (3er trimestre)	32%	21%	25%
	(X^2 = 2.472; p = 0.13)		
Síntomas de infección urinaria	7%	9%	8%
Convulsiones	4%	3%	3%
Fiebre	16%	8%	11%

La presencia de sangrado en algún momento durante el embarazo estuvo significativamente asociada con riesgo de mortalidad peri y neonatal.

Los demás síntomas no estaban asociados con un mayor riesgo, aunque un síntoma que probablemente esté relacionado con la pre-eclampsia (dolor de cabeza constante en el tercer trimestre del embarazo) manifestó una tendencia a tal asociación. Esta observación asume mayor importancia cuando se toma en cuenta el hecho de que un 3% de los embarazos, o sea 8 madres, había convulsiones. Las entrevistas del personal de campo confirmaron estos informes e identificaron que una de las madres sufría de epilepsia. Las otras siete , aparentemente, sufrían de una enfermedad hipertensiva grave asociada con sus embarazos. Este porcentaje de eclampsia franca sugiere la posibilidad de una prevalencia significativa de pre-eclampsia entre esta población. Los resultados merecen una investigación en más profundidad sobre la prevalencia de la hipertensión de esta gente durante el embarazo.

También se concontró otros problemas relativamente frecuentes, aunque no asociados con el riesgo de mortalidad. La intervención debe tomar en cuenta la prevalencia de estos problemas, para ofrecer a las madres tratamientos apropiados para los problemas que ellas padecen con mas frecuencia.

6. Atención y Prácticas durante el parto

6.1. Personas que participan en el nacimiento

Familiares presentes en el momento del Nacimiento	Casos	Controles	Total
Madre (de la mujer)	21%	20%	20%
Padre (de la mujer)	6%	8%	8%
Suegra	11%	13%	12%
Suegro	7%	4%	5%
Esposo	70%	82%	78%

Estos datos identifican dos grupos muy importantes que deben ser tomados en cuenta al desarrollar la intervencion. Mayormente es el esposo el que está presente en el momento del nacimiento, aproximadamente un 80%. Los datos sobre el trabajo de parto también indican que el padre es la persona que con más frecuencia atiende el trabajo de parto. Parecería que la adecuada información a los esposos puede jugar un rol muy importante en la detección de problemas en el embarazo y parto. Las abuelas también están frecuentemente presentes en ese momento y pueden representar una "audiencia secundaria" también importante, dependiendo de su inclinación a aceptar nueva información.

Quién atendió el Parto?	Casos	Controles	Total
Partera	22%	24%	23%
Madre (de la mujer)	15%	12%	13%
Suegra	4%	4%	4%
Esposo	40%	38%	38%
Enfermera/auxiliar	5%	9%	7%
Médico	4%	6%	5%
Promotor	1%	2%	1%
Otro	7%	9%	8%
Ninguno	3%	< 1%	1%

Una vez mas se ve la importancia del esposo y los familiares en la atencion de los partos. La partera atiende menos de la cuarta parte de los partos, segun las madres.

Lugar de nacimiento	Casos	Controles	Total
Casa	90%	96%	94%
Casa de la abuela	5%	1%	2%
Puesto médico	0	3%	2%
Otro	5%	1%	2%

6.2. Prácticas de Atención del Trabajo de Parto y del Parto

Práctica o Tratamiento	Casos	Controles	Total
Manteo	40%	51%	48%
Sobado	48%	53%	51%
Faja	53%	47%	49%
"Poner el feto en posición"	28%	19%	22%
Exámen Vaginal	11%	15%	13%
Mates	62%	70%	67%
"Pujantes": tabletas	10%	9%	9%
inyección:			
Pituitina	1%	3%	3%
Metergín	0	3%	2%
No sabe qué	0	3%	2%

Estos datos nos dan información útil sobre las prácticas de atención de parto en esta población. La mayoría de las madres fueron tratadas con manteo, sobado y faja; según información del personal de campo, estas prácticas -con algunas excepciones- se realizan en forma suave, no violenta y no se muestran asociadas con mayor riesgo. También la mayor parte de las madres, tomó varios mates durante el trabajo de parto, que tampoco están asociados con el riesgo.

Los exámenes vaginales se realizan prácticamente solo en partos atendidos por médicos, enfermeras o auxiliares; no es común entre las parteras o familiares que atienden partos.

Una práctica que puede ser preocupante es aquella de "poner en posición al feto". Según informe de una partera, ésto no se hace con fuerza, es sólo para dar confianza a la madre. Hacerlo con fuerza, no solo que es prácticamente imposible cambiar la posición de un bebé durante el trabajo de parto, sino que también puede representar un peligro para la madre (muerte materna) y para el bebé.

El uso de medicamentos todavía no es muy prevaleciente. Lo mismo ocurre con las inyecciones, su prevalencia es muy poca, y más en controles (que usaron más serivicos médicos para atención de parto). Esta práctica, en este momento, no tiene que ser un enfoque muy importante de la intervención, pero debe mencionarse y vigilar que su prevalencia no aumente.

6.3. Características y Problemas del Trabajo de Parto y del Parto

Duración del Trabajo de Parto	Casos	Controles	Total
6 horas	30%	47%	41%
7-12 horas	32%	30%	31%
12 horas	38%	23%	28%

(X^2 = 7.48 [2 grados de libertad]; p = 0.02)

Este cuadro muestra una tendencia significativa de asociación de los casos con trabajos de parto mas prolongados. Este analisis no toma en cuenta el hecho de que las primagestas tienden a tener trabajos de parto mas largos; sin embargo, se debe recordar que el hecho de ser primagesta no estaba asociado con mayor riesgo.

Por estas razones, la asociación del trabajo de parto prolongado con el riesgo de mortalidad peri y neonatal, parece ser independiente de la gravedad de la madre. El trabajo de parto de duración mayor a 12 horas, se ve más frecuentemente en la sub-categoría de mortalidad intraparto y en el primer día (44%) que en los óbitos (35%) o las muertes neonatales después del 1er día (30%).

Duracion de Ruptura de Membranas	Casos	Controles	Total
En el parto	58%	71%	67%
12 horas	28%	23%	21%
12 horas	14%	6%	8%

Se demostró una tendencia de asociación de ruptura de membranas mayor a 12 horas con el riesgo de ser caso. Con las pequeñas cifras disponibles, esta tendencia no resultó estadísticamente significativa.
(X^2 = 2.367; p = 0.14)

Problemas del Trabajo de Parto	Casos	Controles	Total
Malpresentacion	13%	4%	6%
	(X^2 = 4.433; p = < 0.05)		
Hemorragia	15%	0%	5%
	(X^2 = 21.259; p = < 0.001)		
Fiebre materna	11%	0%	4%
	(X^2 = 14.432; p < 0.001)		
Circular del Cordón	9%	7%	7%
Prolapso del Cordon	1%	0%	1%
Meconio	7%	1%	3%
Convulsiones	0%	2%	1%

Estos datos nos demuestran la asociación significativa de algunos problemas obstétricos con la mortalidad peri y neonatal. La hemorragia intrapartum y la fiebre materna, se asocian principalmente con mortalidad del niño durante el trabajo de parto o en el primer día; 2 casos de hemorragia y 2 de fiebre materna fueron identificados entre los óbitos y en igual número entre mortalidad neonatal después del primer día.

La categoria de malpresentaciones incluye presentaciones podálicas (la mas frecuente, formando dos terceras partes de las malpresentaciones), transversas, y complejas (con prolapso de miembro, más frecuentemente de pierna).

Las tasas de letalidad debido a estas complicaciones, se pueden estimar, proyectando los datos de la muestra de controles hacia la población total de controles (multiplicando el número de eventos en la muestra de controles por el factor 3.65, reconociendo que la muestra representa una muestra de 27% de la población total de controles [1/0.27 = 3.65]). Con estos cálculos llegamos a los siguientes resultados:

Problemas	Número estimado de eventos	Número de eventos resultados en Niños Casos	Letalidad estimada por evento
Ruptura de membrana >12 horas	43	10	0.23
Malpresentación	30	8	0.27
Hemorragia Intrapartum	42	9	0.21
Fiebre materna	15	8	0.53
Prolapso del Cordón	1	1	1.00

Estas tasas estimadas de letalidad, sugieren que en las complicaciones más comunes, entre 1 de cada 5 y 1 de cada 2 frecuencias van a resultar en mortalidad peri o neonatal.

La falta de reconomimiento y respuesta adecuada a estas complicaciones del trabajo de parto, contribuyen significativamente a la mortalidad peri y neonatal: más de la mitad de las muertes intrapartum y en el primer día, están asociadas con una de estas complicaciones.

Otro factor que puede haber contribuído a la mortalidad perinatal relacionada con el parto, es la falta de conocimiento sobre el manejo adecuado de trabajo de parto y del parto: mas del 10% de los niños aparentemente vivos al iniciarse el trabajo de parto nacieron con signos de traumatismo durante el trabajo de parto (moretes, magulladuras, fracturas o lesiones traumáticas). Este hallazgo indica un práctica de obstetricia básica que es, sin resultar sorprendente, muy deficiente, pues en la mayoría de los casos se trata de familiares no muy experimentados y con conocimientos puramente empíricos.

Estos hallazgos sugieren también que hay un amplio campo para mejoramiento e impacto positivo.

7. ATENCION INMEDIATA POST-NATAL - MADRE

Duración del Alumbramiento	Casos	Controles	Total
< 1 hora	77%	88%	85%
> 1 hora	23%	12%	15%

Qué hicieron en caso de retención de placenta (entre aquellos casos con este problema)?

	Total
Halar el cordón	3%
Soplar/toser/provocar nauseas	17%
Intento de extraer	5%
Otro	22%
Nada	48%

Hemorragia Post-Parto	Casos	Controles	Total
"Ninguno"	42%	28%	33%
"Poco"	45%	52%	50%
"Mucho"	13%	20%	18%

Qué hicieron para controlar la hemorragia (si había mucha)?

	Total
Masaje del abdómen	20%
Estimular pezones	6%
Administraron Metergin	12%
Otro	17%

8. ATENCION AL RECIEN NACIDO

(En este analisis, por el efecto distorcionado de los niños nacidos muertos en la evaluación de las practicas de atención al recién nacido, se describe solamente las prácticas en los niños controles)

Atención al Recién Nacido el momento del Nacimiento	Controles
Inmediatamente	33%
Despues de la salida de la placenta	64%

Parece común que el recien nacido no reciba atención hasta después del alumbramiento. Esta practica obviamente expone al recién nacido al peligro de enfermarse o de no recibir la atención necesaria si hay algún problema.

Cuidado del Cordón	Controles
Cuando lo cortaron?	
- inmediatamente	25%
- antes de que salió la placenta	14%
- después de que salió placenta	59%
Qué usaron para ligar?	
- hilo	87%
- cayto	8%
- otro	5%
Cómo desinfectaron?	
- alcohol	31%
- lavaron	5%
- hirvieron	1%
- nada	62%
Qué usaron para cortar?	
- juk'illa	11%
- vidrio roto	9%
- navaja	8%
- tijera	69%
Cómo desinfectaron?	
- alcohol	32%
- lavaron	17%
- hirvieron	6%
- limpiaron con un trapo	10%
- nada	30%

Estos datos demuestran una deficiencia importante en el cuidado del cordón del recién nacido: el niño se queda frecuentemente hasta que sale la placenta sin que le liguen el cordón, y la manera de cortarlo y ligarlo generalmente es anti-higiénica. Dada la importancia de las infecciones neonatales y el tétanos en la morbi-mortalidad de los RN, esta práctica inadecuada puede contribuir al riesgo de estas enfermedades. Esta debe ser un area de intervención.

El hecho de que haya la intención de desinfectar los materiales (aunque inadecuadamente) sugiere que ya hay una base en los conceptos de la población para introducir prácticas higiénicas que deben ser sencillas y factibles para ellos.

Cuidados al RN	Controles
Aspirar de flemas	29%
Bañarlo	89%
Abrigarlo	88%
Ponerlo al lado de la madre	79%

Lactancia	Controles
Dió calostro	49%
Dió de mamar:	
inmediatamente	25%
en el 1er día	40%
en el 2o día	22%
Dejo de amamantar en el primer mes	17%

La mitad de los RN's no recibieron calostro. Un porcentaje bajo de RN's controles (no enfermos) se pusieron al pecho de la madre inmediatamente; sin embargo, practicamente todos los bebés recibieron lactancia materna en el primer ó segundo día de la vida. La encuesta no determinó porqué 17% de madres de niños controles reportaron de haber dejado de amamantar a su niño durante el primer mes. Este dato debe verificarse, y si es verdad, las razones por esta practica dañina deben ser identificadas.

8. EVALUACION DE LAS CONDICIONES ASOCIADAS Y CAUSAS DE MORTALIDAD

La evaluación siguiente está basada en una revisión de la historia de cada caso (antecedentes de la madre, historia del embarazo, parto y post-parto en forma adecuada) y los datos y narrativas de las autopsias verbales.

8.1. Obitos Fetales (n = 15)

Condiciones asociadas	Número
Síntomas de enfermedad hipertensiva	3
Epilepsia no controlada	1
Trauma fuerte (sin movimiento fetal después)	5
Muerte materna (el niño no nació)	2
Ninguna	4

Entre las madres de los obitos fetales, 3 tuvieron síntomas persistentes de enfermedad hipertensiva en el 3er trimestre; si esta enfermedad en realidad estaba presente y si contribuía a la mortalidad del feto, no se puede determinar. En 5 casos había historia de trauma fuerte y la señora no sintió más movimiento fetal después del trauma. Algunos casos fueron accidentales, pero hubo un intento de aborto y otra

madre soltera recibió golpes de sus familiares porque no deseaban ese embarazo. Una señora recibió un golpe a causa de un rayo (descarga eléctrica), ella sobrevivio pero el feto no.

8.2. Muertes intrapartum en el 1er Día de vida (n = 34)

Causas Generales	Número
- Asfixia	18
- Asfixia y/o trauma	6
- Hemorragia intrapartum	3
- Descuido/enfriamiento	3
- Amnionitis	1
- Ninguna probable causa identificada	3

Estos diagnosticos estan, como todo diagnóstico retrospectivo, limitado por la ausencia de observación directa. Sin embargo, la calidad de la información recogida por los encuestadores parece igual a la de un estudio similar que se realiza en Guatemala, donde un estudio prospectivo verificó la validez de tales diagnósticos retrospectivos. Se nota que la mayoría de los niños muertos por causas obstétricas (en las cuales se verificó la presencia de movimiento fetal inmediatamente antes del inicio del trabajo de parto) recibieron el diagnóstico de asfixia; estos niños o nacieron sin señales de vida o nacieron deprimidos y no se recuperaron. En estos últimos casos, la falta de estimulación o resucitación podía haber resultado en pérdida de la oportunidad de salvar a estos niños.

El diagnóstico "asfixia y/o trauma" se asigno solamente a aquellos bebés que nacieron con señales físicas de trauma o con una historia clínica de maniobras muy fuertes.

Condiciones Asociadas con la Mortalidad Intrapartum/1er Día	Número
Malpresentación sola	5
con prematurez	1
Trabajo de parto prolongado (TPP) solo	5
TPP-con prematurez	2
TPP-con amnionitis	1
TPP-con trauma por maniobras	2
Hemorragia intraparto:	
por placenta previa	1
por separación de la placenta	2
Falta de atención, enfriamiento	2
Descuido intencional	1
Amnionitis, con trauma	1
Tamaño del bebé mayor al normal	1
Gemelos	2
Circular múltiple del cordón	1
Prematurez solo	1

Ademas de estas condiciones, habia 5 casos de asfixia y asfixia con signos de trauma que no tuvieron una condición de predisposicion.

Este listado nos permite enfocar los problemas aparentemente asociados con más frecuencia a la mortalidad infantil relacionada con el trabajo de parto y el parto. Estos son la malpresentación, el trabajo de parto prolongado, la hemorragia, la infección del niño y/o la madre en el momento de nacer (con factores predisponentes de prolongación de membranas ó infección [fiebre] materna al momento del trabajo de parto), y la falta de atención inmediata al recien nacido.

8.3. Muertes neonatales después del 1er día (n = 23)

	Número
Sepsis	4
Sepsis más deformidad	1
Sepsis y/o neumonía	2
Neumonía	3
Tétanos	3
Tétanos o Sepsis	1
Hemorragia (bajo peso al nacer, asociado con sepsis?)	4
Muerte súbita	1
Niño no deseado; descuido/ infanticidio?	2
Labio leporino con inanición	1
Diarrea persistente	1

Estos datos indican la probable importancia de enfermedades infecciosas del RN en la mortalidad perinatal. Se observó el tétanos principalmente en las comunidades ubicadas a menor altura. En dos casos hubo historias de un bebé no deseado, problemas de paternidad y mortalidad no explicable del bebé.

La detección y respuesta inmediata a síntomas tempranos de sepsis o neumonia en el RN se ha hecho efectiva en la reducción de la mortalidad neonatal en otras poblaciones parecidas.

La prevención del tétanos siempre es importante y por medio de inmunización y promoción de buenos hábitos de higiente en la atención al cordón umbilical del RN.

9. MORTALIDAD MATERNA

Para el número pequeño de casos y porque los problemas asociados con esta mortalidad pueden ser distintos a ellos asociados con la mortalidad peri y neonatal, aquí se presenta un análisis breve descriptivo de estos casos.

9.1 **Características de las madres casos.**

Entre las distintas características de estas madres, había una que era claramente diferente de aquélla de la mayoría de mujeres en el estudio: la edad de los casos. Los casos tenían una edad mayor a la mayoría de madres, con un rango entre 30 y 43 años; el promedio de edad de los casos de mortalidad materna era de 38 años, y el mediano de 40 años.

9.2 **Momento de fallecimiento (datos de 8 casos).**

Embarazo	3
Parto	2
Puerperium:	
-inmediato	2
-mediato	0
-tarde	1

9.3 **Diagnóstico (causa probable).**

Sepsis asociada con muerte fetal intrauterina	3
Sepsis puerperal	1
Hemorragia 2° retención de placenta (1 caso con atonía uterina)	2
Malpresentación, parto prolongado	1
Hemorragia durante el embarazo (separación de la placenta)	1

Revisión de estas causas otra vez indica el nivel muy bajo de conocimientos y atención obstétricos de que dispone esta población. Los 3 casos de muertes fetales intrauterina llaman mucho la atención: cada una de esta mujeres cargaron por una semana ó más un feto que ella y su familia reconocía como probablemente muerto, sin tomar acción, hasta que la madre sufrió infección y falleció.

10. DIAGNOSTICO DEL PROCESO

El Diagnóstico del Proceso se basó en un modelo de detección del problema, toma de decisión, busqueda de atención (clasificada como "adecuada" para resolver el problema que llevó al caso a la muerte, versus la "inadecuada"), el proceso de llegar y encontrar esta atención y la respuesta de los servicios. Este diagnóstico se aplicó solamente a los casos.

El estado actual del proceso en Inquisivi se define básicamente en los cuadros siguientes:

En que momento se Detectó el Problema"	Número
En el momento adecuado	27%
Tardiamente	30%
No se dió cuenta	25%
No se le dió importancia	16%

Este cuadro indica que solamente en uno de cuatro eventos que resultaron en muerte, la familia detectó el probellema en el momento "adecuado" (definido como el momento de la aparición de los síntomas que señalaron el peligro de muerte); 30% detectaron el problema cuando ya era tarde, y en muchos casos prácticamente ya el momento en que la paciente se moría. En un 41% de los casos o no reconocieron el problema o pensaron que no era importante.

Desglosando estos datos por sub-categorías de mortalidad, se encuentra que había una tendencia a reconocer tempranamente el problema más en los casos de neonatos (45%) y muertes maternas (38%) que en casos que resultaron en mortinatos o muertos en el 1er día (22%). Esto sugiere una vez más que los conocimientos sobre problemas de trabajo de parto y parto son muy limitados en esta población.

En general, el paso de reconocimiento de los problemas que resultaron en la mortalidad, fue muy deficiente.

Para aquellas familias que tomaron alguna acción (ya sea en el momento adecuado o cuando era tarde), el siguiente cuadro presenta la manera en que ellos intentaron manejar este problema.

"Qué hicieron cuando detectaron el problema"	Porcentaje
Buscaron atención "adecuada"	29%
Buscaron atención "inadecuada"	12%
Trataron de curar en casa	44%
Otro	15%

De las familias que reaccionaron frente al problema, la respuesta más común fue la de tratar con remedios caseros en la casa. Menos de una tercera parte de aquellas familiar que reaccionaron, buscaron servicios supuestamente adecuados para resolver la situación.

Este diagnóstico tienen implicaciones importantes para el programa: sugiere que hay deficiencias básicas en el reconocimiento de problemas potencialmente letales de los embarazos, partos, recién nacidos, y puérperas en esta población. También indica que la población no tiene bien definida cuál es la respuesta adecuada para tomar decisiones cuando ocurren estos problemas.

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Estos hallazgos sirven para informar al proceso de intervención, que aparentemente tendría que contener elementos muy fuertes de información, educación y comunicación con la población sobre estos aspectos.

Sin embargo, es importante en este momento mirar hacia el futuro y considerar los otros pasos en el proceso de recibir atención adecuada para reducir las tasas de mortalidad materna, perinatal y neonatal. Tendría que contemplarse qué se puede hacer con los recursos disponibles en los hogares, las comunidades y los servicios de salud que tienen que apoyar a estas comunidades y atender los casos complicados que en ellas se presenten. Este proceso sería otro elemento fundamental y esencial en el desarrollo de la intervención del proyecto.