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PSYCHOSOCIAL FACTORS FOR RISK AND PROTECTION TO CHILD MALNUTRITION IN MOTHERS OF MALNOURISHED AND EUTROPHIC CHILDREN: THE ROLE OF MATERNAL MENTAL HEALTH

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Abstract

In this study, the relationship between child malnutrition, depression, anxiety and other maternal socio-demographic variables was investigated in mothers of malnourished (MD) and eutrophic (ME) children. The causes attributed by mothers to malnutrition were also studied. Ten mothers from each group, with children aged from 11 months to three years and who were users of primary health care units, participated in the study. They answered Beck depression and anxiety inventory, a questionnaire on vital events and an open question concerning the causes of malnutrition. The evaluation instruments were corrected according to proper guidelines and comparative analyses between the groups were performed. The answers to the open question were qualitatively evaluated, submitted to content analysis. The mothers in the two groups were nearly 30 years old or older. They had a steady partner and were subject to very similar life conditions. They had attended school for 5.5 years and were housewives or worked in low-income jobs. Concerning mental health indicators, a significantly larger number of mothers in the MM group showed depression indicators when compared to mothers in the EM group. Most mothers attributed malnutrition to biological factors or to the lack of maternal care, with more moralist statements in the EM group, and statements filled with guilt in MM. Results suggest that in order to fight malnutrition, in addition to nutritional interventions, it is necessary to heed attention to maternal socio-emotional issues.

Key words: malnutrition; depression; anxiety; mental health.

INTRODUCTION

In the last three decades, malnutrition has been considerably reduced in Brazil. The positive evolution is mostly attributed to the population's access expansion to health services as well as to the increased maternal education. Nevertheless, without the endemic character of other times, these pictures still affect young children who live in disadvantageous conditions[1,2], therefore justifying the researchers' interest in identifying the malnutrition determinants and in investigating ways to fight against malnutrition.

Numerous studies conducted in different countries confirmed the relationship between malnutrition and factors of diverse nature, such as biological, cultural, socioeconomic and demographic factors. Until the 80's, in order to explain the interrelationships among the different factors related to malnutrition, the explanatory models presented children's nutritional status as a result of: a) food consumption and, consequently, all its conditioning elements (agricultural and economic policies, purchasing power, wages); and b) the child's biological capacity to make use of available nutrients. Both factors would have common elements which would ultimately be historical, political and economic factors that would define, at a given moment, the country's wealth distribution and production[3].

In the early 90's, the child care appropriateness was recognized as one of the three determinant aspects of malnutrition, together with food safety, environmental salubriousness and access to health services[4]. The mother's capacity to adequately care for her children and to optimize the available resources would soften the impact of an unfavorable environment, especially when

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children go through periods of greater vulnerability as during infectious diseases, weaning, or when the family is going through a financial crisis[5]. Even individuals who have faced several adversities in their development, with biological hazards (prematurity, underweight, diseases) and environmental risks (broken homes, alcoholic parents with mental disorders) can change their life trajectory and escape misfit if they are supported by their mother's mediation with protective factors to counteract the adverse ones[6].

According to Engle, Menon and Haddad[7], the mother's appropriateness as a caregiver directly depends on her skills or abilities, deriving from a close relationship with her education, her physical and mental health state, her self-confidence and autonomy, her workload and time availability, as well as the possibility of relying on suitable substitutes and on the community and family help in times of crisis. There are studies showing that higher level of maternal education may be associated with better children nutritional status due to interfering in the way of families inclusion in the production process and, consequently, in obtaining food and in children's nutritional status[8,9]. Education would augment the chances of proper care as a consequence of a stronger scientific knowledge appreciation and of the maternal capacity to articulate resources for the benefit of her children's needs[7].

Notably concerning mental health, work carried out in many countries, including the developed ones, emphasized the importance of maternal mental health for child care and development[10,11]. Depressed mothers are many times not emotionally available and tend to reduce responsiveness, what may generate psychosocial deprivation, low interaction and adverse conditions on development[11,12]. Parents' social and emotional problems can negatively interfere on their children. As parents repeatedly use inadequate food practices, conflict is established and meals turn to moments of lasting tension[13]. There is an extensive literature showing the depression effects for children's cognitive and psychological development and for children's psychosocial functioning[12,14]. Moreover, studies on the consequences of maternal depression on children's physical growth and malnutrition have increased in recent years in developing countries. There are three studies with Brazilian samples.

In a study developed in the municipality of Embu, São Paulo State, Miranda *et al.*[15] found a 2.8 times higher psychiatric morbidity prevalence among mothers of malnourished children compared to mothers of eutrophic children. Three hypotheses were formulated from this study: a) maternal depression could lead to mother's negligence towards basic childcare; b) pre-existing malnutrition in children would result in maternal depression; or c) both maternal mental illness and child malnutrition would be factors related to their socioeconomic conditions.

In a case-control study, Carvalhaes and Benício[4] found that poor maternal mental health, indicated by the presence of 3-4 depressive symptoms, enhanced the risk to children malnutrition in their second year of life. Notwithstanding, this association was not maintained after income adjustments.

The research of Surkan *et al*.[16], whose aim was to quantify the association between social support and maternal depression to the physical growth of children living in Teresina City, Piauí State, did not find any evidence which showed that maternal depression affected children's physical growth.

The results heterogeneity of the aforementioned studies and of other studies can be either attributed to real differences in the relationship between maternal depression and children's physical growth in different countries or to methodological differences, as for instance the fact that some studies are cross-sectional while other studies are cohort, clinical or population samples, time recruitment of research participants and measurement forms of maternal depression[11].

There are indicators of maternal depression associated with poverty and with adverse home environment conditions, such as low levels of education and maternal perception of infant irritability[17]. Furthermore, there are other indicators like not having a steady partner, having many children and several people living in the same household, experiencing a conflicting marital relationship, but mostly having to deal with severe life events, as for example being obliged to cope with dangerous situations, violence, disasters, deaths of loved ones and with other losses[2,10].

If maternal depression is a concern in pediatric healthcare, there are few studies on the potential impact of maternal anxiety on child development. Barnett *et al.*[18] identified that, five years after giving birth to a child, mothers who suffered postpartum high anxiety went through more psychosocial pathologies and their children showed stronger maladjustment signs compared to mothers who had reported having low anxiety. On the other hand, Nóbrega and Campos[19] associated negative psychological symptoms, as maternal anxiety, with child malnutrition. Additionally, O'Brien *et al.*[20] found that both anxiety and depression of mothers whose children had difficulty gaining weight were notably higher than children whose mothers gained weight adequately.

Hence, the aim of this study is to investigate the association between maternal socio-demographic conditions considered as risk factors and children's nutritional status and to describe the mothers' perception on the malnutrition causes.

METHODS

Participants

The research participants were 10 mothers of malnourished children (MM group) and 10 mothers of eutrophic children (EM group) attending Primary Healthcare Units in the surrounding areas of Botucatu, in the period March 2006 to March 2007.

No child had chronic diseases with negative or positive impact on their appetite and on their physical growth; children had a birth weight of e" 2500 g; they were not premature (gestational age e" 37 weeks); they were aged between 11 and 36 months and were regularly fed by their biological or social mother. As a criterion for measuring malnutrition, it was adopted the height/age ratio lower than the 5th percentile of the reference population of National Center for Health Statistics (NCHS) of the World Health Organization (WHO), which is a chronic protein-energy malnutrition indicator. In order to include the mother in the EM group, it was adopted the height/age ratio higher than or equal to the 50th percentile of the same reference standard.

Instruments and measures

A – Measuring instruments: Balmak brand scale for measuring the child's weight and height when the child was taller than a meter high, and Taylor brand wooden ruler for measuring height when the child was smaller than that.

B - Instruments to assess the mother's emotional state:

-Beck Depression Inventory (BDI)[21,22]. It is composed of twenty-one questions or items of depressive symptoms and attitudes, each with four possible responses. Each response, assigning a score ranging from zero to three, indicates an increasing degree related to the severity of the depressive symptom. At the end of the application, the score ranges from 0 to 63, classifying the levels of the severity of depression[23].

-Beck Anxiety Inventory (BAI) [22,24]. It assesses the intensity of symptoms common to anxiety. It is a 21-item scale measuring the severity of self-reported anxiety rated on a four-point Lickert scale ranging from 0 to 3. At the end of the application the score ranges from 0 to 63, classifying the levels of the severity of anxiety. Both scales were translated into several languages and validated in different countries. In Brazil, they were validated by Cunha[22].

- In order to assess the Vital Events, it was developed an instrument based on some scales[25,26] where 20 items were listed, attempting to identify changes the individual had undergone within a six-month period and which were evaluated by the literature as possible stress generators: deaths, job loss, debts, legal problems, problems related to drug abuse or to alcoholism, marital conflicts, changing school, moving home, among others.

C – In order to identify to what the mothers attributed malnutrition, the following question was made: "Why do children get malnourished?" Then, the responses were recorded.

Procedures

Malnourished children were located through the Food and Nutrition Surveillance System (SISVAN). When a malnourished child was not found or did not meet the research criteria, the next child was searched from a list. The same procedures were used to form the group of mothers and eutrophic children (EM). An important endeavor was to include children with similar ages to those observed in malnourished children and whose mothers had similar age and number of children to the MM group. Data collection was conducted in households.

Data analysis

Wilcoxon non-parametric test for independent samples was used

to compare both groups regarding anxiety, depression and vital events.

For classifying anxiety levels, it was considered the minimal level anxiety scores ranging from 0 to 10; mild level anxiety, scores ranging from 11 to 19; moderate level anxiety, scores ranging from 20 to 30; and severe level anxiety, scores ranging from 31 to 63. With regard to depression levels, it was considered minimal level depression scores ranging from 0 to 11; mild level depression, scores ranging from 12 to 19; moderate level depression, scores ranging from 20 to 35; and severe level depression, scores ranging from 36 to 63[22]. The minimal level of both inventories was considered an indicator of the absence of anxiety or depression[23]. In order to compare anxiety and depression levels (minimal, mild, moderate and severe levels) of the mothers of both groups, a Chi-square Test was used.

For analyzing the data collected from response to the question on the causes attributed by the mothers to malnutrition, it was followed the content analysis organization as proposed by Bardin (1977) which involves three phases: 1) pre-analysis, 2) exploitation of content, and 3) treatment of results, inference and interpretation. Therefore, all responses were read and explanatory categories were created[27]. The study was approved by the Research Ethics Committee of FMB-UNESP (Case No. 176/2006).

RESULTS

There were no representative differences in relation to age, marital status and number of children between MM and EM groups. Most mothers were almost 30 or older, they had a steady partner, and half of the MM group had up to three children, with a range of variation from one to six children. Differences were also not found concerning

education: half of the sample had five years of schooling, that is, the mothers had dropped out of school before completing the primary school. In both groups there were mothers with low education, who had dropped out of school in the early years of primary school, and mothers who reached higher education. Most mothers of the EM group (seven mothers) had paid work, while only three of the MM group worked outside the home; however, the difference was not significant.

Both groups could be characterized by low socioeconomic status based on the available indicators (education, housing characteristics and place of residence). They lived and were registered at Primary Healthcare Units in the surrounding areas which had a Swaroop-Uemura Index (percentage of mortality ratio of people aged 50 and above on the total deaths) in 2004 ranging from 37.5% to 77.8%, in contrast to the 80.6% average of the city where the study had been carried out. They were places where infant mortality in 2004 could also be considered high (ranging from 13.3/1000NV to 76.9/1000NV) if compared to the infant mortality city indexes (12.8/1000NV)[28].

As expected, children in the MM group had mean values for anthropometric indicators significantly lower than children in the EM group. No statistically significant differences were observed in regard to age and sex: 50% of the EM group and 60% of the MM group were composed of girls; and the median age of both groups was similar — 16 and 17 months respectively.

No statistically significant difference was observed as to the number of vital events cited by the mothers of both groups [MM group Med=4.5 (1-9) and EM group Med = 3 (0-8); p = 0.49], neither in regard to the frequency of each one of them. With reference to the group of mothers (n = 20), the most memorable vital events were job change, job loss, death of a family member and financial losses. Notwithstanding, none of them had a frequency of more than 50%, although having debts to pay was cited by 70% of mothers in the MM group as opposed to 40% in the EM group.

On Table 1, when comparing anxiety and depression median scores of the mothers of MM and EM groups, in spite of the differences not being statistically representative, it was observed that the mothers in the MM group scored higher on both scales as well as that the scores variation range was also higher.

Table 1: Median, minimum value and maximum value of mothers' depression and anxiety indicators in the MM and EM groups

Variables	MM Group (n = 10)		EM Group (n = 10)		p Value
	Med	Mín-Máx	Med	Mín-Máx	
Anxiety (BAI)	8,5	1 - 35	4,5	0 - 14	0,1488
Depression (BDI)	10,0	1 - 23	5,0	0 - 9	0,1031

Wilcoxon non-parametric test

With regard to anxiety signs, three mothers of the MM group and one of the EM group showed an indicative score of some degree of anxiety, although the differences were not pronounced. As for depression, the groups differed greatly: no mother of the eutrophic group had signs of depression in contrast to five mothers of the malnourished group who suffered depression, being two of them with mild depression and three with moderate depression (Table 2).

As for the explanations on the causes of malnutrition, they were the same ones in both groups. Many of them reported that malnutrition is a condition with inumerous causes, such as biological, behavioral, social and psychological causes, sometimes acting together.

The causes that led children to malnutrition were grouped into two main thematic axis:

a) biological causes: children have malnutrition due to hereditary problems, diseases and poor breastfeeding;

b) lack of childcare because of:

- maternal neglect - e.g. *"I think they are children of mothers who do not care for them, right? Some mothers just think about work, others only about their husband, and others only about their own homes ..."* (MM);

- inherent difficulties to maternal condition: age, low education and guidance, time to childcare, emotional problems and family conflicts - e.g. *"... I didn't have much experience ... I didn't have enough notion of feeding the child, for me it was breastfeeding and bottle ... so, that is why I say that a little is because of the lack of mother's guidance ..."* (ME);

-difficulties imposed by the inappetent and obstinate child;

- difficulties imposed by the context, such as socioeconomic status, poor access to and difficulty in being attended by healthcare services - e.g. *"... it bothers a bit because the doctor said I have to give him more food that has vitamin, like papaya, fruit, vegetables ... but now I cannot buy vegetables, a lot of things, because I do not have a refrigerator to store food ..."* (MM).

Table 2: Frequency of mothers of the MM and EM groups according to anxiety intensity assessed by BAI and depression intensity assessed by BDI

Variables	MM Group (n= 10)		EM Group (n= 10)		p Value
Ansiety intensity (BAI)	**N**	**%**	**N**	**%**	
Minimal	7	70,0	9	90,0	0,5762
Mild	2	20,0	1	10,0	1,00
Moderate	0	0,0	0	0,0	NA
Severe	1	10,0	0	0,0	1,00
Depression intensity (BDI)					
Minimal	5	50,0	10	100,0	0,03887**
Mild	2	20,0	0	0,0	0,4561
Moderate	3	30,0	0	0,0	0,2104
Severe	0	0,0	0	0,0	NA

* Chi-square Test; NA = Not applicable; ** $p \leq 0,05$

DISCUSSION

Data revealed that mothers of both groups were subject to very similar life conditions, notably determined by low socioeconomic status. The World Health Organization (WHO) acknowledges that the main health problems have, among its causes, social determinants, factors related to the environment in which people live and work and to life conditions[29]. The mothers themselves recognized they had difficulty to adequately feed their children and to follow the instructions due to their socioeconomic status. In spite of the similarities, it was possible to notice some differences in both groups of mothers.

As for maternal employment, despite the difference not being significant a larger number of mothers of eutrophic children (seven mothers) worked, compared to mothers of malnourished children (three mothers). The mothers seemed to share a recurring vision[30] that considers the time spent with their children as a defining variable of ability to care. *"... the other daughter over there, she was malnourished when she was of his age for real lack of care because I worked, then I couldn't take care of her"* (EM).

With the gradual increase of women in the labor market there was an expectation that the maternal separation could raise the risk of morbidity in children's health. Nevertheless, there are studies showing that the mothers working outside the home exerted a protective effect on height/age deficits, making evident that, stronger than the mother's presence, access to goods and services determined the nutritional status of children[4]. Engle[31] has already indicated the inaccuracy to investigate the effect of maternal work as a dichotomized variable: work presence or work absence. According to this author, depending on the generated income, on the work type, on the appropriateness of substitute care, the employment of the mother would allow autonomy to guide the resources, so the effect on child nutritional status could change from risk to protection. As reported by Solymos[32], job security seems to have a positive effect as the mothers of malnourished children achieve more security to face difficulties with the household budget.

Nevertheless, the interviewees in this study did not regard the employment as protective, but rather as an obligation for survival that would harm their children.

"Sometimes the mother has no money; she doesn't have much time to be together with her children. Then I don't know, she has to work ... There are people here who are very poor, right?" (EM).

The weakest children´s mothers postponed going back to work or left their jobs to care for their children. *"... then, when I noticed she was getting bad I left my job to take care of her, but I've almost lost her ... "* (MM). If, on the one hand, staying at home implied for the mother having more time for direct childcare, the high percentage of mothers of the MM group (70%) who reported having debts in the range of vital events, on the other hand it allows raising the hypothesis that if mothers did not work, then they would be mothers in a worst financial condition, and that the lack of money and of essential consumer goods hampered purchasing adequate food.

"... cookies that have vitamin, I'm not able to buy them. Danone, which other people say it's good, it has calcium, I can't buy it ..." (MM).

Concerning mental health, although malnourished children´s mothers scored higher on emotional distress indicators than the eutrophic children´s mothers, the difference was only expressive in relation to the number of mothers with signs of depression: no mother in the eutrophic children group and 50% of mothers in the malnourished children group. The association between depression and malnutrition still has controversial results as shown in the published papers in recent years. Studies carried out in Asia, including cohort studies, have shown an association between depression and children's physical growth. Nevertheless, researches conducted in other African, Latin American and European countries, with just a single exception, have not demonstrated that maternal depression is an independent risk factor for child malnutrition[11,33].

Stewart[11] hypothesizes that maternal depression has a strong impact on child nutrition; the more "hostile" the environment, the worst for the child. Besides living in poor neighborhoods, the interviewed women were exposed to other conditions associated with maternal depression, such as job change, job loss, and a family member´s or a close friend´s death, moving home, financial losses, and especially debts to pay. They themselves noticed that, due to stressful conditions, the impact changed their sensitivity towards their children´s psychological and physical needs and, finally, led them to malnutrition.

"... my husband left me and my brother was killed. I saw him dead, sprawled on the floor, and got unhappy with life and didn't care for the children adequately. Then, everything helped her getting undernourished. I wasn't able to take care of her, I just cried in the house ..." (MM).

Although the association between vital events and mental health was not representative, the mothers who scored higher for anxiety and depression were those who went through a larger number of stressful situations, and they were alone, without a partner, with many children to raise. Some of these adverse conditions persisted for a long time.

"... I'm stressed, so anything she does in a sly manner, everything she will do, turns me angry and I don't want to vent my anger on her because, hey, it's wrong. But imagine yourself living in a room, together with your 10 children, even you, your husband and your son, or just you and your child, right? This influences , of course..." (EM).

In recent years, several studies have demonstrated that the presence of a support group can act as a protective factor for maternal mental health[34,35]. On the other hand, having to take care of a child without someone to share responsibilities can be a risk factor.

The stable relationship and the presence of a partner, mainly when the partner gives support to the woman in taking decisions and shares childcare, can be seen as protective factors for child development[12,32]. On the other hand, marital conflicts magnify the risk of developing anxiety and depressive symptoms[36]. Many mothers mentioned having problems with their husband, such as husbands who drank, who had arguments with them, who beat them, and the mothers associated that environment of tension to the child malnutrition.

The relationship between maternal depression and malnutrition is not a one-way street which is solely associated with maternal conditions. In addition to the mother's stress, the difficulty of interacting with an inappetent and malnourished child demanded a great deal of energy in a moment in which the child's level of engagement was probably very low.

"... I insist, but she's not eating. There are days I'm very irritated by other things, then I have no patience ... I quarrel with her and so she doesn't eat at all" (MM).

Then, this starts a vicious cycle. The depressed mother who cannot feed her child properly and defeat malnutrition perpetuates a deficitary interaction, which leads to a perception of acquired incompetence that keeps her depressed, insecure and more reticent towards medical instructions[4].

"It is my responsibility to decide upon what feeds her and what doesn't feed her, so everything that can have bad consequences because of poor nutrition is whose fault? Mine, who is the whole time with her ... because I've already given her everything: egg duck, liver, beet juice ... and she doesn't gain weight. And I'm a person who does everything correct, who follows the instructions. So, if she doesn't gain weight I have given up. I'll leave it as it is" (MM).

The percentage of depressed mothers in this study was higher than in other recent Brazilian studies[4,16]. The different assessment instruments used in this research as well as the way the data analysis was carried out have probably influenced in the achievement of different results. On the one hand, Carvalhaes and Benicio[4] used the *Self-Reporting Questionnaire 20* (SRQ-20), which is an instrument for detecting general mental distress, but not specific to detect either anxiety or depression. In another study, the *Center for Epidemiologic Studies Depression Scale* (CES-D) was applied, which is a scale of worldwide use to detect depression. However, the variable was dichotomously analyzed, that is, for individuals with or without depression[16]. In this research we opted for the Beck Depression Inventory, a specific screening instrument which allows categorizing depression according to four levels of intensity of depressive symptoms and only excludes as normal individuals who score the minimal score. Because of the serious consequences of depression on child development reported in the literature[11,33], we also chose to classify as depressed mild depressed mothers, even though they may have been categorized as mothers with dysphoric symptoms[37]

in other studies, raising the number of depressed mothers in the current sample.

In the case of cross-sectional study, it was not possible to state whether maternal depression was a risk factor for malnutrition or if the fact of being the mother of a malnourished child precipitated the mother's depression. In the second case, the woman's perception as a "failure" mother may be associated with the external pressure, with criticism coming from her family, from the community and even from the health services which stigmatize the mother whose child does not develop properly[11]. It is noteworthy to mention that, in spite of assigning the same causes for their malnourished children, the eutrophic children´s mothers' statements were more moralistic and critical, in contrast to the malnourished children´s ones, which were full of guilt. The effects of those pressures might explain why the MM group´s mothers´ median anxiety was nearly twice of the EM group.

An additional limitation of this research concerns the sample size. The intention was to interview all the mothers who met the inclusion criteria. However, there were difficulties to find malnourished children from the SISVAN because a great deal of their data was outdated; besides, some of their units did not feed the system properly. Venâncio *et al.*[38] had already mentioned that there is no total commitment in Sao Paulo municipalities towards the proposal. They also observed that, in the places where the system was implemented, maintaining the database was discontinuously performed, presenting failures both in filling spreadsheets and typing on monthly data. Although we searched carefully, we estimate that some of the malnourished children have not been located.

In spite of the limited number of interviewed mothers, our research data bring additional information to other researches that associate maternal mental health with malnutrition, mainly depression. According to Rahman *et al*.[14], depression is the most common mental disorder and its relation to child development is greater than with other mental disorders. Notwithstanding, little attention has been given to maternal mental health treatment and prevention in government programs[2]. Brazilian intervention programs for malnourished children within a comprehensive childcare proposal have prioritized offering children food supply and dietary supplements, along with nutritional counseling, where health professional suggest the mothers how to introduce and consume certain food items to their children's diet. These interventions have shown a positive effect on children's physical growth regardless of their time duration[39].

Although the programs are successful, the frequent recurrence of malnourished children and infant mortality rates warn us to the fact that the service should avoid focusing solely on biological aspects as well as that it is important to develop educational strategies which are contextualized in the families' reality, being among them the contemplation and acceptance of the maternal difficulties and of their emotional state[40]. Therefore, actions aiming at providing greater social support to women, early detection of maternal depression through validated screening tools, psychoeducational interventions that can match information with psychosocial support, giving special attention to the relationship between the mother and her children, using actions that enable the increased sensitivity and maternal responsiveness to the children's needs in order to prevent children malnutrition and developmental delay[2].

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