Evaluation of computer-generated guidelines for companions of paediatric patients undergoing chemotherapy

Avaliação de orientações geradas por sistema computacional a acompanhantes de pacientes pediátricos submetidos à quimioterapia

Evaluación de orientaciones generadas por el sistema computacional a acompañantes de pacientes pediátricos sometidos a quimioterapía

Vagner José Lopes[a]
Marcos Augusto Hochuli Shmeil[a]

ABSTRACT

Objective: To compare computer-generated guidelines with and without the use of a Clinical Decision Support System - Oncology Care and Healthcare for Chemotherapy Patients, for the caregivers of children undergoing chemotherapy.
Methods: This is a descriptive, evaluative, and quantitative study conducted at a paediatrics hospital in Curitiba, Paraná, Brazil, from December 2015 to January 2016. The sample consisted of 58 participants divided into two groups: Group 1, without the aid of software, and Group 2, with the aid of the software. The data were analysed using the Mann-Whitney U test.
Results: The guidelines revealed a statistical significance (p<0.05), with a prevalence of a higher concordance average in Group 2 in comparison with Group 1.
Conclusion: Computer-generated guidelines are a valuable qualitative support tool for nurses.
Keywords: Evaluation. Paediatric nursing. Drug therapy. Decision support systems, clinical.

RESUMO

Objetivo: Comparar as orientações geradas com o auxílio do Sistema de Apoio à Decisão Clínica – Cuidados em Oncologia e Saúde com Quimioterápicos com as orientações não auxiliadas por tecnologia, destinadas aos acompanhantes de crianças em tratamento quimioterápico.
Métodos: Pesquisa descritiva, avaliativa, de abordagem quantitativa, realizada na pediatria de um hospital em Curitiba-PR, entre dezembro de 2015 e janeiro de 2016. A amostra foi composta por 58 participantes, divididos em dois grupos: Grupo 1, não apoiado pelo *software*, e Grupo 2, apoiado pelo *software*. Na análise dos dados, utilizou-se o teste não paramétrico de Mann-Whitney.
Resultados: Houve significância estatística nas orientações (p <0,05), prevalecendo maior média de concordância com o auxílio do *software* no Grupo 2, quando comparada ao Grupo 1.
Conclusões: Evidenciou-se que as orientações geradas com o auxílio do *software* consistem em uma forma de apoiar qualitativamente os enfermeiros na geração de orientações.
Palavras-chave: Avaliação. Enfermagem pediátrica. Quimioterapia. Sistemas de apoio a decisões clínicas.

RESUMEN

Objetivo: Comparar las orientaciones generadas con el auxilio del Sistema de Apoyo a Decisiones Clínicas – Cuidados en Oncología y Salud con Quimioterápicos con las orientaciones que no son auxiliadas por el mismo Sistema, ambas dirigidas a los acompañantes de niños en tratamiento quimioterápico.
Métodos: Investigación descriptiva, evaluativa, de abordaje cuantitativo, realizado en la pediatría de un hospital de Curitiba, Paraná, Brasil, entre diciembre de 2015 y enero de 2016. La muestra está compuesta por 58 pacientes, divididos en dos grupos: 1) compuesto por los que no son apoyados por el software y 2) por los que son apoyados por el software. En el análisis de los datos, se utilizó el Test no paramétrico de Mann-Whitney.
Resultados: Hubo una estadística expresiva en las orientaciones (p<0,05), prevaleciendo mayor promedio de concordancia con el auxilio del software en el Grupo 2, cuando comparado con la falta de auxilio del Grupo 1.
Conclusiones: Se evidenció que las orientaciones generadas con el auxilio del software es una forma de apoyar, cualitativamente, a los enfermeros en la generación de orientaciones.
Palabras clave: Evaluación. Enfermería pediátrica. Quimioterapia. Sistemas de apoyo a decisiones clínicas.

a Pontifícia Universidade Católica do Paraná (PUCPR), Programa de Pós-Graduação em Tecnologia em Saúde. Curitiba, Paraná, Brasil.

■ INTRODUCTION

The Clinical Decision Support System ("SADC") is considered a tool to support decision-making in healthcare. The system consists of one or more knowledge bases and is preferably supported by standards for information interoperability and reusability. This kind of software provides alerts, notices, messages, possible non-conformities, educational information, and evidence, as well as functions to interact with users to support decision making[1].

The aim of the SADC applied to nursing is to support the practice, learning, and education of healthcare and treatment of patients. This support standardises languages, ensures data security and recovery, and facilitates multidisciplinary communication to manage care, improve patient assistance, and increase the humanisation of healthcare[2].

Children's cancer is a grouping of various pathologies, all of which include the uncontrolled proliferation of abnormal cells anywhere in the body of children and adolescents. According to the National Cancer Institute, the most common tumours in childhood and adolescence are leukaemia, tumours in the central nervous system, and lymphomas, with an estimated 12,600 new cases recorded in Brazil, in 2016 and 2017[3].

Chemotherapy is the established modality in the treatment of children's cancer, with immediate responses given the sensitivity of children's tumours to anticancer therapy. Its therapeutic use can cause various adverse effects and toxicities, and its effect is nonspecific since it can systematically affect rapidly proliferating cells and not just in neoplastic cells[4]. The most frequent adverse effects and toxicities are nausea, vomiting, weight loss, alopecia, haematomas, epistaxis, mucositis and diarrhoea[5]. In children, these effects alter their everyday lives and transform a healthy and productive child into a sick incapacitated child[6] due to the limitations imposed by the disease and complications of treatment that reach the patient and the child's family[7-8].

The COFEN Resolution #210/1998 that regulated nursing performance in antineoplastic chemotherapy establishes that health workers have the duty to "prepare therapeutic nursing protocols to prevent, treat, and minimise side effects in patients undergoing anticancer treatment"[9]. Nursing guidelines are paramount for the continuity of care of children undergoing chemotherapy because they reduce the consequences of adverse effects and toxicities and improve their quality of life. During nursing consultations, nurses must describe the recommendation of patient follow-up, teach the companion, provide information on chemotherapy and associated medication, and talk about potential adverse reactions[10].

According to studies, the activities of nurses with the companions of children receiving chemotherapy[7-8] are the provision of guidelines, teaching and informing about the required care, such as[6-10] bathing, hygiene, diet[8], clothing, oral and skin hydration, and physical limitations of the child related to fatigue and skin protection[5-11].

Information technology linked to patient-oriented guidelines can support and enhance nursing work, improve the quality of care, and reduce errors and adverse events[7]. It can also support companion-oriented education and cause an evolution of the possible results[2].

Research shows the support that the SADC can provide at the time of individual recommendations for each patient or companion, according to the prescribed treatment[2-12]. For health workers, it can help them choose and guide the care they provide, and ensure the continuity of care and treatment, both in the hospital and in the home[12-13]. The SADC promotes recovery of a given pathology by notifying possible incompatibilities with other medication, and adverse reactions through recommended action[1-2].

The intersection of the subjects covered in the SADC, paediatric oncology, chemotherapy, nursing, care in chemotherapy and information technology, enabled the creation of a SADC in the field of paediatric oncology called the Clinical Decision Support System – Oncology Care and Health with Chemotherapy ("SADC-COSQ") to support nurses who provide guidance to the companions of paediatric cancer patients during pre-, trans- and post-treatment[14].

The quality of the information generated by technology should be assessed to verify whether the software meets or does not meet the needs of the users involved in its operation. Consequently, the guiding question was: Can a SADC assist nurses in the provision of guidelines for the companions of paediatric cancer patients receiving chemotherapy treatment?

Therefore, the aim of this study was to compare the guidelines generated using the SADC-COSQ with or without the assistance of technology, for the companions of children undergoing chemotherapy.

■ METHODS

The study is characterised as descriptive and evaluative research with a quantitative approach. For this experiment, the assessment was performed in the outpatient chemotherapy unit and at the bedsides of inpatients in the paediatric unit of a philanthropic hospital, a reference unit in cancer treatment, in the city of Curitiba (PR). This sector assists children from zero to 18 years and four months of

age, who require paediatric cancer treatment. The patient treatment services offered at the unit are nursing consultations, medical consultations, pre- and post- surgery admissions, radiotherapy follow-up, clinical admissions, paediatric intensive care admissions, and chemotherapy administration. The unit offers an average of 600 consultations every month, of which 400 are for chemotherapy, according to the paediatric schedule in the electronic patient records of the institution. The unit has 14 outpatient chemotherapy beds and 16 inpatient beds. Of mandatory presence, the companion is the legal guardian of the child, and can be a relative of the first degree, another degree of kinship or someone close to the child. The companion authorises treatment, participates in the consultations and procedures, and receives the information necessary for the continuity of patient care. Data were collected from December 2015 to January 2016.

The scope of the experiment comprised nurses who work at the paediatric service of the referred hospital and the companions of paediatric oncology patients receiving outpatient or inpatient chemotherapy treatment. The criteria for inclusion were companions who accompany the follow-up of children receiving chemotherapy, and nurses who work directly in the paediatrics service of the study hospital.

The software was created by the authors of this study, based on a master's thesis entitled *Orientações a cuidadores de pacientes pediátricos, submetidos a quimioterapia, baseadas em sistema computacional de apoio a decisão*[14]. The SADC-COSQ provides information for nurses on the adverse effects and toxicities of chemotherapy in children, and suggestions of guidelines for the caregivers of patients, thus supporting the clinical decision-making process of nursing workers regarding recommendations for the care of children with cancer, and enabling the guidance, learning, and the continuity and management of care of these patients[14].

To operationalise the research, it was necessary to structure and execute the following stages: sample definition, preparation of data collection forms, pilot test for the adequacy of forms, structuring of the groups for the experiment, surveying for the participant profile, application of the guidelines, assessment of the guidelines, and analysis of the results. This operationalisation method is sustained by previous studies on the evaluation of software and healthcare technology[15-16], which are compatible with this study.

The first stage was definition of the sample, which included the entire population of the research period since they met the established inclusion. This population was composed of eight nurses and 50 companions. Each child of the population underwent more than one chemotherapy session, varying depending on the type of tumour and protocol. As for the companions, they also received guidelines equivalent to the chemotherapy sessions. Sample calculation was not necessary since all the subjects agreed to participate in the survey by signing an informed consent statement.

The second stage, after sample composition, consisted of the creation of four data collection forms; characterisation of the nurse profile; characterisation of the companion profile (both profiles were obtained using nine variables related to clinical and epidemiological data); creation of an assessment questionnaire for the nurses (with nine topics to evaluate the perception of nurses regarding care guidelines for the caregivers of children receiving chemotherapy); and creation of a questionnaire to assess the guidelines provided by nurses (with nine topics to evaluate the perception of companions regarding their understanding of the care offered to the children).

These forms were reviewed in a pilot test, in the third stage, involving a nurse and three companions in two groups (T1 and T2). The results were evaluated by reading the answers, marking relevant responses with different context components and applying the weighted Likert scale of concordance with closed answers in a scale that varied from 5 to 1: 1 fully agree (weight 5) agree (weight 4), indifferent (weight 3), disagree (weight 2) and strongly disagree (weight 1). Once the pilot test and adaptation of the forms was completed, we initiated the experiment.

In the fourth stage, the participants were divided into two disjointed groups: conventional group (G1), composed of four nurses and 25 companions who assessed the guidelines without the aid of the SADC-COSQ; and intervention group (G2), composed of four nurses and 25 companions who assessed the guidelines with the use of the SADC-COSQ. The criterion for grouping was simple randomisation to avoid any risk of bias during data collection.

The fifth stage of the experiment consisted of surveying the profile of the G1 and G2 components. Subsequently, the nurses in G1 and G2 generated the guidelines with and without the software, respectively. The experiment lasted 30 days, during which the nurses only provided guidelines for the caregivers of their respective group.

In the sixth stage, after the experiment period, the companions and nurses of both groups received the forms to assess the applied guidelines. It should be noted that the nurses from each group evaluated the perception, knowledge, consistency, and concordance of the guidelines given to the caregivers, while the companions veri-

fied the ease of obtaining knowledge and learning to care for children receiving chemotherapy using the guidelines provided by the nurses. The aim of this assessment was to compare the effectiveness of the guidelines generated with and without the help of the SADC-COSQ using the satisfaction questionnaire prepared and validated in the pilot test. The use of a satisfaction survey and simple random selection to create the disconnected groups, G1 and G2, eliminated any risk of bias.

In the seventh stage, the data of the assessment were exported to an Excel 2010 spreadsheet and processed using Statistical Package for Social Sciences (SPSS) version 21. In this stage, two sets of data were obtained from the surveying of the participant profiles, and the assessments with and without the computer-based tool.

The Mann-Whitney U test was used to analyse the evaluation of the guidelines produced without the SADC-COSQ versus the guidelines generated with the SADC-COSQ in all the questions submitted to the components of both groups of nurses and caregivers. This test was used to analyse and compare the significance of the guidelines, while p value, average, and standard deviation revealed the effectiveness and support of the SADC-COSQ in the generation of guidelines. The level of significance for the statistical inferences was established at p < 0.05.

The study was submitted to the research ethics committees of the Pontifícia Universidade Católica do Paraná, in Curitiba (PR), with CAAE approval number: 49108415.4.0000.0020, and of the philanthropic hospital, in the same city, with PP approval number 2471 and CAAE: 54695916.4.0000.0098, in compliance with the national and international human research ethics standards of the national health council (CNS).

■ RESULTS

Table 1 shows the results of the characteristics of the companion profile, distributed in the experiment groups.

Based on the value of p, averages and standard deviations, a homogeneous sample was observed in most variables, that is, there was little variability between the characteristics of the participants. As regards the variable treatment follow-up time, the distribution did not behave like the other variables, and the longest treatment follow-up time was observed in G1.

In terms of the nurse profile, Table 2 shows the results of the characteristics of these subjects, distributed in the experiment groups.

Through the value of p, averages and standard deviations, it was observed that the characteristics of the nurses had a normal distribution in both groups.

Regarding the guideline assessment of the companions of both groups, Table 3 shows a comparison of the scores obtained after application of the guidelines. The evaluations consisted of nine statements on the effectiveness of the guidelines produced with and without the aid of software.

The Mann-Whitney U test was applied to the questions submitted to the G1 and G2 to obtain the p values. In all the variables, the p value was less than 0.05, with

Table 1 – Characteristics of the companion profile. Curitiba, Paraná, Brazil, 2016.

Variable	G1 (n = 25)	G2 (n = 25)	p value*
Age**	32.4 ± 7.8	36.8 ± 8.4	0.062
Treatment follow-up time (months)**	14.8 ± 18.7	4.7 ± 4.1	0.008
Sex	Female 22 (88%)	Female 22 (88%)	1
Education***	Primary School 5 (20%) Secondary School 16 (64%) Higher Education/ Specialisation 4 (16%)	Primary School 12 (48%) Secondary School 10 (40%) Higher Education/ Specialisation 3 (12%)	0.110
Difficulty in understanding chemotherapy***	6 (24%)	6 (24%)	1
Difficulty with home care***	5 (20%)	6 (24%)	1
Difficulty due to doubts in chemotherapy***	5 (20%)	6 (24%)	1

Source: Research data, 2016.

Notes: * Student T Test for independent samples (age), Fisher's exact test (sex and difficulties), Chi-square test (education), Mann-Whitney U test (treatment follow-up time), p<0.05. ** Average ± standard deviation. *** Participants (participation %).

Table 2 – Characteristics of the nurse profile. Curitiba, Paraná, Brazil, 2016.

Variable	G1 (n = 4)	G2 (n = 4)	p value*
Age**	29.7 ± 6	30.7 ± 4.9	0.686
Time of service (months)**	13.2 ± 15.8	11 ± 9.4	1
Sex***	Female 100%	Female 100%	†
Education***	Specialist 100%	Specialist 100%	†
Difficulty regarding knowledge of chemotherapy***	2 (50%)	1 (25%)	1
Difficulty in identifying the adverse effects and toxicities***	2 (50%)	2 (50%)	1
Difficulties in preparing the chemotherapy guideline***	2 (50%)	3 (75%)	1

Source: Research data, 2016.

Notes: * Mann-Whitney U test (age and service time), Fisher's exact test (difficulty of nurses), p < 0.05. ** Average ± standard deviation. *** Participants (participation %). † Test was not applied to sex and education since the observed frequencies only cover one category.

Table 3 – Scores of the comparisons of the companions' assessments: G1 *versus* G2. Curitiba, Paraná, Brazil, 2016.

Question	N*	Group	Average	Standard deviation	p value**
Did you understand the definition of chemotherapy?	25	G1	4.0	0.9	0.001
	25	G2	4.8	0.4	
Was the information received necessary for you to learn about childcare?	25	G1	4.0	0.7	0.001
	25	G2	4.6	0.4	
Were the guidelines easy to understand?	25	G1	4.2	0.7	0.012
	25	G2	4.7	0.4	
Was the information provided clearly and objectively?	25	G1	4.2	0.7	0.002
	25	G2	4.8	0.3	
Did you manage to apply the care at home?	25	G1	3.9	0.9	0.001
	25	G2	4.6	0.4	
Did the guidelines meet your needs to accompany treatment?	25	G1	4.1	0.3	0.001
	25	G2	4.7	0.4	
Did the guidelines allow you to learn about chemotherapy?	25	G1	4.0	0.8	0.003
	25	G2	4.7	0.4	
Did the information meet your home care needs?	25	G1	3.8	0.8	0.001
	25	G2	4.7	0.4	
Do you agree that the information can be used by other companions?	25	G1	4.3	0.4	0.001
	25	G2	4.8	0.3	

Source: Research data, 2016.

Notes: * number of participants. ** Mann-Whitney U test, p < 0.05.

a difference of the same variable in each of the groups. Based on this difference, the averages and standard deviations were analysed to search for score with the highest concordance among the participants of each group. It was noted that the companions of G2 had a greater concordance average for the guidelines generated with the aid of the SADC-COSQ, in relation to the companions of G1.

For the nurses and the evaluation of the produced guidelines, Table 4 shows the comparison of the scores obtained

Table 4 – Scores of comparisons of the nurses' assessments, according to the groups: G1 *versus* G2. Curitiba, Paraná, Brazil, 2016.

Question	N*	Group	Average	Standard deviation	p value**
Did the generated guidelines meet the needs of the companions?	4	G1	3.2	0.5	0.029
	4	G2	4.7	0.5	
Did the guidelines contribute to continuity of care by the person responsible for the child?	4	G1	3.2	0.5	0.029
	4	G2	4.7	0.5	
Did the generated guidelines correspond to the care required for paediatric chemotherapy?	4	G1	3.2	0.5	0.029
	4	G2	4.7	0.5	
Did the style of the guidelines correspond to the level of understanding of the companion?	4	G1	3.2	0.5	0.029
	4	G2	4.7	0.5	
Was the information provided clearly and objectively?	4	G1	3.0	0.8	0.029
	4	G2	4.7	0.5	
Did the guidelines allow the companion to care for the child at home?	4	G1	3.0	0.8	0.029
	4	G2	4.7	0.5	
Did the guidelines provide the companions with the knowledge they need to care for the child?	4	G1	3.2	0.5	0.029
	4	G2	4.7	0.5	
Did the guidelines address the necessary issues for the companion to monitor paediatric chemotherapy treatment?	4	G1	3.0	0.8	0.029
	4	G2	4.7	0.5	
Can the guidelines be used by any companion?	4	G1	2.7	0.9	0.029
	4	G2	4.7	0.5	

Source: Research data, 2016.
Notes: * number of participants. ** Mann-Whitney U test, p < 0.05.

after application of the guidelines to G1 and G2. The evaluation consisted of nine questions on the effectiveness of the guidelines produced without and with the aid of software.

The Mann-Whitney U test was applied to all matters contained in the assessment of G1 and G2 to obtain the p values. For all the variables, the p value was less than 0.05, showing a difference between the groups for the same variable. Based on this difference, the averages and standard deviations were analysed to search for score with the highest concordance among the participants of each group. It was noted that the nurses of G2 had a higher average of concordance for the guidelines generated with the aid of the SADC-COSQ compared to the nurses of G1.

By way of synthesis, it was observed that, according to the scores presented in the tables, the guidelines generated with the aid of the SADC-COSQ versus guidelines not generated with this tool were assessed as effective in G2. This finding was revealed in the higher concordance average of the companions on the information and care support and of the nurses on the support and quality of information given to the companions of children receiving chemotherapy.

DISCUSSION

To present the results more effectively, this section was divided into two parts: results of the companion and nurse profile, and assessment results.

About the companion and nurse profiles

Firstly, in relation to companions of G1 and G2, the average age corresponded to the age of some of the participants of a study on the assessment of companions of children with cancer receiving chemotherapy[17]. The results of this experiment (Table 1) and in the cited article did not reveal whether the variable age interfered in the follow-up of paediatric chemotherapy.

Regarding the average chemotherapy follow-up time, the participants of G2 had a lower average than the participants of G1. The shorter the follow-up time, the greater the difficulty in accompanying paediatric chemotherapy[8]. According to the results of this experiment (Table 1), the averages of the difficulties were the same in both groups, despite the prevalence of treatment follow-up time in G1.

As for the sex variable, most of the participants were women, a characteristic that did not interfere with chemotherapy. These data were similar to those of the evaluation study of the experience of caregivers who were the grandparents of paediatric oncology patients, where 100% of the participants were women[18].

In terms of education, the results showed no resemblance to the presented difficulties. According to literature, schooling may or may not influence the follow-up of children with cancer, as some of the participants are still in school and manage to reconcile their studies with chemotherapy[17].

In relation to the difficulties presented, the results of these variables can be compared with those of a study on the assessment of feeding difficulties of the families of children with cancer[8], which found that the participants have difficulty in obtaining knowledge of chemotherapy and care of paediatric oncology patients.

As regards the nurses of G1 and G2, the average age corresponded to the age of some participants of a study of the perspective of nursing staff on the use of play in the care of hospitalised children and adolescents with cancer[10]. In the article cited and in this study, it was not clear whether the age of the nurses influenced the results.

Regarding time of service, this result corresponded to the time of service of the professional participants in the qualitative study on whether nurses believe nursing promotes the autonomy of schoolchildren with cancer[11]. In the article cited and in this study, it was not clear if the nurses' service time influenced the results.

For the variables sex and education, it was not evident if these variables interfered in the companion assessments. This consideration also corresponds to the study on the burden and quality of life of caregivers of children and adolescents receiving chemotherapy[17]. The authors of this paper do not mention whether these variables influenced the results.

The difficulties presented by the nurses, as shown in Table 2, were similar to the results of study to assess a therapeutic instrument in play therapy for children receiving chemotherapy, where it was found that nurses can minimise the difficulties of nursing guidelines on chemotherapy recommendations with the use of support tools[10].

Therefore, the profiles of the companions and nurses did not influence follow-up treatment, but the variable difficulties, in both groups, resulted in negative statements about the knowledge of care for paediatric oncology patients in chemotherapy, as shown in the statistical analysis of the results obtained in this study in relation to evidence in literature[10-17].

On the assessments of the companions and nurses

The p value, averages, and standard deviations show that the companions of G2 had a higher concordance average for the guidelines generated with the aid of the SADC-COSQ than the companions of G1, as shown in Table 3. The scores obtained in this study were similar to those of a study to assess a guidelines handbook for the companions of patients with cerebrovascular accident in relation to care with and without the orientations of an educational handbook. The statistical test of the cited paper showed significance ($p < 0.05$), resulting in a higher concordance average for the group of companions who used the educational handbook, which, through the information provided, increased adherence of the companion to treatment[19]. It is clear that the guidelines generated with the aid of the software are more effective than those generated without the aid of a technology, related to the structure of care information, the easier interpretation, and greater adherence to the recommendations generated with the aid of the SADC-COSQ.

The averages of the concordance variables among the companions G2 were favourable in the assessment of the information generated by the nurse with the aid of the SADC-COSQ. These averages can be compared with those of literature, where the concordance of companions regarding a care-structured guidelines instrument is greater that the concordance of unstructured guidelines[6] because they lack the educational tutorial on the care applied to the child[8] or any basis to meet the needs of companions[17].

Studies conducted with the companions of patients are based on the need to create instruments that support those responsible for the care of paediatric oncology patients[7], facilitate their understanding of the child's needs, and prevent any misunderstandings that may compromise the quality of chemotherapy follow-up[5].

The nurses' assessment shows that the workers of G2 had a greater concordance with the guidelines generated with the aid of the SADC-COSQ than nurses of G1, who did not use the software, as shown in Table 4. In a descriptive-exploratory study carried out by nursing graduates to compare the effectiveness of the nursing diagnoses of a decision support system with the manuscript[12], there was statistical significance in the diagnoses generated with the aid of the system, resulting in the score $p = 0.013$. This score can be compared with the score of this study ($p < 0.05$) in the assessment of nurses who used the SADC-COSQ to support guideline generation. Thus, it is clear that the information generated with the aid of a software

has better satisfaction results than the information produced without software, possibly related to the easy operation of the system, the standardisation of procedures and clinical records, and the availability of a database for nurses to clinically judge which care guidelines are best suited for the companions[2-13].

The nurses of G2 had favourable concordance averages for the support and quality of information generated with the aid of the SADC-COSQ offered to the companions of children receiving chemotherapy. These scores can be compared with the averages of a professional experience report of nurses at a chemotherapy unit who assessed an instrument that supports decision making in chemotherapy, resulting in 91.6% to 100% concordance on issues concerning the content of information and the quality of the guidance protocol[20]. According to literature, a SADC collaborates with the practice of nursing care and guides the work of nurses by providing quality care information that can be applied to patients[13].

Therefore, the guidelines generated with the aid of the SADC-COSQ, based on the scores obtained in the assessment of the companions and nurses of the G2, compared to literature, reveal the quality of these recommendations and their effectiveness to monitor the treatment of children undergoing chemotherapy.

■ CONCLUSION

This study statistically presents the result of an assessment on the comparison of guidelines generated with and without the use of the SADC-COSQ. The significance of the guidelines (p < 0.05), according to the averages and standard deviation, prevailed with higher concordance scores in G2, considering the assessment of the companions on the support and care information and of the nurses on the quality of the information provided to the companions, contrary to the participants of G1 who did not use the computer-generated guidelines. The scores and results found in literature are similar to those obtained in this study.

During the process of analysing data in the experiment, we observed the limitation of nursing studies on the creation of instruments to support decision-making and guidelines for the companions of paediatric patients receiving chemotherapy. Furthermore, we stress the importance of inserting nursing guidelines in computer systems to support decision making and the clinical judgment of nurses regarding care guidelines for children undergoing chemotherapy treatment, and to improve the quality of recommendations to companions.

Thus, the SADC-COSQ should significantly encourage future studies on the creation of care-oriented instrument to support clinical decision making, involving companions and nurses, especially considering the high concordance of computer-generated guidelines in comparison with guidelines provided without this technology.

■ REFERENCES

1. Lichtenstein F, Tavares A, Pisa IT, Sigulem D. Sistemas de apoio à decisão baseados em diretrizes interpretadas por computador: um breve histórico e outros tópicos. J. Health Inform. 2011 [cited 2016 April 10];3(4):164-9. Available at: http://www.jhi-sbis.saude.ws/ojs-jhi/index.php/jhi-sbis/article/view/157/105.

2. Topaz M, Shalom E, Masterson-Creber R, Rhadakrishnan K, Monsen KA, Bowles KH. Developing nursing computer interpretable guidelines: a feasibility study of heart failure guidelines in homecare. AMIA Annu Symp Proc. 2013 [cited 2017 Jan 17];1353-61. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3900150/pdf/amia_2013_symposium_1353.pdf.

3. Instituto Nacional de Câncer (BR). Tumores infantis. Rio de Janeiro: INCA; 2016.

4. Lopes Júnior LC, Silva GP, Nascimento LC, Lima RAG. Cuidados de enfermagem à criança e ao adolescente com câncer e à sua família. In: Associação Brasileira de Enfermagem, Gaíva MAM, Ribeiro CA, Rodrigues EC, organizadores. PROENF Programa de Atualização em Enfermagem: saúde da criança e do adolescente: ciclo 9. Porto Alegre: Artmed; 2015. p. 87-154.

5. Silva LN, Silva LF, Goes FGB, Machado MED, Paiva ED. Guidance on chemotherapy aimed at children with cancer: a sensitive creative method. Online Braz J Nurs. 2015 [cited 2017 Jan 17];14(4):471-80. Available at: http://www.objnursing.uff.br/index.php/nursing/article/viewFile/5310/pdf_925.

6. Lopes Júnior LC, Bonfim EO, Nascimento LC, Pereira Silva G, Lima RAG. Theory of unpleasant symptoms: support for the management of symptoms in children and adolescents with cancer. Rev Gaúcha Enferm. 2015 July/Sept. [cited 2017 Jan 17];36(3):109-12. Available at: http://www.scielo.br/pdf/rgenf/v36n3/1983-1447-rgenf-36-03-00109.pdf.

7. Sarmento LS, Silva LF, Goes FGB, Paiva ED, Depianti JRB. A visão dos familiares quanto às orientações realizadas junto à criança em quimioterapia antineoplásica. Cogitare Enferm. 2016 [cited 2017 Jan 15];21(1):1-9. Available at: http://ojs.c3sl.ufpr.br/ojs/index.php/cogitare/article/view/42835/27652.

8. Sueiro IM, Silva LF, Goes FGB, Moraes JMRM. A enfermagem ante os desafios enfrentados pela família na alimentação de criança em quimioterapia. Aquichan. 2015 Oct./Dec.;15(4):508-20.

9. Conselho Federal de Enfermagem (COFEN). Resolução n. 210, de 1º de julho de 1998. Dispõe sobre a atuação dos profissionais de Enfermagem que trabalham com quimioterápico antineoplásicos. Diário Oficial da União [da] República Federativa do Brasil, 1998 jul 2 [cited 2016 May 10]. Available at: http://www.cofen.gov.br/resoluo-cofen-2101998_4257.html.

10. Marques EP, Garcia TMB, Jane CA, Luz JH, Rocha PK, Souza S. Lúdico no cuidado à criança e ao adolescente com câncer: perspectivas da equipe de enfermagem. Esc Anna Nery. 2016 June;20(3):1-8.

11. Cunha M, Costa J, Almeida F, Maia M. Crenças do enfermeiro na promoção da autonomia do escolar com câncer frente aos procedimentos de enfermagem. CIAIQ: Atas: Invest. Qualit Saúde. 2016 [cited 2017 Jan. 14];2:1214-23. Available at: http://proceedings.ciaiq.org/index.php./ciaiaq2016/article/view/876.

12. Peres, HHC, Jensen R, Martins TYC. Avaliação da acurácia diagnóstica em enfermagem: papel versus sistema de apoio à decisão. Acta Paul Enferm. 2016 [cited 2017 Jan 14];29(2):218-24. Available at: http://www.scielo.br/pdf/ape/v29n2/1982-0194-ape-29-02-2018.pdf.

13. Spigolon DN, Moro CMC. Essential datasets archetypes for nursing care of endometriosis patients. Rev Gaúcha Enferm. 2012 [cited 2017 Jan 14];33(4):22-33. Available at: http://www.scielo.br/pdf/rgenf/v33n4/en_03.pdf.

14. Lopes VG. Orientações a cuidadores de pacientes pediátricos, submetidos a quimioterapia, baseadas em sistema computacional de apoio a decisão [dissertação]. Curitiba (PR): Programa de Pós Graduação em Tecnologia em Saúde, Pontifícia Universidade Católica do Paraná; 2016.

15. Lahm JV, Carvalho DR. Prontuário eletrônico do paciente: avaliação de usabilidade pela equipe de enfermagem. Cogitare Enferm. 2015;20(1):38-44.

16. Cintho LMM, Machado RR, Moro CMC. Métodos para avaliação de sistema de informação em Saúde. J Health Inform. 2016;8(2):41-8.

17. Rubira EA, Marcon SRM, Belasco GS, Gaíva MAM, Espinosa MM. Sobrecarga e qualidade de vida de cuidadores de criança e adolescentes com câncer em tratamento quimioterápico. Acta Paul Enferm. 2012 jul.;25(4):567-73.

18. Mendes Castillo AMC, Bousso RS. A experiência das avós de crianças com câncer. Rev Bras Enferm. 2016 maio/jun.;69(3):559-65.

19. Lima CL, Pinto FCG, Torquato JA. Evaluation of a physiotherapeutic guidance program to the caregiver of the patient with cerebrovascular accident. J Nurs UFPE on line. 2014 [cited 2017 Jan 15]; 8. Available at: http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/view/4539/pdf_5663.

20. Barbosa MS, Neris RR, Anjos ACY, Magnabosco P, Porto JP. Education action witch nursing team in outpatient chemotherapy service: case studies. J Nurs UFPE on line. 2016 [cited 2017 Jan 16];10(2):675-82. Available at: http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/view/8640/pdf_9654.

■ **Corresponding author:**
Vagner José Lopes
E-mail: profvagnerjlopes@gmail.com