SOCIOECONOMIC, OBSTETRIC, DEMOGRAPHIC AND PSYCHOSOCIAL FACTORS AS RISK TO CHILD DEVELOPMENT

Fatores socioeconômicos, obstétricos, demográficos e psicossociais como risco ao desenvolvimento infantil

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ABSTRACT

Purpose: to investigate obstetric, demographic, socioeconomic and psychosocial risk factors of mother-child dyads for the occurrence of changes in the Risk Indicators for Child Development (IRDI) in children age groups from zero to 18 months. **Method:** the sample consisted of 182 mother-infant dyads. Data collection occurred through the analysis of mother-infant interaction based on the Risk Indicators for Child Development (IRDI) Protocol and on an interview which investigated socioeconomic, demographic, obstetric and psychosocial aspects in the first stage of the procedures. Data were organized into an electronic spreadsheet and then converted to computer software for statistical analisys. **Results:** the significant risk factors for the four phases of IRDI were, in the range of zero to four months, the mother's marital status and number of children; in the range of four to eight months, the number of prenatal visits and *per capita* income; in the range of eight to twelve months, pregnancy planning; and in the range of twelve to eighteen months, maternal depression history, the mother's age and profession. **Conclusion:** the study demonstrated that the environment and the situations in which the mother-infant dyad is part of, may hinder or facilitate the development of the infant.

KEYWORDS: Socioeconomic Factors; Risk Factors; Language; Child Development

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INTRODUCTION

Researches aiming at investigating characteristics which may influence or pose a risk to child development are part of the national[1,2] and international[3,4] literature in different theoretical perspectives on childhood. While some explore factors more inherent to babies,[1] others focus more on the parental conditions in caring for a child,[4-10] with several of them showing that the mother's moods, for example, may be a risk factor in child development[4,8-10].

In addition, other studies have addressed the effects of environmental situations such as access to water sports[11] or cultural conditions[12-14] and their impact on child development. Among the aspects investigated, the psychomotor or neuropsychomotor[15,16] and cognitive[3,17] development have

been recurring themes in research, often covered in aspects such as prematurity[18] or postpartum conditions[2,19]. As a result of these studies, propositions have been made by health care teams to try to minimize risks since pregnancy[20]. UNESCO[21] claims that the vast majority of countries recognize that services targeted at the early childhood period make it possible to identify children with special needs or in risk situations, which, in this case, would enable the discussion of proposed interventions to prevent the onset or reverse pathological processes in their earliest stages.

Although the risks to child development – especially the most noticeable ones, where there is a biological sign – have been identified and confirmed, epidemiological studies bringing to the public health domain psychoanalytic knowledge[22,23] are rather recent, despite the long-time relationship between psychoanalysis and health. In this regard, mention should be made of a multicenter study on risk indicators in child development[24] funded by the Brazilian Ministry of Health which combined the singular dimension of child development and more universal aspects that recur in clinical cases in children – that is, the emerging symptoms enabled drawing up risk indicators capable of capturing the physical risk and/or the risk to child development between the ages of one and eighteen months, during psychic-structure formation. It was also possible to detect if there was something wrong with aspects critical to child development, which was investigated by the authors who carried out this research. What drew our attention was the potentiality of the risk indicators designed to detect the risk to language acquisition, as well as the interface between psychological issues and food transition, all of these being aspects which have already been confirmed by research papers deriving from them[25-27].

Thus, the initial hypotheses that children at risk according to indicators based on the psychoanalytic theory[26] – particularly the theoretical axes of establishment of the baby's demand of the other, alternate presence/absence, alterity or paternal function and assumption of subjectivity – also exhibit slower language acquisition and difficulties with food transition were supported.

Since the research on Clinical Risk Indicators in Child Development (IRDIs)[24] did not find correlations with the epidemiological (obstetric, demographic, socioeconomic) variables, this work aimed at investigating the association between obstetric, demographic, socioeconomic and psychosocial risk factors and the presence of risk to child development in the age range of one to eighteen months in a cohort study with children aged one to eighteen months, in a medium-sized city in Rio Grande do Sul, in view of carrying out a statistical analysis that could confirm or deny Kupfer's study's findings.

■ METHOD

In order to conduct this study, we adopted the mandatory ethical standards for research involving human subjects – (Resolution 196/96 of the National Health Council – CNS) –, approved by the Ethics Committee of the University where the research was undertaken, under protocol number 0284.0.243.000-09. All subjects involved in the study were informed about the purposes and procedures and read and signed the Free and Informed Consent Statement.

This is a quantitative study with quasi-experimental design, given that there is no control group. In order to carry it out, a research team comprised of speech-language pathologists and psychologists was trained in the IRDIs (Figure 1) during two lectures given by the researches in charge of the Kupfer's study[24] in Porto Alegre – RS, Brazil. They also read texts on the subject matter and watched training videos.

0-4 months	4-8 months	8-12 months	12-18 months
1- When the child cries or screams, the mother knows what the child wants. AS/ED 2- The mother talks to the child in a style that is particularly addressed to the child (motherese). AS 3- The child responds to motherese. ED 4- The mother proposes something to the child and waits for the response. PF 5- Mother and child exchange eye-contact. AS/PF	6- The child uses different signs to express different needs. ED 7- The child responds (smiles, vocalizes) when the mother or somebody else addresses him/her. ED 8- The child actively seeks contact with the mother's eyes. ED/PF	9- The mother realizes that some demands from the child may be a way to call her attention. ED/AS 10- During body care, the child actively seeks to play loving games with the mother. ED 11- Mother and child share a private language. AS/PF 12- The child feels ill at ease with unknown people. PF 13- The child shows cute behavior. ED 14- The child accepts solid, semi-solid and varied foods. ED	15- The mother alternates moments of dedication to the child with other interests. ED/PF 16- The child takes well the mother's brief absences and reacts to longer absences. ED/PF 17- The mother no longer feels compelled to meet all demands from the child. PF 18- Parents establish small behavior rules for the child. PF

Figure 1 – Final Risk Indicators in Child Development (KUPFER, 2008)

The sample initially examined consisted of 182 mothers and their babies, with ages ranging from 28 days to four incomplete months, contacted during the newborn hearing screening at a renowned University Hospital in the central region of the state of Rio Grande do Sul, from March to June of 2010. Babies born with malformations or syndromes and who failed the hearing test were not included in the study. Based on interviews conducted by the research psychologists, newborns whose mothers showed psychic impairments such as psychosis and schizophrenia were also excluded. Thus, we included full-term, preterm or post-term infants not diagnosed with any apparent biological alteration.

Data collection was structured around an initial interview conducted by a team of psychologists. The interview was based on a pre-existing protocol[7] which covers several aspects in order to investigate the obstetric history of the mother, the socioeconomic and demographic data, as well as psychosocial data with questions concerning the existence of planning for pregnancy or how the pregnancy news was received, whether the mother had family and social support, number of children, number of miscarriages, educational level, age, family income, marital status, occupation, prenatal care or lack thereof, number of people living in the same house, breastfeeding information, and also feelings about the experience of motherhood, among others. The psychologists administered the questionnaire in the form of an interview, taking it as

a script and allowing the mothers to talk freely about themselves and their children. During the interview and through the observation of the mother-infant dyad, they sought to examine the psychic state of the mothers. Only one dyad was initially excluded due to the suspicion of significant psychic alteration in the mother. Next, the psychologists administered the Beck Inventory[28] in relation to both the anxiety scale and the depression scale. The mothers who showed a level of anxiety and/or depression equals to or higher than low were invited to take part in a support group with the psychologists at the private practice where the program of speech-language pathology services this research is linked to is held.

Throughout the interview process initially predicted, whenever we could observe the interaction, Kupfer's Risk Indicators in Child Development[24] were identified, in the first age range, as shown in Figure 1. In addition, we filmed short clips about 10-to-15-minutes-long, from a distance of more than two meters and using zoom, in order to capture the interaction of the mother-infant dyad, so that a second examiner expert in child development (the lead researcher) could check the notes by the teams. In case of discrepancy between the notes made by the team and the ones by the lead researcher, or if it was not possible to observe some indicators in the interaction, or in the case of some babies who were sleeping during the interview, the infants were reevaluated in their homes within a week after the first assessment. In this second

assessment, we just observed the indicators and filmed a short clip, following the conditions described above. We took care that the footage would be treasured by the mothers as a keepsake of the babies, since they were intended to receive a DVD copy with all videos featuring their children by the end of the study. In most cases, when it was possible to observe the indicators, the agreement between the notes by the teams and the ones by the lead researcher was higher than 95%.

For the other age ranges of the IRDIs (Figure 1 for separation by age group), we observed moments of interaction between mother and infant e also did some brief footage, which followed an interview with update on the situation of the baby and the family. The mother was invited to talk freely about how she was feeling, what her routine was like, baby care and whatever else she would like to say about how she had been doing since the previous interview. As already mentioned, at each assessment interview, whenever the examiner felt that the mother was in need of psychological support, an appointment with the psychologists was offered.

The second, third and fourth stages of collection of data were conducted by a psychologist and three speech-language pathologists, two research fellows and the lead researcher, all armed with the knowledge required to collect the IRDIs which was provided by the training in the beginning of the study, as already mentioned. There was a 100% level of agreement in this stage. The observing took place at the speech-language pathology private practice and/or the child's home when the mother was not able to return to the practice. In either situation, we sought to facilitate the access to toys and usual family objects in order to help the mother-infant interaction.

It should be noted that the dyads studied throughout the research process were always the same. However, due to problems involving difficulties for the babies to return for the series of evaluations, given that some of them had changed address, phone number, and could no longer be contacted, there was a decrease in the starting sample size in the following stages of collection of the IRDIs. Thus, in the first (1-4 months) stage of the

process of evaluation of the IRDIs, we started out with a sample of 182 dyads; in the second stage (4-8 months), 117 dyads took part in the data collection; 89 dyads were evaluated in the third stage (8-12 months); and in the fourth and last stage (12-18 months) we assessed 58 dyads.

Based on these data from the study database, we identified the obstetric, demographic, socio-economic and psychosocial risk factors, such as gestational age, number of children, marital status, miscarriage history, number of pregnancies and births, family income, maternal and paternal occupation, social support, educational level of the mother and the father, age of the mother and the father, number of prenatal visits, type of delivery, complications during pregnancy and as a newborn, labor and postpartum conditions, prematurity, low birth weight, type of breastfeeding, depression history, difficulties in the motherhood experience for the IRDIs in the mother-child dyads collected in the first interview.

The data were organized into an electronic spreadsheet and then converted into the computer software STATISTICA 9.0. and PASW 17.0. for statistical analysis. In order to obtain the four multiple logistic regression models which identify the risk factors for the IRDIs, we initially performed the Chi-square nonparametric test, in which the variables where $p \leq 0.25$ were included in the testing of the multiple model of logistic regression analysis. In the multiple model, variables which did not reach the p-value threshold of less than or equal to 0.10 were gradually removed from the model and the software was run again.

■ RESULTS

In order to facilitate the visualization of the results obtained from the statistical analysis, we decided to present them in Table 1, which shows the rates, percentages, and risk ratios (RR) with the respective confidence intervals for the age ranges of the variables (risk factors) that were significant in the multiple logistic regression model. The results summarized in Table 1 are discussed below.

Table 1 – Demographic, obstetric, socioeconomic and psychosocial variables in relation to the Risk Indicators in Child Development evaluated in the 4 stages of the Risk Indicators in Child Development

Variables	IRDIs		Adjusted RR	CI 90%	p-value
	Absent (%)	Present (%)			
0 - 4 months					
Maternal marital status					
Married	134 (85,4)	23 (14,6)	1		
Single / separated	17 (68,0)	8 (32,0)	3,113	(1,371 – 7,070)	0,023*
Nº of Children					
< 2	77 (87,5)	11 (12,5)	1		
≥ 2	74(78,7)	20 (21,3)	2,121	(1,060 – 4,246)	0,075*
Total	151 (83,0)	31 (17,0)			
4 - 8 months					
Nº of prenatal visits					
6 or more	100 (96,1)	4 (3,9)	1		
Fewer than 5	10 (76,9)	3 (23,1)	4,940	(1,144 – 21,340)	0,073*
Per capita income					
≥ 201	67 (98,5)	1 (1,5)	1		
< 200	39 (86,7)	6 (13,3)	7,070	(1,089 – 45,895)	0,085*
Total	110 (94,0)	7 (6,0)			
8 - 12 months					
Pregnancy planning					
No	41 (77,4)	12 (22,6)	1		
Yes	18 (50,0)	18 (50,0)	3,417	(1,583 – 7,347)	0,009*
Total	59 (66,3)	30 (33,7)			
12 - 18 months					
Maternal depression history					
No	38 (80,8)	9 (19,2)	1		
Yes	6 (54,5)	5 (45,5)	10,304	(2,143 - 49,548)	0,015*
Maternal age (years)					
<20 e ≥35	21 (87,5)	3 (12,5)	1		
20 a 34	23 (67,6)	11 (32,4)	10,320	(2,082 – 51,153)	0,016*
Maternal occupation					
Other	25 (83,3)	5 (16,7)	1		
Housewife/Stay-at-home	19 (67,9)	9 (32,1)	4,454	(1,295 – 15,315)	0,047*
Total	44 (75,9)	14 (24,1)			

IRDI = Risk Indicator in Child Development; Absent = children with no deviation in the IRDIs; Present = children who showed deviation in at least one IRDI; RR = risk ratio; CI = confidence interval; *Significant in the multiple logistic regression analysis, with level of significance of 10%. Missing data: family income (5).

The variables that remained in the final model were statistically significant, at a significance level of 10%, to identify obstetric, demographic, socioeconomic and psychosocial risk factors in the mother-child dyads for the occurrence of changes in the IRDIs in these four age ranges. We chose a significance level of 10% due to the sample size and the demands for the multifactorial analysis. Regarding this aspect, the literature[29] suggests that, if one is likely to take a less conservative approach, then a probability of 0.10 (or significance level of 10%) can be used.

It is possible to notice that, in the age range of one to four months, the model selected the demographic variables of marital status and number of children. As for the marital status variable, we verified that mothers whose marital status was single, identified as the group without a spouse, regardless of their

legal status, were twice as likely to pose risk to their children's development as those who had a spouse. Infants with siblings were once more likely to be at risk than only children.

In the stage of four to eight months, the logistic regression model showed the number of prenatal visits and the *per capita* family income as significant risk factors for the IRDIs. As for the number of visits, babies whose mothers had five or fewer prenatal visits were four times more likely to risk their child development than infants born to mothers who had six or more prenatal visits.

The socioeconomic variable of *per capita* family income proved to be a protective factor in families with income above R$ 201.00 per dependent. The results of this work suggest that children from families with *per capita* income lower than R$ 200.00 are six times more likely to face risks to child development than the other group.

In the model obtained for the IRDIs that cover the period from eight to twelve months, the risk indicators were associated with the obstetric variable of pregnancy planning, with the data showing its absence as a protective factor.

Considering the indicators for the range of twelve to eighteen months, the model showed significant associations between the risk factors maternal depression history, the mother's age and her occupation. This study indicates that mothers with a history of depression are nine times more likely to have a child whose development is at risk, in the range of twelve to eighteen months, than mothers who were not subject to depression at any point in life. Another finding within this age group was that mothers under twenty years of age and over thirty-five represented protection to child development – that is, surprisingly enough, mothers between 20 and 35 years old, the biologically ideal age for motherhood, had children with higher risk than younger or older mothers.

The socioeconomic variable of maternal occupation, through which we verified whether the mother worked outside the home, served as a protective factor, and also correlated significantly with the fourth stage of the IRDIs, given that stay-at-home mothers are three times more likely to have a baby with child development at risk during this stage.

■ DISCUSSION

Based on the results obtained from the logistic regression model, we were able to find some surprising data, which even seem to contradict what was stated in other studies, and some data that confirm many previous studies.

Among the data that confirm previous research, we highlight low family income and history of maternal depression as risk factors, and family support with the presence of a spouse and prenatal care as protective factors for child development.

One study[13] claims that living with the baby's father, legally or consensually, may influence how the conception of the child is perceived and accepted by the mother and her family, both positively and negatively. In this study, the factor identified in the interviews, which goes well beyond pure statistics, is that mothers with children with no risk not only lived with their spouses, but could also rely on their help and participation in the upbringing and support of the children. This was also found in other studies,[25,26] with the same sample, in which the difficulties in handling motherhood correlated with the lack of spousal support. Therefore, it is not just about physical presence, but a broader sense of presence that included not only psychic aspects, but also financial support to mothers and their children. This last aspect is also reinforced in our study by protective factor in babies from higher-income families. In agreement with these findings, a study[15] shows that children from families with income up to seven hundred reais are 2.81 times more likely to exhibit suspected developmental delay. Other authors[16] state that the socioeconomic status of the parents affects directly or indirectly as a determining factor for child development.

The protection provided by the completion of prenatal care in the range of four to eight months points to the importance of public policies for monitoring maternal and child health, given its relevance to the child's health. As for the number of visits, babies whose mothers had five or fewer prenatal visits were four times more likely to present risk to child development than infants born to mothers who had six or more prenatal visits. This association is highlighted in another study[30], which states that the number of prenatal visits is connected to the risk of developmental delay in children. It is noteworthy that health education during pregnancy is a means of providing the mother and her family with knowledge that can help her prepare for her new role, as well as clear up doubts, thus contributing to their autonomy in caring for her baby[20].

The negative influence of maternal moods, particularly depression, as risk factors observed in the studied sample reinforces what has already been proven by several studies[8-10]. Maternal depression seems to limit mother-child interactions and this was fully captured by the indicators for months one to four, as they are focused on the initial protoconversation between mother and infant (use of *motherese* by the mother and the baby's reaction) and identify

the difficulties and fluctuations in the establishment of demand and the assumption of subjectivity, by the mother, or even in the baby's refusal to look at the mother when she is depressed, which is shown by the indicator about the mother and the child making eye-contact.

One of the surprising results from the logistic regression model was the planning pregnancy variable, for, contrary to expectations from many studies[8,19], planned babies showed higher risk of developmental problems between the ages of eight and twelve months, in this sample. Two aspects of these results are worth mentioning. Firstly, in this stage the number of dyads had already decreased significantly. Secondly, precisely the dyads with risk, who at that point did not exceed 22 babies in total, were followed-up until the baby's 24th month and among the factors identified in those dyads is the extension of the mother-child symbiosis – which was observed in most cases of only children who were carefully planned, and reported in some cases discussed in this dissertation[27] in which the fulfillment of the paternal function was affected. As this axis is much emphasized in the indicators for the last age ranges, this seems to explain the correlation found in the age range of eight to twelve months.

The demographic variable that describes the mother's age showed that mothers under twenty and over thirty-five years old were most often among those with children with no risk than mothers between 20 and 34. This finding contradicted a study on the evaluation of child development indicators in 12-month-old preterm infants, in which the mother's age during the pregnancy correlated to the scale items related to solving the child's language problems. With this in mind, the authors[18] argue that the younger the mothers are during the pregnancy, the greater the proportion of children who did not score in items related to those areas is. Another study[3] also found an association between younger maternal age and losses in the child's cognitive development. This association may be connected both to the biological risk of that a precocious pregnancy poses to the baby's development and to the interaction between the younger mother and her child.

In the findings of the study mentioned above, the mothers between 20 and 34 years old are nine times more likely to have a baby with risk to child development during the stage of twelve to eighteen months of the IRDIs than teenage (< 20 years old) or older (> 34 years old) mothers. Possibly, this factor was correlated to other factors not observable in the statistical model because the low number of dyads by the end of the study did not allow for further comparisons. One of the hypotheses initially proposed to explain this result is that mothers between 20 and 34 were in the prime of their working lives and might feel torn between motherhood and their professional careers.

However, this hypothesis was falsified in the model, because in this study having an occupation served as a protective factor and correlated in a significant way to the fourth stage of the IRDIs. One study[17] showed that maternal employment is positive, not only for generating income and facilitating the access to resources, but also for providing occupational satisfaction, thus boosting the mother's self-esteem and stimulating experiences with her child. Also, another study[25] demonstrated that this variable affects the range of types of breastfeeding. Working mothers are less likely to use mixed feeding than stay-at-home mothers; despite the latter's physical availability, they failed to offer only one type of breastfeeding, which shows that breastfeeding is matter of desire and possibility of maternal care for the child.

It is believed that other more specific factors of the conditions of the mother and her family may account for such findings, and therefore it is desirable that larger samples be reevaluated in view of the theory that underlies this study and that the results presented in this work be taken as suggestions for future research and not as truths that can be extended to the entire the population. Nevertheless, after observing infants at risk for developmental problems who were only children of stay-at-home mothers, we can suggest that the mothers fully planned their pregnancies and had high expectations for their babies. Perhaps, such a projection and expectation prevented the necessary separation between mother and infant at the end of the first year of life through the paternal function.

Despite the numerical limitations by the end of the data collection, the findings suggest that the practices of health care teams for assessing child development during the mother-child follow-up must move beyond major psychomotor or nutritional developmental signs. The psychic and relational dimension has to be integrated in the training process of these teams, so that the risk indicators, as well as other proposals for evaluating these aspects, are understood and can be used in child development assessment. In addition to detecting the risk, health care teams need to be prepared to deal with it in a constructive and positive way, without making negative predictions to the family about the child and by finding ways to refer risk cases to early intervention teams. In order to do so, the study argues that a thorough effort for providing on-going training for health professionals should be initiated and paradigm shifts in health should be made in

the university's approach towards a more interdisciplinary perspective on the study of childhood.

Having the initial purposes in mind, it was possible to observe that there was an indication of association between some of the variables studied and the risk indicators in child development and that, although the statistics should be more flexible, the findings allow for a reflection upon the aspects which were analyzed. This work also points to the importance of investigating such factors with a larger sample in future studies, so that some trends observed in this study can be confirmed with higher statistical significance.

■ CONCLUSION

Having in mind the initial analysis proposed regarding the association between the presence of risk to child development and the socioeconomic, demographic, obstetric and psychosocial variables, this study proved the correlation with some of these aspects in all stages of collection of the IRDIs.

The results of this study also showed that, at each stage of the IRDIs, the theoretical axes that guide them are also associated with the environment and the situations that are part of the baby's life, which points to their importance for the monitoring of child development. The way and the place in which such indicators can be introduced in the practices of health care teams should be better studied, for there needs to be some training for their introduction. Such training should be on-going and encompass the study and observation of the multiplicity of social, economic, cultural, etc., factors which correlate in such a particular way in each case.

At last, we highlight that the numerical analyses fail to compute the particularity and complexity of each case. They are just indicators of precautions that should be taken in public policies as a guide for possible actions. However, the actions to be actually implemented in each case must result from a specific investigation of it, for an intervention is always a particular event.

RESUMO

Objetivo: investigar a associação de fatores de risco obstétricos, demográficos, socioeconômicos e psicossociais com a presença de risco ao desenvolvimento infantil nas faixas etária de um a dezoito meses de idade. **Método:** a amostra inicial foi constituída de 182 díades mãe-bebê e final de 58 díades. A coleta de dados ocorreu por meio da análise da interação mãe-bebê feita com base no Protocolo de Indicadores de Risco ao Desenvolvimento Infantil e de uma entrevista que investigou aspectos socioeconômicos, demográficos, obstétricos e psicossociais na primeira etapa da pesquisa. Os dados foram organizados em uma planilha eletrônica e posteriormente convertidos para os aplicativos computacionais para análise estatística. **Resultados:** os fatores de risco significantes para as quatro fases do protocolo foram, na faixa de zero a quatro meses o estado civil da mãe e o número de filhos; na faixa de quatro a oito meses o número de consultas pré-natal e a renda *per capita*; na faixa de oito a doze meses o planejamento da gestação; e na faixa de doze a dezoito meses o histórico de depressão materna, a idade da mãe e a profissão da mãe. **Conclusão:** a pesquisa demonstrou que as condições socioeconômicas, obstétricas, psicossociais e demográficas podem oferecer risco ao desenvolvimento infantil.

DESCRITORES: Fatores Socioeconômicos; Fatores de Risco; Linguagem; Desenvolvimento Infantil

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