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Environmental influences on child mental health

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Abstract

Objective: To present an up-to-date review about environmental influences on child mental health, describing major risk factors and discussing recommendations for intervention by pediatricians.

Sources of data: MEDLINE, PsycLIT and Lilacs, technical books and publications about child development and child and adolescent mental health problems and health promotion.

Summary of the findings: Children are exposed to multiple risk factors, among them high prevalence of disease, premature birth, being born from a problematic pregnancy, and living in poverty. This negative chain of events increases the risk for emotional problems. The negative effects on development and behavior result from the complex interaction between genetic, biological, psychological and environmental risk factors. The main factors influencing the mental health of children are the social and psychological environment. The cumulative risk effect is more important in determining emotional problems in children than the presence of one single stressor, regardless of its magnitude.

Conclusion: Environmental factors play an important role in the etiology of emotional problems in childhood. An adequate clinical investigation allows pediatricians to identify risk factors for the development of mental health problems and to ensure early intervention for children at risk.

J Pediatr (Rio J). 2004;80(2 Suppl):S104-S110: Child mental health, risk factors, environment, child development, early intervention.

Introduction

Pediatricians have shown more interest in children's mental health in the last few years. This concern mirrors the fact that recent studies have found a prevalence of mental disorders of 10 to 20%, being considered the most important cause of childhood problems.[1] According to a recent study, Glied & Cuellar estimate that 11% of U.S. children have a mental disorder of some sort.[2] Half of the children and adolescents between ten and seventeen years old are affected at least by two risk behaviors, such as abuse of alcohol and drugs, delinquency, low school performance and pregnancy.[3] Several studies from different countries have revealed an equally high percentage of preschool and school-aged children with emotional disorders.[4-6]

The improvement in pediatrics leads us to a substantial change of paradigm in terms of child and adolescent health care. With various therapeutic instruments at hand, pediatricians could divert their attention away from the treatment of acute diseases, based on the hospital-based model, and provide the population with community-centered health care. This way, by preventing diseases and promoting health, the coverage of this treatment could be extended. Synergistically, such measures further decreased infant mortality, revealing new problems, which were grouped under the name of "new morbidity" or "hidden morbidity,"[7] defined in the 1970s as a set of functional situations and environmental factors that affect

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child development.[8] The situations that resulted from the decrease in infant mortality submitted children, who were previously exposed to the risk of death, to the stress caused by unfavorable living conditions, most of which are the result of increased urbanization, violence, changes in family structure, and in some specific areas, the result of poor food supply.[9] The group of children with this "new morbidity" includes those who experienced childhood abuse, maltreatment, neglect and developmental disabilities caused by lack of stimuli or inappropriate stimuli. The etiology of mental disorders in children often is attributed to these factors, but it is important to assess the multiple contexts in which these children live from birth to adolescence and adulthood. Most studies have focused on individual behavioral processes that determine mental health, leaving aside the fact that the continuity of adverse environmental factors also determines changes in child development.[10] Mental disorders in childhood and adolescence have an immediate impact on children and their families and also are precursors of psychiatric and social problems throughout life.[11,12] The present study discusses the influence of environment on children's mental health, the major risk factors involved, and some early interventions.

Environmental risk factors and mechanisms of action

Risk factor is defined as an element that determines an increased probability of problem occurrence. It can also be defined as a factor that increases vulnerability of a person or group to a certain disease or to health deterioration.[13]

According to Garbarino,[14] we should bear in mind two types of interactions when we talk about risk: firstly, the interaction of children as a biological organism with their immediate social environment, represented by the family (microsystem), in which several processes, events and relationships occur**;** secondly, the interaction regarding the relationship of this system with the environment, in its broadest meaning (exosystem or macrosystem) through time (chronosystem). This model is shown in Figure 1, which describes the relations between several systems that influence children's lives, according to Bronfenbrenner's ecological theory of development.[15] The author proposes a model where development occurs through processes of reciprocal interaction that are progressively more complex between children and all levels of environmental influences.

Children have different opportunities in their development given by their personal attributes (physical and mental) and by the social environment in which they live. As several studies have shown, direct threats to development may occur due to acquired genetic and biological problems, although this may also occur due to the absence of expected opportunities. In short, the forms though which the risk of developmental disorders appear may be related to biological substrate, to direct or indirect continuity of environmental interference and cognitive processes.[16-21] Therefore, the negative effects on development are produced by the combination of genetic, biological, psychological and environmental risk factors, usually involving complex interactions between them. Social and psychological factors are strongly associated with children's mental health, influencing more than the individual's intrinsic characteristics.[22-25]

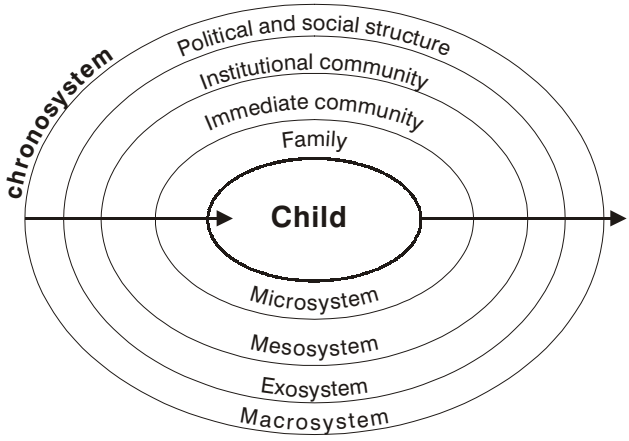

Figure 1 - Ecological theory of development[15]

The several factors involved in the etiology of developmental and behavioral disorders rely more on the amount than on the nature of risk factors, since different risk factors produce similar results.[26] Therefore, we reinforce the importance of multiple risks, whose cumulative effect proved to have a great impact on children's cognitive and socioemotional results.[27,28]

The Rochester Longitudinal Study, carried out by Sameroff et al., on the role of the environment in the determination of mental health followed up children from the prenatal period to adolescence.[23] The main findings of this study regarding the influence of environmental factors on mental health were: a) history of maternal mental disease; b) high level of maternal anxiety; c) limited parental perspectives; d) poor interaction between children and their mothers; e) head of the family without qualified occupation; f) low maternal education; g) family of minority ethnic groups; h) single-parent families; i) presence of stressful events; j) families with four or more children. The multiple risk effect individually compared with each variable showed that high-risk children (e.g.: those with mental health problems in the family, parent's low expectation, poor mother/child interaction, low level of maternal

education and no family support) had 24 times more chances of having a deficiency, compared to low-risk children. On top of that, the set of variables explained 50% more of the variation in verbal skills than did the variables that were individually assessed. Some of these findings were also obtained by other studies on development, although some of them applied different methodologies,[28,29] which reinforces their importance. These findings emphasize the need to identify the group of children at higher risk for emotional and behavioral problems. A recent study carried out by Harland et al.[30] showed a statistically significant association between familial characteristics and the risk of emotional and behavioral disorders in children, among which parental unemployment and recent separation from parents are the most important factors.

Several epidemiological studies demonstrated the relationship between low socioeconomic level and the occurrence of mental disorders in children.[31-34] These findings are plausible given the higher probability for the existence of multiple risks in the underprivileged population. However, it is essential to distinguish between two important concepts that are strongly associated with the etiology of mental health: social causation and social selection.[35] The first one refers to the interaction between genetic and environmental factors in which genetic aspects are latent until individuals exposed to adverse factors and stress (common in unfavorable socioeconomic situations) develop mental disease, due to situations that run out of their control. The second one refers to a correlation between genetic and environmental aspects where susceptible individuals are pushed down to the poverty line or cannot come out of it, causing the environment to increase the risk of mental disease. The distinction between these two theories is important, since it influences prevention and/or intervention strategies. In a recent study, Costello et al. found that coming out of the poverty line significantly decreased behavior-related symptoms (oppositional behavior and conduct disorder) in children, but that it did not change other psychiatric symptoms such as anxiety and depression, suggesting the existence of different mechanisms that are not directly related to unfavorable socioeconomic conditions.[36]

These are also the conclusions of one of the most important longitudinal studies on children's development and behavior, conducted by Werner et al.,[37-42] which has followed up children since 1955 and revealed that most individuals exposed to birth-related biological problems do not develop any kind of adaptive difficulty in adolescence and adulthood. Perinatal complications, when analyzed individually, are not predictors of later physical and psychological developmental delays, but present an increased risk only if combined with adverse environmental situations.[43,44] According to the two-year follow-up, wealthier children with perinatal complications had a mean IQ score five to seven points lower than wealthier children without perinatal complications. On the other hand, poorer children with perinatal problems had a decrease between 19 and 37 points in their IQ, comparatively to poorer children without perinatal problems.[37] In the 18-year follow-up, the authors found out that adolescents with behavioral developmental problems lived in poverty at a percentage 10 times higher than those who had been exposed to perinatal problems.[41] Lipman et al.,[34] even without assessing biological risk, showed that children of low-income families have three times more chances of having a low school performance and social difficulties, compared to those of more privileged families. In addition, low maternal education and the existence of disruptive families had independent effects on the etiology of psychosocial morbidity.

Besides the importance of being aware of the risks to which these children are submitted, we should also consider a person's ability to adapt to certain types of stress. Anthony[45] described the concept of "invulnerability" that certain children have to certain types of aggression. This adaptation has been called resiliency, which in physics, is the capacity of a material to return to its original shape or position after deformation that does not exceed its elastic limit. Applying this example to individuals, it means a person's ability to bounce back from potentially negative events. This resiliency, however, is not totally present in children, and thus the child may be highly efficient in dealing with a stressful situation at school, and extremely inefficient in dealing with a situation that involves emotions.[46] Thus, living in poverty and in a psychologically unfavorable environment are high-risk conditions for physical and mental disorder, but certain individuals can develop competences for a good physical and mental development. These resilient people have personal attributes that act synergistically with the support received from the family and community.[47]

Nevertheless, the concept of resiliency runs counter to that of vulnerability, according to which certain children, for being exposed to the same stress, develop difficulties that interfere in their development and behavior. In the last few years, research about protective factors has changed in terms of methodology. While cross-sectional and retrospective studies have provided elements to define possible risk and protective factors,[16] longitudinal and prospective studies have been used to document and analyze the short- and long-term effects of these factors on child's development and emotional functioning.[42,48,49]

Interventions for mental health promotion in childhood

The studies on the efficacy of early institutionalized intervention programs for the prevention of behavioral and/or learning disorders in children have yielded contradictory results regarding the general population. However, when studying populations with a low socioeconomic level, there seems to be an agreement on the benefits that these interventions provide, especially

those that are maintained for a long period of time.[50,51] The benefits of social and community services for the intervention are characterized by a decrease in intrafamily violence and social misdemeanors, and also cause a positive effect on the relationship between mothers and children. The larger impact occurs when interventions are initially made in the prenatal period and extend up to the first three years of life.[52]

One of the most important preventive measures that offers benefits in several areas is breastfeeding encouragement. Although no definitive conclusions exist as to the role of human milk in cognitive development, different studies conducted in different social contexts suggest that breastmilk has a positive effect on child development and on the mother/child relationship.[53] If this relationship is sound, it is a good start for the child's mental health. In a cohort study carried out in Pelotas, southern Brazil, 1,363 newborn infants were followed up during their first year of life and the relationship between development and breastfeeding, among other variables, was assessed.[28] The results showed a dose-response effect regarding the length of breastfeeding: the longer the breastfeeding period, the lower the risk of having a Denver II test with suspected delay. Non-breastfed children had an 88% greater risk of having a test with suspected delay, compared to those breastfed for longer than six months. In addition to proven nutritional, psychological and immunological advantages,[54-56] the evidence that breastfed children have a better performance in their future cognitive development is another reason for breastfeeding to be encouraged consistently. Breastfeeding is not an innate behavior, but a habit that depends on learning and on the positive interaction between cultural and social factors.[57,58]

Intervention on the risk factors and mechanisms of action that influence children's mental health goes beyond the health sector. Joint actions that involve the health sector, education, social assistance, and economics are increasingly needed, producing jobs and income for the families, infrastructure and leisure. Integrated projects aimed at promoting children's and adolescents' good development have been implemented in different communities, especially in the ones with lower socioeconomic level, showing a high probability of success.[59,60]

Even though most developmental and behavioral disorders may be recognized still in childhood, disorders such as speech delay, hyperactivity and emotional disorders are not commonly diagnosed before the third or fourth years of life.[61] In primary care, health professionals often do not assess children's development and mental health as a routine practice.[62]

The positive impact that early intervention programs have shown in terms of children's development and later school performance are a definitive justification for the necessity of early identification of children at risk for such delays.[63-66]

To be efficient, the programs should include the major groups of children at risk: a) group with an established diagnosis, for instance, syndromes in which delays are a natural part of the course of the disease, would have an intervention for the improvement of infants and/or children with growth and behavior retardation with established disabilities;[67] with regard to the group of children at biological risk, usually related to pregnancy and/or birth conditions, as is the case of preterm babies, preventive interventions should be implemented for infants with increased biomedical risk;[68] finally, the group of children who have social risks related to unfavorable socioeconomic conditions, poor family structure and inappropriate health care, the strategy includes preventive interventions for infants and children with increased environmental risk.[69-71,30]

It is quite difficult to distinguish the actual impact of social variables from the impact of biological variables, since the relationship between them is quite complex, thus hindering the interpretation of results and consequently the intervention.

There are biological and environmental components in the etiology of mental disorders that affect the neural substrate. Brain dysfunctions are not the only etiology of psychopathology, but also have an impact that depends on the individual's environmental and social response, thus determining the risk for a negative result. Environmental conditions such as no physical and social stimulus, poverty, stress, and prenatal exposure to drugs, may compromise brain functions in the presence of predisposing conditions.[72] The relationship between genetics and environment is dynamic and also cumulative in its ability to influence development and change subsequent behaviors. This combination makes brain function malleable enough to reduce the risk of mental disorders by changing the environment. For instance, the neurobiology of processes related to social anxiety shows the clear relationship between neurochemical susceptibility, which combined with an unfavorable exposure, causes a disruption in brain homeostasis.[73]

Some theories exist on the neurobiology of drugs of abuse, suggesting that addiction is strongly associated with genetic mutations in neurotransmitters, making susceptible individuals abuse the substance in order to increase the levels of dopamine in their brain.[74] An extensive review on this topic can be found in Gil-Verona et al.[74] Research improvements in this area will allow a change in the course of development or at least attenuation of negative results.

According to Werner,[40] risk factors are not static elements and are only valid if they are linked to intervention programs, where there is a regular follow-up, offering health education, rehabilitation and treatment.

Despite the fact that early interventions in developing countries may be more difficult, several alternatives exist that could promote low-cost and community-

based programs, involving children at risk for mental disorders. The type of model depends on the target population. According to Thorburn,[75] there are nine available models, ranging from home visits (on which occasion the mother is taught how to stimulate her child), day care center (as a training center for caregivers), and school, with teacher's participation and parental training, and participation of the media, as described in Table 1.

Table 1 - Early intervention models for developing countries[75]

Model	Target-population
Home visit to the mother	Child and mother
Home visit to the caretaker	Child and caretaker
Day-care center	Child and day-care professionals
Maternal	Child, caretakers and teachers
Aggregate to puericulture	Health professionals
School	Children and teachers
Aggregate to education for adults	Parents and community workers
Groups of women	Parents and volunteers
Media	Parents and general population

Problems associated with children's mental health are not restricted to specialists' private practices, but are very common in primary care. Academic researchers are often found in specialized university centers and have sufficient knowledge about the distribution of health problems in the community. On the other hand, they cannot observe treatment results and do not know much and are poorly interested in the interrelations of different types of health conditions in the use of services and in the subsequent effects of these services on health.[76]

In their turn, clinicians, especially those with a well-defined clientele, which is continually followed up for several years (such as pediatric clients), are exposed to the initial stages of the problem. They have a privileged position in making a general assessment of the child in order to observe the interrelations of different symptoms of poor mental health, and follow the natural history of the dysfunction as the child grows up and develops.

Therefore, pediatricians play a key role in the intervention of mental and developmental disorders, since they often are the major source of information for parents about the development of their children, in addition to being the professionals that can identify risky situations earlier.

The involvement of pediatricians in health promotion of children and adolescents will certainly bring immediate effects on suffering and will improve the quality of life, in the medium and long run, reducing school failure, abusive use of drugs, violence, crime rate, and development of psychiatric disorders in adulthood.

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