

## ORIGINAL RESEARCH

# Acute lymphoblastic leukemia in children: NANDA, NIC-NOC care-givers intervention

Bertha Alicia García-Ibarra<sup>1</sup>, María Candelaria Betancourt-Esparza <sup>\*2</sup>, Josefina Gallegos-Martínez <sup>2</sup>, Dario Gaytán-Hernández<sup>2</sup>, Juan José Otíz-Zamudio<sup>1</sup>

<sup>1</sup> Hospital Central "Dr. Ignacio Morones Prieto" de San Luis Potosí, México

<sup>2</sup> Facultad de Enfermería y Nutrición Benemérita Universidad Autónoma de San Luis Potosí, San Luis Potosí, México

**Received:** October 17, 2015

**Accepted:** January 26, 2016

**Online Published:** February 16, 2016

**DOI:** 10.5430/jnep.v6n7p31

**URL:** <http://dx.doi.org/10.5430/jnep.v6n7p31>

## ABSTRACT

**Background and objective:** Childhood cancer is now considered a chronic cancer, and thanks to technological advances, survival has increased. Childhood cancer affects patients younger than 15 years. Acute lymphoblastic leukemia (ALL) is among the four primary causes of cancer-related mortality worldwide. ALL is a source of great concern, fear, and guilt for the caregiver due to the lack of knowledge regarding its complications and how to properly care for a child with this disease, highlighting the importance of caregiver education. An educational intervention was carried out according to the Nursing Interventions Classification (NIC): Teaching: Group intervention and based in the North American Nursing Diagnosis Association, Diagnostic: Disposition toward improving knowledge. To identify this program was named Acute Leukemia Program (Programa Leucemia Aguda "P-LEA"). The objective of this study was to analyze the effectiveness of group educational intervention in improving caregivers knowledge of the care of the child with ALL.

**Methods:** A pre-experimental study with a pre-test/post-test group was performed in which a pre-intervention questionnaire and two post-intervention questionnaires at the time of intervention and one month following were administered. These questionnaires measured the level of caregiver knowledge (n = 30; 80% mothers, 7% fathers and 3.3% siblings). The results were based on the Nursing Outcomes Classification (NOC) labels ("management of the cancer", "disease process"), in the following indicators: "disease process"; "precautions for preventing treatment complications", and "adverse effects of the medication". The scores varied from zero to six (no knowledge) to > 25 (extensive knowledge). Caregiver interest in learning was also evaluated using an affective learning instrument based on Patricia Potter's theoretical contribution.

**Results:** The mean level of knowledge prior to intervention was 16.63 (SD 3.6). The mean level immediately following intervention was 25.53 (SD 1.9). The mean one month following was 25.2 (SD 4.9), with 29 degrees of freedom ( $p = .000$ ).

**Conclusions:** The group instructional intervention (NIC) "P-LEA" based on NANDA and NOC-NIC helps caregivers learn about the care of children with ALL.

**Key Words:** North American Nursing Diagnosis Association, Nursing Intervention Classification, Group education, Nursing Outcome Classification, Knowledge, Nursing, Parents, Disease process

## 1. INTRODUCTION

Childhood cancer is now considered a chronic cancer, and thanks to technological advances, survival has increased.<sup>[1,2]</sup>

The population affected by childhood cancer is younger than 15 years. Acute lymphoblastic leukemia (ALL) is among the four primary causes of cancer-related mortality worldwide.<sup>[3]</sup>

\*Correspondence: María Candelaria Betancourt-Esparza; Email: etebespar1324@hotmail.com; Address: Facultad de Enfermería y Nutrición Benemérita Universidad Autónoma de San Luis Potosí, San Luis Potosí, México.

In Mexico in 2011, of every 100 persons under 20 years with malignant cancer, 59 had cancer in the hematopoietic organs, principally due to leukemia.<sup>[4]</sup> In San Luis Potosi, leukemia is one of the four leading causes of mortality in children from 5 to 14 years and occurs more frequently in males (12.5%), than in females (8.3%).<sup>[5]</sup>

ALL compromises the immunological and humoral immune system, and basic system defenses are compromised during chemotherapy treatment. Consequently, the patient requires special attention provided by parents and/or responsible caregivers. No caregiver is prepared to learn that his or her child has cancer, and the shock of the diagnosis is quickly followed by the expectation of assimilating a large quantity of information about the condition<sup>[1,6]</sup> treatment, and care.

When caregivers learn of the diagnosis, they begin an ongoing process of learning to live with their child's disease as an integral part of their lives. They ask themselves about the concrete causes of the disease, particularly how it began. Mothers may blame their actions during pregnancy or believe that they did not feed the child properly.<sup>[2,7]</sup> They feel guilty and powerless for not being able to protect the child from cancer. They usually feel insecure with respect to the care that they should give and uncertain about the treatment's success and whether the child will be cured.<sup>[1]</sup>

This insecurity, fear and uncertainty of the unknown causes, caregivers to be unable to remember or think clearly when the physician explains the child's diagnosis to them. Consequently, a nursing service for caregivers is to provide them with clear and repeated information<sup>[8]</sup> and to allow them to ask about any questions or doubts to reduce their uncertainty.<sup>[1]</sup> When they gain knowledge about this disease process, they understand the factors that aid recovery or staying healthy and how they can modify these factors in a favorable way.<sup>[9]</sup> In the pediatric environment, nursing instruction is usually directed at parents and/or caregivers because they are responsible for the child's care.<sup>[10]</sup>

Patients and family members consider the nurse the primary source of reliable information.<sup>[11]</sup> Consequently, nursing staff should facilitate the instruction-learning process for those who come to receive medical care and wish to receive necessary caregiving information. Health care recipients have the responsibility of protecting and promoting their health, and thus, the lack of instruction of health care professionals could be considered a form of negligence.<sup>[12]</sup>

Currently nursing with the theoretical reference to provide care in a systematic way and with a universal language based on taxonomies: Taxonomy North American Nursing Diagnosis Association (NANDA),<sup>[13]</sup> Nursing Outcome Classi-

fication (NOC),<sup>[14]</sup> and Nursing Intervention Classification (NIC).<sup>[15]</sup>

In the case of health caregiver education it is possible to focus the actions through the nursing diagnosis "Disposition toward improving knowledge manifested by the interest that the caregiver presents and the manifestation of knowledge about Acute Lymphoblastic Leukemia" (Code 00161).<sup>[13]</sup> On the other hand, this intervention can be based in the NIC Instructional Intervention "Teaching disease process" (Code 5602), which encompasses nine activities (assess the current level of knowledge of the caregiver related to the disease process and how they control the symptoms; describe the signs and symptoms and possible etiologies; the process of the disease, changes in the child's physical state, what lifestyle changes they require, as well as show the caregiver how to prevent/minimize the side effects of the disease and to control/minimize symptoms).

Based in the NIC Instructional Intervention "Teaching chemotherapy management" (Code 2240) the activities could be: Learn about observing effects of chemotherapy, infections, hygiene techniques, hand washing; notify alarm symptoms (fever, hemorrhages); and techniques in oral hygiene.

The educational program could be constructed based on the meaningful learning and the learning of the adult, under some principles of learning (recognized learning need, active participation of the apprentice, Association of new words with prior knowledge and strengthening of knowledge). In addition, it is necessary to evaluate the affective learning.<sup>[12]</sup> The caregivers will need to build their knowledge guided by the teaching of nursing. The purposes of the study were to analyze the effectiveness of group instructional intervention in increasing caregiver knowledge of the child with ALL and to establish new working strategies in nursing practice the NANDA and NOC-NIC methodology is in the beginning stages of implementation in Mexico.

## 2. METHODS

### 2.1 Design

The study design was a pre-experimental study with a pre-test/post-test group design, with non-probabilistic sampling. The sample size was 30 caregivers of children with ALL.

### 2.2 Intervention

The design of the NIC educational intervention, called the Acute Leukemia Program (Programa Leucemia Aguda, P-LEA), was directed at caregivers of children with ALL under the Disposition toward improving knowledge in nursing diagnosis (NANDA) evaluated using the NOC result labels "management of the cancer" and "disease process".

The NIC group instructional intervention was developed in four stages. The principal investigator executed the program, and the measurements were conducted by three study collaborators.

In the first stage, the educational pre-intervention measurement was conducted using the Caregiver Knowledge Measurement (Medición del Conocimiento del Cuidador [MCC-Garcia]) instrument.

The second stage was the development of the P-LEA educational program. The program was based on the NIC program instructional group (Code 5604)<sup>[15]</sup> and was based on adult learning and the principles of learning.<sup>[16]</sup> The learning strategies were organized into three stages: a) pre-instructional, b) co-instructional and c) post-instructional.<sup>[17]</sup> The program sessions were developed based on the NIC Instructional Intervention “disease process” (Code 5602), which encompasses 9 activities, and the NIC Instructional Intervention “chemotherapy management” (Code 2240), which encompasses 5 activities. The interventions were developed using 4 P-LEA instructional program sessions. The instruction was reinforced by providing didactic material, a multimedia presentation (presentation in PowerPoint), and materials (notebook, pen, leaflets). The leaflets were didactic-educational material with illustrations and included topics relevant to ALL. The information was presented in question-answer form and included topics such as disease process, treatment, caregiving, and the nutritional needs of the child with ALL.

The interest displayed by the caregiver in acquiring knowledge was evaluated by the Caregiver Interest Measurement (MIC-Garcia) instrument by previously trained interviewers.

In the third stage, the first measurement of knowledge was conducted on the first group of caregivers; the educational pre-intervention and implementation of the program were measured using the MCC-Garcia instrument.

In the fourth stage, the second measurement was conducted on the group of caregivers at 30 days following the culmination of the P-LEA program.

### 2.3 Study site

The intervention was conducted at a Non-Governmental Organization (NGO), the Mexican Association for Assistance of Children with Cancer, San Luis, A. C. (Asociación Mexicana de Ayuda a Niños con Cáncer, San Luis, A. C. - Amanc). This NGO was founded on January 15, 2005, by a group of families in San Luis Potosi. Amanc San Luis Potosi is part of a national system headquartered in Mexico City and delivers technical, administrative, and other necessary support for the child and family. It works in partnership with different government entities, but each center is independent and

organized according to its economic situation.<sup>[18]</sup>

The mission of Amanc is to ensure that all children of San Luis Potosi State between zero and twenty years of age who have low resources, lack medical insurance and have a diagnosis of cancer have optimal resources during their treatment. The medium-term vision of Amanc is to ensure that all children and adolescents in San Luis Potosi state receive integral care during their oncological treatment. The commitment of Amanc San Luis is to provide patients with comprehensive support throughout the time required, including during any cancer recurrence, until attaining the child’s full recovery and to activity reincorporate them into their community. Amanc San Luis has appropriate housing that meets the needs of the child and their family.<sup>[18]</sup>

### 2.4 Population

The population consisted of caregivers of children with cancer at Amanc San Luis. A total of 57 caregivers were recruited, and twenty-seven caregivers were excluded: two because of death, two due to a worsening condition, and 23 who did not attend the instructional program. A sample of 30 caregivers was therefore obtained.

The population was urban (20%) and rural (80%), with 90% from San Luis Potosi State (where Amanc is located) and 10% from surrounding states.

The study population consisted of mothers (80%), fathers (17%) and siblings (3%). The sociodemographic characteristics of the participants are provided in Table 1.

The following criteria were considered for participation in the program:

#### *Inclusion criteria*

Being a caregiver of a child with an ALL diagnosis, a caregiver whose results or target score were equal to or less than 24 points (no knowledge, low, moderate, or substantial) in the instructional pre-intervention measurement, and agreement to participate in the study.

The study population comprised 30 caregivers, who were predominantly mothers, followed by fathers. The mean age was 36 years (SD 9.2), and the majority were from rural areas with a basic education level (primary and secondary).

### 2.5 Ethical considerations

The study was conducted according to the General Health Law regarding human subjects research<sup>[19]</sup> and the Declaration of Helsinki.<sup>[20]</sup> It was approved by the Academic Committee and authorized by the Ethical and Research Committee of the Autonomous University of San Luis Potosi Department of Nursing, record number CEIFE-2013-056.

Participants signed informed consent in which the objectives, benefits, procedures and purpose of the study were clearly explained to them. Their right to withdraw from the study without risk of consequences was also explained to them, and the participant’s right to confidentiality was respected.

**Table 1.** Sociodemographic characteristics of caregivers of children with acute lymphoblastic leukemia (n = 30)

| Characteristic            | Condition                      | Fr | %    |
|---------------------------|--------------------------------|----|------|
| <b>Gender</b>             | Female                         | 25 | 83.3 |
|                           | Male                           | 5  | 16.7 |
| <b>Family member</b>      | Mother                         | 24 | 80.0 |
|                           | Father                         | 5  | 16.7 |
|                           | Sibling                        | 1  | 3.3  |
| <b>Age range</b>          | 15-19                          | 1  | 3.3  |
|                           | 20-24                          | 3  | 10.0 |
|                           | 25-29                          | 3  | 10.0 |
|                           | 30-34                          | 5  | 16.7 |
|                           | 35-39                          | 9  | 30.0 |
|                           | 40-44                          | 4  | 13.3 |
|                           | 45-49                          | 2  | 6.7  |
|                           | 50-54                          | 2  | 6.7  |
|                           | 55-59                          | 1  | 3.3  |
| <b>Level of education</b> | Primary                        | 15 | 50   |
|                           | Junior High                    | 10 | 33.4 |
|                           | High school                    | 3  | 10.0 |
|                           | Complete professional degree   | 1  | 3.3  |
|                           | Incomplete professional degree | 1  | 3.3  |
| <b>Religion</b>           | Catholic                       | 26 | 86.7 |
|                           | Other                          | 4  | 13.3 |

Note. Source: Caregiver Knowledge Measurement Instrument (MCC-García).

**2.6 Data collection methods**

**2.6.1 Data collection**

After obtaining authorization from the Amanc Director, data collection was conducted from May to September of 2013. During the caregiver’s time at the NGO, a personal invitation was individually conveyed through an interview. Information about the study was provided, and informed consent was obtained.

Two instruments were utilized: The Caregiver Knowledge Measurement Instrument (MCC-Garcia) and the Caregiver Interest Measurement Instrument (MIC-Garcia).

**2.6.2 Description of the MCC-Garcia instrument**

The construction of the instrument called the MCC-Garcia is aimed to explore the knowledge of the caregivers and was based on two NOC outcome labels. The first label was Knowledge: “disease process” (Code 1803), with the indicators “disease process” and “adverse effects of the medication”. The second label was NOC Knowledge: “management

of the cancer” (Code 1833) with the indicator “precautions for preventing treatment complications”. The instrument was built with a total of 27 items, with “Yes”, “No”, “Don’t know” answer options, the score for each answer was as follows: “Yes” punctuation (1) “No” and “Don’t know” (0), thus obtaining a maximum of 27 and a minimum of zero punctuation, according to diana score of the NOC.

The instrument was a questionnaire, and the application methodology was an interview. The instrument used a Likert-type scale, with an overall score or instrument total and scores for the three indicators according to the NOC.

The overall score (27 items) was classified as follows: a) zero to six, no knowledge; b) seven to twelve, low knowledge; c) 13 to 18, moderate knowledge; d) 19 to 24, substantial knowledge; e) greater than 25, extensive knowledge.

The scores for the indicator “disease process” (nine items) were classified as follows: a) zero to one, no knowledge; b) two to three, low knowledge; c) four to five, moderate

knowledge; d) six to seven, substantial knowledge; e) eight to nine, extensive knowledge.

The scores for the indicator “precautions for preventing treatment complications” (eight items): a) zero, no knowledge; b) one to two, low knowledge; c) three to four, moderate knowledge; d) five to six, substantial knowledge; e) seven to eight, extensive knowledge.

The scores for the indicator “adverse effects of the medication” (10 items) were classified as follows: a) one to two, no knowledge; b) three to four, low knowledge; c) five to six, moderate knowledge; d) seven to eight, substantial knowledge; e) nine to ten, extensive knowledge.

The validity of the instrument was carried out in three steps. First, the theoretical reference was used for validation of construct. Second, through the judges’ review: three professors of the Universidad Autónoma de San Luis Potosí experts in NANDA, NOC-NIC Taxonomies; three experts in the clinical management of the child with leukemia (a pediatrician-oncologist and two nurses with more than 10 years of experience in the Pediatric Oncology nursery), the statistical validation of internal consistency (Cronbach alpha 0.813) was finally performed.<sup>[21]</sup>

### 2.6.3 Description of the MIC-García

This instrument was developed to evaluate the interest displayed by the caregiver in acquiring knowledge during the P-LEA instructional sessions. The instrument is called the MIC-García and responds to the defining characteristics of the Disposition toward improving knowledge in nursing diagnosis displayed by the caregiver. The instrument was designed based on the affective learning theory of Patricia Potter.<sup>[16]</sup>

The instrument was constructed with a total of 15 items by way of checklist. The items of the instrument have option to choose the response that is observed most frequently about the interest expressed by the caregiver during the session of the educational program, the measurement was carried out through direct observation by three collaborators of the educational program who were trained for the implementation of the instrument MIC-García; the instrument response options are 5 in scale likert type: always, usually, sometimes, almost never and never. The statistical validation of internal consistency of the MIC-García had a Cronbach’s alpha of 0.897.

Affective learning<sup>[16]</sup> was displayed by the caregiver when he or she was ready to “receive the instruction” (listening, being attentive and maintaining eye contact while the nurse gave the instruction), “respond to the instruction” (the caregiver actively participated by listening and responding verbally and

non-verbally), and “value the instruction” (expressed concern or rejected visual contact with the distributed material).<sup>[21]</sup>

## 2.7 Data analysis method

For the data analysis, the statistical software package SPSS (Statistical Package for the Social Sciences) version 18 was used to create the database. For the sociodemographic (categorical) variables, the following descriptive statistics were analyzed: central tendencies and dispersion. For the dependent variable, frequencies and percentages were obtained. For hypothesis testing, Student’s *t* statistic was used for paired samples.

## 3. RESULTS

The care of children with ALL using systematic educational strategies is not considered part of their daily care. The NANDA NIC-NOC methodology was produced in a framework of providing care to families with an ALL child to test the effectiveness of the P-LEA strategy. For this purpose, two categories were considered: the level of knowledge of the disease process, adverse effects of medication and precautions for preventing treatment complications and the interest in learning displayed by the caregiver as indicated by receipt of instruction, response to instruction and value of instruction.

These results will be presented according to the categories and indicators:

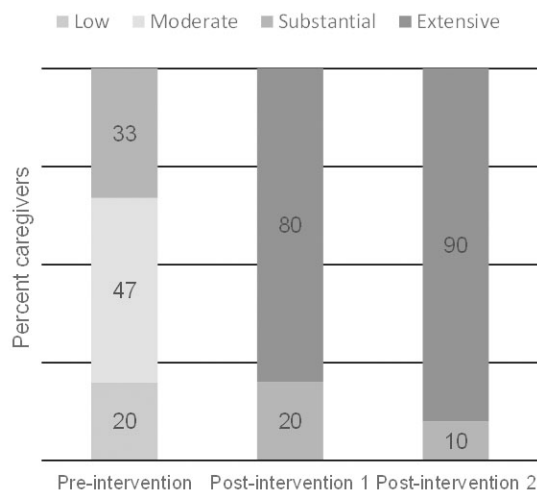
### 3.1 Knowledge

To measure the dependent variable NOC knowledge, three measurements were performed. One measurement was obtained pre-instruction, and two measurements were obtained subsequent to the intervention: one immediately after the P-LEA program and 30 days after the end of the program.

The following observations were made concerning the level of knowledge of caregivers of children with ALL:

As shown in Figure 1, prior to the implementation of the P-LEA program, approximately half of the caregivers already had a moderate level of knowledge on the subject. After the implementation of the program, more than three fourths of caregivers had acquired an extensive level of knowledge; a further increase of 10% was observed at the second measurement post intervention.

This result was obtained using the indicators developed according to the NOC outcome labels “management of the cancer” and “disease process”.



**Figure 1.** Level of knowledge of caregivers of children with acute lymphoblastic leukemia. Teaching: Group intervention of program P-LEA (n = 30)

Source: Caregiver Knowledge Measurement Instrument (MCC-García)

**3.1.1 Disease process (NOC) indicator**

Prior to the educational intervention, less than half of caregivers displayed substantial knowledge of the disease process indicator. Immediately following the P-LEA program, knowledge increased to extensive in more than three fourths of caregivers. In the second measurement following the instructional intervention, knowledge was increased by 10%.

**3.1.2 Precautions to prevent treatment complications (NOC) indicator**

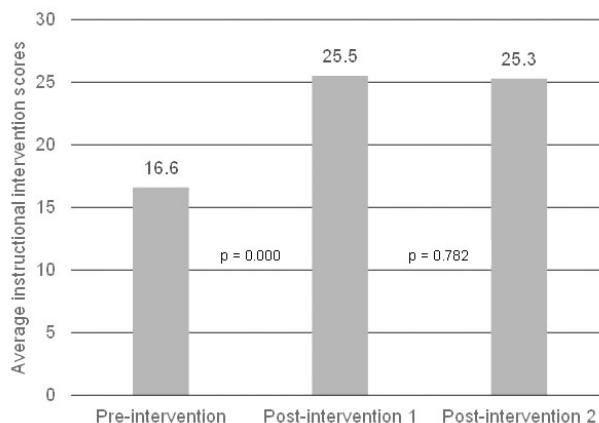
Slightly more than half of caregivers displayed substantial knowledge with regard to precautions for preventing treatment complications prior to the implementation of the P-LEA program. Following the implementation of the program, overall knowledge increased to extensive knowledge, and this level was maintained in the second measurement following the instructional intervention.

**3.1.3 Adverse effects of medication (NOC) indicator**

Less than half of caregivers displayed substantial knowledge prior to the implementation of the P-LEA program, and in the first measurement following the implementation of this knowledge, the majority of caregivers increased to extensive knowledge, which was maintained in the second measurement following the program.

Statistical analysis was performed using Student’s t test for paired samples. In the pre-intervention group instruction, the mean was 16.6 (95% CI, SD 3.9). In the first measurement post-group instruction intervention, a mean of 25.53 was obtained, with an SD of 1.9 and a CI of 95%. In the second measurement post-intervention, a mean of 25.27 with

an SD of 4.9 and a 95% CI was obtained. The means for the measurements pre-intervention and first post-group instructional intervention differed significantly ( $p = .000$ ). The average scores obtained pre-intervention were different from those obtained in the first measurement post-intervention ( $p = .000$ ). The difference between the second measurement and the third one was not significant ( $p = .782$ ).



**Figure 2.** Average of pre and post intervention punctuation of knowledge of caregivers of children with acute lymphoblastic leukemia. Teaching: Group intervention of program P-LEA (n = 30)

Source: Caregiver Knowledge Measurement Instrument (MCC-García)

**3.2 Notable results for learning by caregivers**

As providers of care, caregivers must develop their learning skills to better assist their children through oncological treatment, from living the disease process to providing care, the implications and effects of the chemotherapy treatment and the nutrition they provide the child throughout different stages of the disease.

The caregiver’s interest in learning was only evaluated during the development of the instructional intervention. This evaluation occurred during the P-LEA program sessions: “disease process”, “treatment of ALL”, “recommendations for feeding the child with ALL”, and “care of immunosuppression in children with ALL”.

In the “disease process” and “treatment of ALL” sessions, the majority of the population always received the instruction (86.7%), and three fourths always valued the instruction (73.3%). However, only half sometimes responded to the instruction (46.7%).

In the “recommendations for feeding the child with ALL” session, the majority of the population always received instruction (90%), 63.3% responded to the instruction, and 73.3% valued the instruction.

In the “care of immunosuppression in children with ALL” session, the majority of the population always received instruction (96.7%), and 93.3% valued the instruction. More than half of the population almost always (53.3%) responded to the instruction.

#### 4. DISCUSSION

As a key function of care, nursing instruction is directed at those responsible for the care of the dependent child. In the majority of cases, the mother is responsible for therapeutic follow-up for the child with ALL. Various studies have highlighted that women, particularly mothers, are typically responsible for the care of the family. This practice is very much tied to the nature of female responsibilities.<sup>[22,23]</sup> Traditionally in Mexican culture, the woman is tasked with domestic chores, child raising, and the education of children. The care of sick and disabled persons also falls on women. However, participation by fathers is increasing. Studies have demonstrated that participation by the father in the child’s care leads to a more stable clinical condition of this child and allows the father to be perceived as more of a decision maker and supporter of his family.<sup>[24]</sup>

Studies have demonstrated that social factors influence the prognosis of the child with ALL. A low level of education and rural area of residence are associated with worse prognosis.<sup>[25]</sup> During the cancer experience, people rely on their religion and spirituality to confront the situation.<sup>[26]</sup> Specifically, studies evaluating how parents deal with a diagnosis of their child with cancer have found that religion, among other strategies, is helpful. However, religion is typically employed by the mother, whereas the father uses other types of strategies.<sup>[27]</sup>

A systematic review revealed that family experiences and adaptation dynamics are important aspects of family and culture when facing health problems. These experiences and the affects of coping strategies, including the professed religion, are similar across a range of cultures.<sup>[22,28]</sup>

The application of learning principles is most significant when it is based on the actual needs of the recipients, and learning is most efficacious when it responds to a need that the caregiver has recognized. Nursing instruction facilitates the mechanisms of association of medical terminology with the material distributed in the instructional intervention. This information is reinforced by the use of didactic material such as leaflets, images and notebooks and is enhanced by the caregiver’s prior knowledge because the caregiver must build knowledge networks when being taught new material. A study of caregiver learning needs for the care of seniors with Alzheimer’s-type dementia reported that the use of learn-

ing principles in increasing knowledge also promotes the wellbeing of the caregiver and family because they are prepared with knowledge of the disease process and how it will develop.<sup>[12,29]</sup>

The group aspect of the P-LEA program allowed caregivers to learn from others, increasing the active participation of the students<sup>[12]</sup> by recognizing and sharing experiences related to their child’s disease process. This participation also increased facilitator-caregiver interactive dialogue<sup>[30]</sup> and the conversation between caregivers with regard to leukemia. One community intervention study reports that active participation in teaching is useful as a primary strategy for addressing health topics and as an effective method that facilitates the learning process.<sup>[31]</sup>

A study in China that explored the effects of the implementation of an instructional program regarding knowledge of human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) directed at the adult population reported results similar to those of the present study, significantly ( $p < .05$ ) increasing knowledge in the study population.<sup>[32]</sup>

In a quasi-experimental study involving adult pre-liver transplant patients, the instructional intervention was based on nursing care methodology (NANDA, NIC-NOC). Similar to this study, the level of knowledge increased after the intervention.<sup>[33]</sup>

One quasi-experimental study measured the effectiveness of an instructional intervention involving nursing personnel through a pre-test/post-test. The results were evaluated when the intervention was finished and one month following the intervention. Similar to this study, the analysis of the results revealed a significant improvement in knowledge (pre-test mean: 33.6% compared to the average score after the test: 79.2%; 95% CI [35.6, 55.6];  $t = 9.368$ ;  $p < .001$ ). Thus, instructional intervention effectively increased basic knowledge and trust in applying nursing theory to practice.<sup>[34]</sup>

One pre-test/post-test study with a control group that examined educating parents about the condition and treatment of children with hydrocephalus reported statistically significant differences in the pre- and post-test scores for group A ( $p = .0092$ ). The authors concluded that the nursing instruction had a positive effect on knowledge among this group of parents.<sup>[35]</sup>

A systematic search of the literature, including experimental designs, controlled clinical trials and pre- and post-test controlled studies, was performed using the Cochrane Library, MEDLINE, CINAHL and PsycINFO to identify nursing interventions that developed individual adult instruction.

Among the identified studies, 81% observed a positive impact of individualized interventions on patient outcomes. This provides evidence that instruction can produce positive outcomes in the patient.<sup>[36]</sup>

A longitudinal study with an instructional intervention based on a NANDA, NIC and NOC nursing care plan that evaluated the level of knowledge of caregivers of patients with heart failure observed statistically significant differences in all indicators evaluated, as in this study.<sup>[37]</sup>

Affective learning<sup>[16]</sup> is a framework that the nursing profession can use in teaching because the education provided is not limited to the technical, cognitive or psychomotor aspects of the condition. Affective learning is suitable for the caregiver who is open to receiving instruction, responding to the instruction, and valuing the instruction. If the learner appreciates and values what he or she has learned, networks of knowledge of the subject in question are constructed.<sup>[38]</sup>

During the development of the instructional program known as P-LEA, the behaviors of interest for caregivers receiving the instruction were analyzed. When displaying interest in something new and useful, the learner receives significant instruction when constructing his or her knowledge in relation to prior knowledge.<sup>[39]</sup>

With respect to the “response to instruction” indicator<sup>[16]</sup> our results are similar to those reported in a study on mother’s perceptions in an instructional program, which observed increased learning due to parents’ interest in new and encouraging situations.<sup>[40]</sup>

With respect to the “valuing the instruction” indicator, our study is in agreement with a previous study of mothers’ perceptions in an instructional program that encouraged mothers to ask questions freely and without fear.<sup>[39]</sup> In our case, mothers expressed their worries, experience and motivation. Students learned more and learned better if they were interested and felt motivated by the subject and if it was important to them. This motivation pushed them to continue learning<sup>[41]</sup> when participating in a group instructional program<sup>[16]</sup> in which instructional strategies were used to integrate past experiences and were focused on active participation.<sup>[39]</sup>

A study conducted in the United States reported on the perception of students regarding pre-clinical experience in an instructional program directed at nursing students. This study concluded that the motivational aspects of the instruction stimulated increased knowledge. These findings are in agreement with those reported in this study with respect to the motivation that our study population presented.<sup>[42]</sup>

For reinforcing the instruction, according to a qualitative

instructional study of mothers caring for newborns, participants mentioned the importance of having written (brochure) material. This written material helps caregivers to focus on topics related to the condition, promotion and prevention of diseases and has the advantage that it can be brought home.<sup>[40]</sup>

## 5. CONCLUSION

The group instructional intervention (NIC) known as P-LEA, which was based on the NANDA and NOC-NIC taxonomy, motivated caregivers to learn about the care of the child with ALL. The group instruction resulted in client/patient and caregiver education and increased systematic knowledge; this intervention could be evaluated in other groups with different educational necessities in similar populations.

The nursing process reinforces the professional working methodology of care for implementing group instruction under a strategic educational design.

Based on the results obtained, we can conclude that nursing strategies can be designed to increase knowledge in both caregivers and care recipients, promoting the teaching function of the profession.

The design of the knowledge measurement questionnaire based on NOC nursing outcome labels allowed us to more precisely evaluate the knowledge of ALL caregivers.

Group instruction as a nursing intervention constitutes a pivotal element in caregiver instruction management and control. Group instruction interventions aided the caregiver in the initial phases of the disease process by providing knowledge of the chronic processes and allowing the caregiver to adapt to these conditions and become an autonomous caregiver for the child.

The application of the P-LEA instructional program for the caregiver of the child with ALL using the NANDA, NOC-NIC taxonomy facilitates comparisons among distinct clinical and social support environments.

### Methodological recommendations

Studies of the learning differences between fathers and mothers and other family members are needed. The relevance of conducting an impact study should be analyzed.

## ACKNOWLEDGEMENTS

The authors are grateful to the Mexican Association for the Assistance of Children With Cancer (Asociación Mexicana de Ayuda a Niños con Cáncer, Amanc), San Luis A.C. The authors are also grateful to the caregivers for sharing their time and providing their trust in the nursing instruction for caregiver education; without their participation, this study



would not have been possible. The authors also thank the collaborators who participated in the instructional intervention. P/PROFOCIE-2014-24MSU0011E-1. Is acknowledged

for providing financial support for the present publication.

## CONFLICTS OF INTEREST DISCLOSURE

The authors have no conflicts of interest to declare.

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