



PEDIATRIC CANCER: EPIDEMIOLOGIC PROFILE OF ATTENDED CHILDREN IN A REFERENCE CENTER IN THE STATE OF PARA

Leila Maués Oliveira Hanna¹, Rodolfo José Gomes de Araújo², Maria Teresa Botti Rodrigues Santos³, Gelson Gomes de Andrade Filho⁴

¹ Cruzeiro do Sul University, São Paulo, SP, Brazil

² Federal University of Para, Belém, PA, Brazil

³ Federal University of São Paulo, São Paulo, SP, Brazil

⁴ Higher School of Amazonia, Belém, PA, Brazil

CORRESPONDING AUTHOR: rjgaraujo@gmail.com

ABSTRACT

Aim: To describe the epidemiological findings of children diagnosed with cancer in a referral center.

Material and Methods: Daily at Ophir Loyola Hospital visits were made - Belém / PA, in clinical pediatric oncology sector, from December 2013 to June 2014. The sample comprised 46 children 2-12 years, diagnosed with cancer, which was already or would begin anticancer treatment. A questionnaire containing questions about family, socioeconomic and environmental aspects was applied..

Results: The most frequent neoplasia LLA was followed by nephroblastoma, neuroblastoma, Hodgkin lymphoma, and osteosarcoma. The genre most affected by childhood cancer was male. The age group with the predominant prevalence were children aged 8-12 years. By observing the religious belief that it was possible to detect most practiced Catholicism. The practice of sports is not part of the daily lives of these children. The origin of these families had dominated for deriving from the state. As the rating distribution of households according to the Economic Classification Criterion Brazil, the two classes were most frequently C2 and D.

Conclusions: We sought, in this article, to demonstrate the epidemiological profile of children seen at a referral center in the state of Para. Research like this, identifying population groups at highest risk or with more unfavorable prognosis, provide health authorities and researchers in the area of cancer with an important instrument in the definition of health necessary for proper control and prevention of the disease.

KEYWORDS: medical oncology, pediatrics, epidemiology, cancer care facilities, neoplasms

INTRODUCTION

Pediatric tumors are classified through International Classification of Childhood Cancer (ICCC), as established by the International Agency for Research

on Cancer (IARC). Such classification is based on the morphology of the compromised tissue. The malignant diseases of childhood affect the cells of the hematopoietic system and the sustenance tissues, and because they are

predominantly of embryonic nature, they are made of undifferentiated cells. Among the most frequent childhood neoplasia are leukemia, tumors of the central nervous system and the lymphomas.^{1,2}

In this context, the Population-Based Cancer Registry (PBCR), the golden pattern for primary tumor detection, is a source of pattern information to qualify cancer, once the PBCRs make a continuous and systematic collection in the assisting services of cancer patients, in a geographically defined population. Currently, there are 23 active PBCRs in Brazil, located in great centers of oncological attention, which cover approximately 22% of the Brazilian population.³

According to the Health Ministry (2011), the epidemiological profile of cancer in Brazil has been providing the population with more knowledge about this disease, as well as gaining more relevance and priorities for a positive change in the Brazilian population scenario.⁴ The increasing number of cases have been happening mainly in countries with medium to low resources, which means, those in development. This has caused the last past decades to become a world health problem, according to World Health Organization.

As a world health problem, Menossi et al.⁵ (2008), state that the early diagnosis and adequate treatment are essential for the diminishing of the mortality rates.

Because it presents very specific characteristics and its own histopathological origins, cancer, which affects children and teenagers, must be studied apart of those that affect adults, especially in which concerns clinical behavior. Pediatric cancer generally presents short periods of latency, it is more aggressive and grows faster; nevertheless, it responds better to treatment, which means it presents a better prognosis.⁴

Given the above exposition, the

objective of this research was to contribute to the epidemiology of pediatric cancer, as well as to associate the possible risk factors in a specific geographic area.

MATERIAL AND METHODS

This research has been submitted to the evaluation of the Ethics Committee in Human Beings Research, through the Ethics Committee of Cruzeiro do Sul University, having obtained a favorable report according to the protocol number CE/UCS-005/2014. The legal guardians of the selected children have been informed about the research. The ones who have authorized the child's participation, after having read the consent form, have signed the document.

Every child who has been attended in the oncology reference unit in the State of Para - Ophir Loyola Hospital - has been investigated. The criterion used for the inclusion in the study were: unit admission between December 2013 and June 2014, having been diagnosed with cancer, being 2 to 12 years old, being in the diagnosis phase or in the beginning of treatment. Children who have deceased during the stipulated period of the research have been included. Patients diagnosed with benign tumors or with systemic diseases related to cancer have been excluded from the research.

The necessary information for the accomplishment of this research has been obtained through interviews with the children's legal tutors and doctors who were responsible for the oncologic treatment. The collected data included the children's personal information (name, age, gender, address, telephone numbers, religious beliefs, the practice of sports) and their tutor's (tutor's name,

age, and relationship), and the disease data (risk factors and cancer treatment).

At this moment, information about the social and economic conditions of the families have also been collected with the questionnaire of the Brazilian Association of Research Companies (Associação Brasileira de Empresas de Pesquisa - ABEP).

RESULTS

After the stipulated period for the research, the total sample, which has been reached, was of 46 children with cancer. The time between the diagnosis and the beginning of the treatment was relatively long. 37% of the children have taken two months to begin the antineoplastic treatment and 63% have initiated within one month. Figure 1 shows the patients' distribution according to the diagnosed neoplasia. The most frequent neoplasia was LLA (27.9%), followed by nefroblastoma (13.79%), neuroblastoma (10.34%), Hodgkin's Lymphoma (10.34%) e osteosarcoma (6.9%). Other neoplasia such as retinoblastoma, neurofibroma, non-Hodgkin's Lymphoma, melanoma, LMA, medulloblastoma, angiosarcoma, ovary tumor and sarcoma, all with 3.45%.

The gender that is more affected by pediatric cancer has been the male one, with 34 children against 12 of the female gender. There is a proportion of male children higher than 50%. Because there is not a paradigm proportion for this type of population under study, this proportion has not been tested in order to discover if it would differ from what should have been expected. In the patients' distribution according to the age group, it has been observed that the predominant prevalence was in children aged 8 to 12, with 46%, followed by children aged 2 to 4, with 35%, and

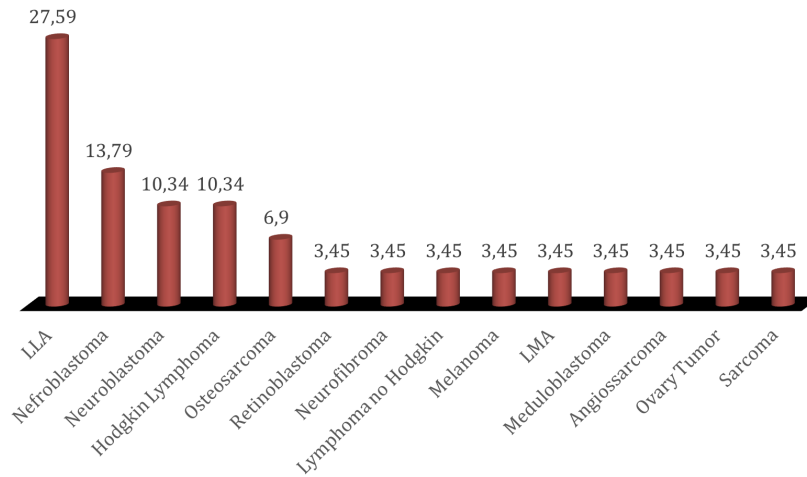
subsequently, children aged 5 to 7, with 19%. The average obtained was of 6.6, with a standard deviation of 3.0. Whenever Boxplot of age groups is applied, an average of seven years has

been obtained, and an interquartile interval of four to nine years (Figure 2).

When observing the religious creed of the researched population, it has been possible to detect that most of them

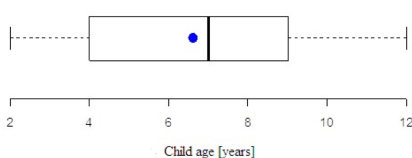
were Catholics. There has been only one exception case in which the person declared himself as indigenous (Figure 3).

Figure 1. Graphic illustrating the distribution of patients according to the type of neoplasia.



Sports practice is not part of these children's daily routine. Ninety-one% have reported not to practice any activity at all, even before having learned about their disease. During the data collection, most of the legal tutors were the mothers, with 36 cases. The fathers were only 9, and there has been only one aunt as a legal tutor. The origin of these families was predominantly of the countryside of the state, with 62% against 38% from the capital.

Figure 2. Age boxplot of sample children.



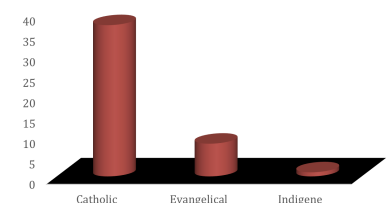
The classification distribution of the families according to the Brazilian Economic Classification Criterion (Classificação Econômica Brasil – CCEB) of ABEP - Associação

Brasileira de Empresas de Pesquisa (Brazilian Association of Research Companies) has been compiled in five of eight possible classes, being the least Class E (average income of BRL\$ 776.00 a month – approximately US\$ 247.00) and the highest B2 (average income of BRL\$ 2,650.00 a month – approximately US\$ 842.00) in this sample. The two social classes with most frequency were C2 and D, with 26% each, producing together, therefore, 50% of the sample. The distribution is asymmetrical, with the prevalence of families that have lower economic power (Figure 4).

The results demonstrate that the probable etiology for the LLA, with a higher prevalence in all age groups, has been the paternal elitism, present in 35% of the patients, followed by the genetic disease in the family in 30%, smoking mother during pregnancy and smoking father with 24%, and inbreeding in the family with 11%.

Other verified causes, such as spontaneous abortion, medication during pregnancy and parents' exposition to chemical products, have presented the prevalence of 7% of the cases. The least prevalent causes were alcohol use during pregnancy with 2%, and mother's exposition to ionizing radiation during pregnancy, with no report (Table1).

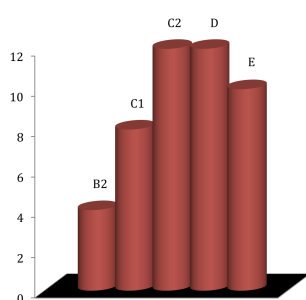
Figure 3. Religion distribution of sample children.



Every child who has been examined was completing the tenth cycle of chemotherapy. Nevertheless, the frequency and number of sessions done on the same day as the interview

have been evaluated, as Figure 6 shows. The typical number of chemo sessions (popular) was of four, which is also the average of this distribution, being the least of one session and the most of nine sessions. The interquartile interval is expected to be of two to six sessions.

Figure 4. Distribution by CCEB of the children's families of the sample.



DISCUSSION

The arrival of most of the patients without having the diagnosis,

the long time that is taken in the laboratory exams, and the delay in the diagnosis are very evident factors that happen at Ophir Loyola Hospital. Perhaps, because of that, there has been found a high death rate (13%) in this research, when compared to the death rates of Brazil (Figure 5). In the past decades, the South, Southeast, and Center west regions have had a decrease in the mortality rates; however, in the North and Northeast regions, the numbers have increased in more than 80%.⁶

For the children of the research, the time factor was one of the biggest problems they had to face, for most of them (37%) had taken two months between the diagnosis and the beginning of treatment; and 19% still hadn't had any estimate for the beginning of chemo treatment. This kind of delay may be related to the precarious situation in the country's

public health system (Sistema Único de Saúde – SUS), in which there is a lack of human resources, as well as consumption materials and maintenance of existing equipment.

A factor that corroborates for this situation is the lack of financial resource equity for cancer treatment, once it is known that more economically developed states receive higher resources. A mapping of the indicators of medical assistance suggests that the inhabitants of the North region and some peripheric towns of the Northeast region (Maranhao, south of Piaui and West of Bahia) receive fewer procedures of chemotherapy, radiotherapy, oncologic surgery and hospital stays when compared to residents of the South and Southeast of Brazil, and demonstrating the inequality of access.⁷

Table 1. Risk factors.

Spontaneous abortion	7%
Inbreeding in family	11%
Genetic disease in family	30%
Paternal elitism	35%
Alcohol exposition of mother during pregnancy	2%
Medication exposition of mother during pregnancy	7%
Ionizing radiation of mother during pregnancy	0%
Parents' exposition to chemical products	7%
Smoking mother during pregnancy	24%
Smoking father	24%

The gender that was most affected by pediatric cancer was the male, with 74% of the cases; the female gender has corresponded to only 26%. These data are very similar to the studies held by Trindade et al.⁸ (2009) and Barbosa et al.⁹ (2010), in which

they had obtained a percentage of 72.1% and 75% for the male gender, respectively.

The data also agree with the prevalence observed in a research developed in Belem do Para, where Figueiredo and Nogueira¹⁰ (2013) have

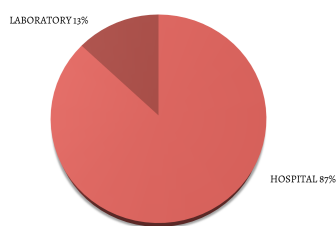
found a percentage of 59.37% for the male gender and 40.63% for the female gender.

The incidence studies held in Brazil confirm that the highest prevalence of pediatric cancer affects the male gender in most of the

tumors⁶.

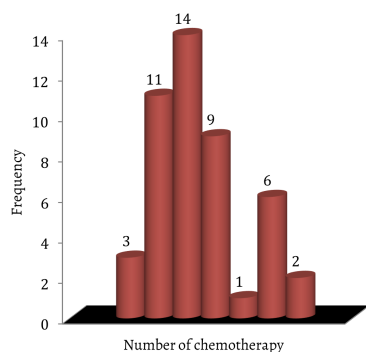
In what concerns patients according to age groups, it has been observed that the highest prevalence was of children aged 8 to 12 (46%). Corroborating with this research, Trindade et al.⁸ (2009) has obtained even higher percentages (37.6%) of children aged 8 to 12; nevertheless, the average age of the groups has been higher than the one of this research – it reached the value of 10.69. Barbosa et al.⁹ (2010) had obtained a sample of 32.5% of children aged 0 to 5, 32.5% aged 6 to 10 and 35% aged over 10. The most affected by cancer has also prevailed on the higher age group.

Figure 5. Type of treatment of children of the sample.



Cariello et al.¹¹ (2010) had observed that 44.9% of the patients were aged under 6, 25.8% were aged 6 to 10, 19.5% aged 11 to 15, and 9.8% aged 16 to 18. These data confront with the ones that had been observed in this study.

Figure 6. Number of chemotherapy sessions of children from the sample.



The religious and spiritual creeds offer possibilities of meanings and answers to existential questions that appear, given the disease and the possibility of death. However, helping these patients with the finding of meaning for their experiences is still a challenge for the health professionals. That is, mostly, because these professionals feel unprepared to deal with the religious and spiritual creeds of patients and of their families and, besides that, there is the fact that there are few studies that address this subject in the scientific literature.¹²

Religion or creeds may be important determiners in the process sickness-healing, as far as it establishes the adoption of healthy habits and behaviors that benefit those who practice it. Some religious practices bring healthy effects on physical and mental health. These practices bring reflections in Family members and, sometimes, have an important role in prevention and cure of diseases.¹³

Therefore, it has been observed that religious involvement, independently of religion, was related to a desirable result of health of the children who have cancer. From the analysis of narratives, “It’s an opportunity of approximation of spirituality; we become more sensitive, and we get closer to God”. “These moments are when we search for hidden forces that recover ourselves, and religion represents this approximation with spirituality”, “It’s the strength we need”, “Spirituality was a way to keep me standing tall”, “The feeling of knowing that we were being helped by people, by friends, by their prayers was indescribable”, “My faith has become stronger after my son’s disease. It is for sure – we are aware that there is someone looking after us,

and it is comforting. There is someone out there, some higher force, that thinks we need to know how to ask, thank, and believe in it”. It has been possible to understand the religious behavior when related to the health – healing process, which was filled with the meaning that is given to the correspondent creeds.

Consequently, depending on the family’s beliefs, the meaning given to sickness and death makes these difficult situations be easier or not.

Aquino and Zago¹⁴ (2007) have completed a study with six Laryngectomized patients in order to understand the influence of religiousness for the oncologic survival. They have verified that the search for religion has been present since the initial steps for the occasion of diagnostic exams, per passing the disease development until it reaches the survival condition. According to the authors, religion has been very important for the redimensioning of experiences with the disease and the treatment.

With the objective of understanding the relationship between spirituality and cancer in the perspective of oncologic patients, Guerrero et al.¹⁵ (2011) had performed a qualitative study with the participation of fourteen cancer patients during chemotherapy treatment. The reports had been organized in three categories: The discovery of cancer, the Faith as a confrontation of cancer, and the search for the cure of cancer. It has been understood that the oncologic patient searches for spirituality as a way of confrontation of the disease, with the purpose of minimizing the suffering or obtaining higher hopes for cure with the treatment.

For the moment in which the

child acquire a debilitating disease, such as cancer, he or she starts suffering from the limitations of it, as it is, for instance, with the practice of sports. For Cicogna et al.¹⁶ (2010) the plays, because of the performed therapies, become restrict and, usually, those of higher physical impact, such as hide-and-peek and run-and-catch are excluded from their daily lives. Going out to play with friends is not part of the child's or teenager's routine anymore.

The low levels of physical activity, musculoskeletal morbidity and weight gain are commonly related as problems in cancer children. Intensive medical treatment and a decline in physical activity may also result in the diminishing of motor performance. Therefore, simple and cheap ways to promote physical activity and exercise have been becoming an increasingly important part in the treatment of pediatric cancer.¹⁷

Although this occurs, it has been possible to observe that currently children live in a time of sedentarism; 91% of the researched children had reported not to practice any kind of physical activity, even before being sick. This problem is caused, in great part, by the development and growing of technology, stimulating children and teenagers to spend hours of their days using computers and playing video games. The lack of safety cannot be disregarded as another factor of sedentarism stimulation. In the past, children and teenagers used to practice physical activities on the streets, through games that have been practically extinct throughout the years.

In the face of all the adversities of the antineoplastic treatment, family members represent

the first confrontation resource for the child. Therefore, it cannot be thought to receive a child for treatment without a tutor, having in mind that he or she will go through invasive treatment, many times painful ones, and that may bring suffering and discomfort.

During the research at Ophir Loyola Hospital, most of the tutors were the children's mothers. Thus, it has been observed that their presence indicates the important role the mothers have within the family unit and in the diminishing of anxiety of children in the face of treatment in a hospital environment, although there could also be noted a great feeling of guilt and anxiety felt by them when facing their children's hospital stays. Some of the mothers' descriptions reveal important aspects related to the difficulties of being far from home, from work, and from their other children. Studies held by Nascimento et al.¹⁸ (2009), Santos and Gonçalves¹⁹ (2008) had also emphasized this distress lived by mothers of cancer children, and had reinforced the difficulties related to the distance of the social and family's daily life.

Cariello et al.¹¹ (2010) had also verified that, from the patients' accompanying people, 72.3% were the mothers, 11.0% were the fathers, and 16.7% were other family members. Even with the fact that the treatment had been performed only for a few hours, and the child and his or her family member (as a general rule) had been released to return home, sitting during the whole infusion of chemotherapy might be very uncomfortable. Stimulating the family member's presence beside the child is a practice that may be positive.²⁰

The origin of these families was predominantly from the state's

countryside (62%), opposing to the families that live in the capital, with 38%. Cariello et al.¹¹ (2010) had observed in their researches that 52.7% of the patients had come from the capital of Sao Paulo, 26.2% from the countryside of Sao Paulo, and 21.1% from other states. There should be considered that in the countryside of Para does not provide reference units for oncologic treatment. This is much different in the state of Sao Paulo, which is more developed and presents better structures in the countryside, explaining, this way, the difference in the results of the research.

In this research, the most predominant social classes were C2 and D, both with 26%, meaning that those are classes with a Family income between approximately 1 and 2 minimum wages, according to the Brazilian Economic Classification Criterion. Classes A and B1 were not involved in this study. Concerning the degree of education of the tutor, the research has demonstrated that most of them have finished high school (20.7%). The other significant percentages were about tutors who have not finished and have finished middle school, both categories with 17.2%. The rate of tutors who have a University Degree was of 10.3 %, meaning that, in a general way, the instruction level of tutors was low. According to Peres et al.²¹ (2009), low income might be related to a lower scholar level, which has been corroborated in this study, since the highest percentage reached was of lower social classes, as well as a lower education degree. Peres et al.²¹ (2009) had observed in their study that children aged 3 to 12, whose family income was inferior to 5 minimum wages, had presented 4.18 times more

chances having high cavity problems when compared to the ones with family income higher than 15 minimum wages.

The results demonstrate that the most respondent factors for pediatric cancer of this research were paternal elitism, present in 35% of the patients' genitors, followed by family's genetic disease with 30%. Cariello et al.¹¹ (2010) had detected in their research that 46.1% of mothers were smokers, 29.2% of the fathers used to consume alcohol on a daily basis, 24.6% had a family genetic predisposition, 16,9% of the father were smokers, and 13.8% presented family inbreeding. The author had also verified other risk factors in a smaller proportion, as it has happened in this research.

Despite the fact that the State of Para has a Support House for these families, the children have arrived in a very weak condition, complaining of being tired, having fever and stains in their body. This has made a daily monitoring necessary. For this reason, hospitalization of children at Ophir Loyola Hospital has been frequent during all the period of the research. 87% of the children have been hospitalized, and some of them for long periods.

Aquino and Vilela²¹ (2014) state that waiting time might cause significant concerns about clinical condition for cancer patients, which reflects on psychosomatic factors, accelerates the sickening process and reduces the healing chances.

CONCLUSIONS

In this article, it has been intended to demonstrate the epidemiological profile of children who have been attended in a reference

center in the State of Para. Research such as this one enable the identification of population groups under a higher risk or with a more unfavorable prognosis, serving to health authorities and researchers in the cancer area as a relevant instrument at the definition of necessary health actions to be taken for the adequate control and prevention of the disease.

REFERENCES

1. Silva DB, Pires MMS, Nassar SM. Câncer pediátrico: análise de um registro hospitalar. *J Pediatr* 2002;78:409-14.
2. Instituto Nacional Do Câncer (INCA). Particularidades do Câncer Infantil. [Access in 10 Feb. 13]. Available at: http://www.inca.gov.br/conteudo_view.asp?id=343.
3. Oliveira PPV, Silva GA, Curado MP, et al. Confiabilidade da causa básica de óbito por câncer entre Sistema de Informações sobre Mortalidade do Brasil e Registro de Câncer de Base Populacional de Goiânia, Goiás, Brasil. *Cad Saúde Pública* 2014;30:296-304.
4. Ministério da Saúde. Incidência de câncer no Brasil: estimativa \2012. Rio de Janeiro: INCA, 2011.
5. Menossi MJ, Lima RAG, Corrêa AK. Enfermagem. *Rev Latino-Am Enferm* 2008;16:489-94.
6. Instituto Nacional Do Câncer (INCA). Particularidades do Câncer Infantil. [Access in 10 Feb. 14]. Disponível em: http://www.inca.gov.br/conteudo_view.asp?id=343.
7. Grabois MF, Oliveira EXG, Carvalho MS. Childhood cancer and pediatric oncologic care in Brazil: access and equity. *Cad Saúde Pública* 2011;27:1-7.
8. Trindade AKF, Biase RCCG, Filho GG, et al. Manifestações orais em pacientes

pediátricos leucêmicos. *Arq Odontol* 2009;45.

9. Barbosa AM, Ribeiro DM, Coldoteixeira AS. Conhecimentos e práticas em saúde bucal com crianças hospitalizadas com câncer. *Ciência e Saúde Coletiva* 2010;15:1113-22.

10. Figueiredo PBA, Nogueira AJS. Prevalência de Neoplasias, cárie e gengivite em pacientes oncológicos pediátricos no município de Belém, Pará. *Pes Bras Odontoped Clin Integr* 2013;13:141-46.

11. Cariello AJ, Lucca A, Caran EMM, et al. Achados epidemiológicos de tumores pediátricos em um centro de referência. *Pediatria (São Paulo)* 2010;32:261-5.

12. Mcleod DL, Wright LM. Living the as-yet unanswered: spiritual care practices in family systems nursing. *J Fam Nurs* 2008;14:118-41.

13. Bousso RS, Poles K, Serafim TS, et al. Crenças religiosas, doença e morte: perspectiva da família na experiência de doença. *Rev Esc Enferm* 2011;45: 397-403.

14. Aquino VV, Zago MMF. O significado das crenças religiosas para um grupo de pacientes oncológicos em reabilitação. *Rev Latino-Am Enferm* 2007;15:42-7.

15. Guerrero GP, Zago MMF, Sawada NO, et al. Relação entre espiritualidade e câncer: perspectiva do paciente. *Rev Bras Enferm* 2011;64:53-9.

16. Cicogna EC, Nascimento LC, Lima RAG. Crianças e adolescentes com câncer: experiências com a quimioterapia. *Rev Latino-Am Enferm* 2010;18:864-72.

17. Kauhanen L, Jarvela L, Lahteenmaki PM, et al. Active video games to promote physical activity in children with cancer: a randomized clinical trial with follow-up. *BMC Pediatrics* 2014;14:94.

18. Nascimento CAD, Monteiro EMLM, Vinhaes AB, et al. O câncer infantil

(leucemia): significações de algumas vivências maternas. Rev RENE 2009;10:149-57.

19. Santos LMP, Gonçalves LLC. Crianças com câncer: desvelando o significado do adoecimento atribuído por suas mães. Rev Enferm UERJ 2008;16:224-29.

20. Gomes IP, Aamador DD, Collet N. A presença de familiares na sala de quimioterapia pediátrica. Rev Bras Enferm 2012;65:803-8.

21. Peres KG, Peres MA, Araujo CLP, et al. Social and dental status along the life course and oral health impacts in adolescents: a population based birth cohort. Health Quality Life 2009;7:95.

22. Aquino RCA, Vilela MBR. Comunicação dos pacientes com câncer: Preocupação relacionada ao tempo de espera para o acesso e o itinerário terapêutico aos cuidados oncológicos. Distúrb Comun 2014;26:420-2.