

Intravenous antineoplastic chemotherapy: knowledge of intensive care nurses

Quimioterápicos antineoplásicos intravenosos: conhecimento de enfermeiros intensivistas

Fármacos antineoplásicos intravenosos: conocimientos de los enfermeros intensivistas

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This is a cross-sectional, descriptive, exploratory study, carried out in an Intensive Care Unit of a university hospital in 2018. It aimed to identify the knowledge of nurses about the administration and disposal of intravenous antineoplastic chemotherapy. A self-administered questionnaire was used, with three parts: (characterization, administration and disposal). The analysis was performed using descriptive statistics and applying the Wilcoxon signed-ranks test. Twenty nurses participated, of which: 90% were female; 70% aged between 20 and 30 years; 40% had 1 to 5 years of training; 40% had specialization and of these, 62.5% in intensive care; 70% had only one job and 50% had worked at the institution for more than 1 year; they all knew the procedures to be performed before administering these medications; 95% identified the necessary personal protective equipment; 90% defined an environmental accident and its disposal; 85% indicated the measures in the personal accident and 80% knew how to characterize it; however, none of those surveyed knew about the legislation related to anticancer chemotherapy. There was no significant difference between errors and successes (p value ≥ 0.05). There was a need for awareness and training of nurses regarding legislation related to disposal and the Spill Kit.

Descriptors: Nursing care; Occupational risks; Antineoplastic agents; Intensive care units; Critical care.

Este é um estudo transversal, descritivo, exploratório, realizado em uma Unidade de Terapia Intensiva de um hospital universitário em 2018, com o objetivo de identificar o conhecimento dos enfermeiros acerca da administração e descarte de quimioterápicos antineoplásicos intravenosos. Utilizou-se questionário autoaplicável, com três partes: (caracterização, administração e descarte). A análise foi realizada por estatística descritiva e aplicação do teste de hipótese de Wilcoxon. Participaram 20 enfermeiros, das quais: 90% do sexo feminino; 70% com idade entre 20 a 30 anos; 40% com 1 a 5 anos de formação; 40% possuíam especialização e destes, 62,5% em terapia intensiva; 70% possuíam um emprego e 50% trabalhavam na instituição há mais de 1 ano; todos conheciam os procedimentos a serem realizados antes da administração desses medicamentos; 95% identificaram os equipamentos de proteção individuais necessários; 90% definiram acidente ambiental e seu descarte; 85% apontaram as providências no acidente pessoal e 80% souberam caracterizá-lo; porém nenhum dos pesquisados sabiam acerca da legislação ligada a quimioterápicos antineoplásicos. Não houve diferença significativa entre erros e acertos (p valor $\geq 0,05$). Observou-se a necessidade de sensibilização e capacitação dos enfermeiros quanto às legislações referentes ao descarte e ao *Kit* de derramamento.

Descritores: Cuidados de enfermagem; Riscos ocupacionais; Antineoplásicos; Unidades de terapia intensiva; Cuidados críticos.

Este es un estudio transversal, descriptivo y exploratorio, realizado en una Unidad de Cuidados Intensivos de un hospital universitario en 2018, con el objetivo de identificar los conocimientos de enfermeros sobre la administración y eliminación de fármacos antineoplásicos intravenosos. Se utilizó un cuestionario autoaplicado, con tres partes: (caracterización, administración y eliminación). El análisis se realizó mediante estadística descriptiva y la aplicación de la prueba de hipótesis de Wilcoxon. Participaron 20 enfermeros, de los cuales: El 90% eran mujeres; el 70% tenían entre 20 y 30 años; el 40% tenían de 1 a 5 años de formación; el 40% tenían especialización y de estos, el 62,5% en cuidados intensivos; el 70% tenían un empleo y el 50% habían trabajado en la institución por más de 1 año; todos conocían los procedimientos a realizar antes de administrar estos medicamentos; El 95% identificó los equipos de protección individual necesarios; el 90% definió accidentes ambientales y su eliminación; el 85% señaló las medidas a tomar en un accidente personal y el 80% supo caracterizarlo; sin embargo, ninguno de los entrevistados conocía la legislación relacionada con los fármacos antineoplásicos. No hubo diferencias significativas entre las respuestas incorrectas y correctas (valor $p \geq 0,05$). Se observó la necesidad de concienciar y capacitar a los enfermeros sobre la legislación relacionada con la eliminación y el *kit* de derrame.

Descriptoros: Atención de enfermería; Riesgos laborales; Antineoplásicos; Unidades de cuidados intensivos; Cuidados críticos.

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INTRODUCTION

Cancer is still the main public health problem and is among the four main causes of death before 70 years of age worldwide. Its incidence and mortality are related to several factors, such as aging and population increase, modification of risk factors related to cancer, especially with regard to socioeconomic conditions. In 2018, 18 million new cases and 9.6 million deaths occurred worldwide. For Brazil, the estimate for each year of the 2020-2022 triennium is that there will be 625,000 new cases of cancer¹.

In Brazil, there are laws that regulate the activities related to health care in anticancer therapy (AT) services, with nurses being allowed to prepare anticancer drugs².

It is known that the cytotoxic effects of antineoplastics can affect, in addition to patients, health professionals, causing acute systemic changes, such as: allergic reactions, eye irritation, nausea, vomiting, syncope, diarrhea, constipation, cough and headache. In the long term, toxic effects range from reduced reproductive capacity, increased rates of infertility, miscarriages, stillbirths and ectopic pregnancy, which can lead to congenital defects in the fetus³.

Currently, cancer patients are hospitalized in Intensive Care Units (ICU), since they offer therapeutic support to complications caused by cancer, such as pulmonary embolism and sepsis, and also due to the toxicity to the drugs used that can cause kidney damage, heart failure and pulmonary complications⁴.

Thus, it is important that nurses who deal with chemotherapy, on a daily or occasional basis, know and take measures to prevent occupational exposure to anticancer chemotherapy (AC), and minimize occupational risks involved in the process. It is necessary to standardize actions, with a focus on safe handling and biosafety standards, and for this to occur, nurses must know the precautions that minimize exposure, and the risks that involve the administration and disposal of these medications⁵. A study that described the nursing team's perception of biosafety in chemotherapy indicated that professionals perceived the risk to which they were exposed, but were resistant to adhering to biosafety measures³.

In the handling, segregation, packaging, identification, internal transport, temporary storage, treatment, external storage, collection and external transport of waste from health services, specific regulations and standards must be followed⁶.

Thus, the following research problem emerged: *What is the understanding of nurses about the safe handling of intravenous AC in the ICU?* Thus, this research aims identify nurses' knowledge about the administration and disposal of intravenous anticancer chemotherapy.

METHODS

Cross-sectional, descriptive and exploratory study, carried out in an ICU of a university hospital, located in the state of Rio de Janeiro, from June to August 2018. The sample was for convenience, with nurses who worked directly in care, and excluded those who were on sick leave or on vacation.

Data collection was performed through a self-administered questionnaire, consisting of three parts, containing closed questions. The first dimension was related to the characterization of participants, with the following variables: gender, age, specialization, number of jobs, training time and working time at the institution.

The second part of the questionnaire comprised five questions related to the safe administration of intravenous AC: PPE used during administration; good practices performed before administration, with a view to the safe handling of these drugs; legislation governing issues related to antineoplastic agents; understanding of personal accident and environmental accident.

The third part had five questions about the disposal of intravenous antineoplastic chemotherapy: proper disposal of AC; when it must be used and items that must be present in the spill "kit"; measures to be taken in the event of accidents.

Data were tabulated in Microsoft Excel® 2016 software and analysis was performed using the Statistical Package for Social Sciences (SPSS®) version 22.0. Absolute and relative frequencies were calculated. The Wilcoxon signed-ranks test was used to compare the responses of each participant to check whether there were significant differences between them⁷.

In accordance with what is described in the National Health Council Resolution 466/2012, for research involving human beings⁸, this study was submitted and approved by the Research Ethics Committee of the proposing Institution, under Opinion No.: 2.544.61, CAAE: 82773417.0.0000.5259.

RESULTS

Twenty nurses participated in the study, 90% female; 70% aged between 20 and 30 years; 40% with 1 to 5 years of training; 40% had specialization and of these, 62.5% were specialists in intensive care; 70% had only one job and 50% had worked at the institution for more than 1 year (Table 1).

Table 1. Intensive care nurses according to sociodemographic data. Rio de Janeiro, 2018.

Participant characteristics	No.	%
Gender		
Female	18	90
Male	2	10
Age		
20-30	14	70
31-40	6	30
Specialization		
No	12	60
Yes	8	40
Number of jobs		
1	14	70
2	5	25
3 or more	1	5
Training time		
Less than 1 year	5	25
1 to 5 years	8	40
5 to 10 years	5	25
More than 10 year	2	10
Time working at the institution		
Less than 1 year	8	40
1 to 5 years	10	50
More than 5 years	2	10

In the administration of intravenous AC and disposal of materials used after administration of these drugs, it was found that 100% of nurses surveyed had knowledge about these procedures and the safe method. Regarding PPE used, 95% of nurses demonstrated knowledge; 90% identify the conditions that characterize environmental accident and the measures to be taken in these cases; 85% understand what measures should be taken in the event of a personal accident and 85% indicated the conditions that characterize it. It draws attention to the fact that all respondents were unaware of the legislation related to anticancer chemotherapy (Table 2).

Table 2. Nurses' knowledge regarding the administration of AC and disposal of materials. Rio de Janeiro, 2018.

Nurses' knowledge	No.	%
AC administration		
PPE use	19	95
Procedures performed before administration	20	100
Related legislations	0	0
Conditions that characterize personal accident	16	80
Conditions that characterize environmental accident	18	90
Disposal of materials used after AC administration		
Proper disposal	11	55
Time of use of the spill kit	11	55
Spill kit composition	14	70
Conduct in case of personal accident	17	85
Conduct in case of environmental accident	18	90

The Wilcoxon test showed that the median of the differences between right and wrong answers is equal to zero, that is, there was no significant difference between right and wrong answers (p value ≥ 0.05).

DISCUSSION

The results revealed a higher percentage of women in the study, which corroborates other research that indicates a greater number of female workers in the area⁹. The nursing workforce is mostly women, despite a significant increase in the number of men with higher education in this profession⁹.

The average age of 28 years is probably due to the fact that the place investigated is a university hospital, with the presence of nursing residents, mostly young adults and recent graduates. In the phase called "*Professional Training*", professionals aged between 26-35 years are included, and is characterized by the search for qualification through a *lato sensu* Post-Graduation, highlighting the Residency Program in Nursing as a specialization that attracts recent graduates in search of practical theoretical knowledge, which brings them closer to the demands of the labor market⁹.

Most professionals investigated had only one employment relationship, from 1 to 5 years after graduation, and this same period of work at the institution, corroborating other studies^{3,10}. The data showed that 12 (60%) had specialization, similar to another survey carried out with nurses at a university hospital in Pernambuco¹⁰.

It was found that all nurses (No=20) had knowledge about the procedures performed for the safe administration of AC. This finding may be related to the conducts already used by professionals in daily care practice in the ICU, for the safe administration of intravenous medications. The following items must be observed and confirmed: patient, medication, time, dose, route, in addition to registration and guidance/action¹¹.

In addition, observation of drug interactions is recommended; visual inspection of the antineoplastic therapy looking for any irregularities, such as perforations, leaks, foreign bodies, precipitation, and others¹². The administration intervals, possible adverse reactions, integrity of vascular access devices and concomitant infusions with other drugs must be checked and recorded, and specific check lists may be used for the administration of AC^{3,12}.

In 95% of respondents, PPE is used in the administration of AC. The use of glasses, mask, cap, gloves are recommended, in addition to the use of a long apron, with low permeability, with a closed front, long sleeves and elastic cuffs. The use of adornments and makeup is not recommended due to the possibility of adherence of aerosols and AC particles^{13,14}.

This data is similar to a study carried out on nurses' knowledge about biosafety measures in the administration of antineoplastic chemotherapy, in which procedure gloves are among the individual protection items most emphatically cited by nursing professionals in the

administration of antineoplastic drugs, followed by long-sleeved aprons and equipments for eye or respiratory protection in all stages of the management of antineoplastics, including the transport, preparation, administration, disposal and care of bodily fluids of patients under these medications³.

Among those interviewed, 90% showed knowledge of the conditions that characterize the environmental accident and what to do in this situation. The environmental accident corresponds to the contamination of the environment generated by the spill or by solid or liquid aerodispersoids of AT¹² medications.

The professional responsible for decontamination must dress before starting the procedure. Once identified, the area where the spill occurred must be limited with absorbent pads and restricted access. Powder spillage should be removed with damp absorbent swabs and liquids with dry swabs¹².

The area must also be cleaned with plenty of soap and water, and possible fragments must be collected and disposed of as chemical waste, according to the institution's Health Services Waste Management Plan¹².

Regarding the measures to be taken in case of a personal accident, 85% of nurses were aware of what they would be and 80% were aware of the conditions that characterize it. Personal accident in antineoplastic therapy is defined as personal contamination generated by contact and subsequent absorption of this medication through the skin and mucous membranes, through splashes or inhalation of AT drugs at any stage of the process¹⁵.

In the case of personal contamination with AC, immediate removal of clothing and washing of the affected areas with soap and water are recommended. If there is contamination of eyes and mucous membranes, one should be instructed to wash with plenty of water or isotonic solution, in addition to seeking medical assistance¹².

In the short term, still in relation to personal contamination, the most commonly reported reactions are skin rash, eyeball irritation, nausea, vomiting, syncope, diarrhea, constipation, cough and headache. In the long term, carcinogenic, mutagenic and teratogenic effects can arise, in addition to affecting reproductive capacity, increasing rates of infertility, stillbirths, ectopic pregnancy and congenital problems in the fetus^{3,16}. Symptoms vary with time of exposure.

As for the composition of the spill "kit", 70% of respondents answered correctly and 55% of them knew which items were needed. The spill "kit" is recommended in cases of environmental accident, and must contain, at least, procedure gloves, low permeability apron, absorbent swabs, mask (activated carbon), glasses, neutral soap, accident registration form¹³. It must be available in places where AC handling activities are carried out, such as: handling, storage, administration and transport¹².

For the correct disposal of intravenous AC, 55% of nurses were aware of this process. Failure to understand the correct way to dispose of such medications can generate risks for both professional and environment.

The Health Service Waste (HSW) presented in liquid form must be packed in containers made of material compatible with the stored liquid, resistant, rigid and watertight, with a lid that guarantees the containment of the HSW and identified with the chemical risk symbol. Solids, on the other hand, must be disposed of in containers made of rigid, resistant material, compatible with the characteristics of the discarded chemical, also identified with a chemical risk symbol. Sharp objects must be disposed of in an appropriate container, separately, at their place of manufacturing¹⁷.

It is recommended that disposable materials contaminated with antineoplastics should be disposed of in rigid containers, properly identified as risk material, in containers resistant to perforation and leakage. The forwarding of these wastes must follow the institution's waste management plan in health services, as recommended by legislation¹⁸.

In this research, the questions referring to legislation were not correct. This result is similar to a narrative review study on the theme of occupational risks in nursing workers. The study carried out a temporal cut of manuscripts published up to the year 2016, demonstrating that the productions point to incipient knowledge by nursing about regulations in oncology¹⁹.

CONCLUSION

The knowledge of nurses investigated in relation to the administration and disposal of AC was related to practices developed in the field of work, such as procedures performed before administration, use of PPE and aspects related to personal and environmental accidents.

However, they are unaware of the norms that regulate such procedures, and it is also necessary to reinforce the issues about disposal and related to the Spill Kit, which can be optimized in the activities of formal nursing education, specialization and professional training.

In view of the results, it is also important to develop and implement specific protocols for the administration and disposal of AC in inpatient units, aiming to guide the actions of the nursing team, according to the recommended and institutionalized norms.

As a limitation of the study, it is understood that it was carried out in a single unit, with a reduced number of participants. It is hoped that further studies will be carried out so that there is a better understanding of the issues related to AC.

REFERENCES

1. Ministério da Saúde (Brasil), Instituto Nacional de Câncer José Alencar Gomes da Silva (Brasil). Estimativa 2020: incidência de câncer no Brasil [Internet]. Rio de Janeiro: INCA; 2019 [cited in 13 June 2020]. 117p. Available from: <https://www.inca.gov.br/sites/ufu.sti.inca.local/files//media/document//estimativa-2020-incidencia-de-cancer-no-brasil.pdf>
2. Conselho Federal de Enfermagem (Brasil). Parecer N° 30/2014/COFEN/CTLN. Competência do Enfermeiro Ministrando quimioterápico antineoplásico, conforme farmacocinética da droga e protocolo terapêutico, sendo-lhe facultado o preparo de drogas quimioterápicas antineoplásicas [Internet]. Brasília, DF: COFEN; 2014 [cited in 27 Sep 2021]. Available from: <http://www.cofen.gov.br/wp-content/uploads/2014/10/Parecer-CTLN-30-2014.pdf>
3. Ferreira AR, Ferreira EB, Campos MCT, Reis PED, Vasques CI. Medidas de biossegurança na administração de quimioterapia antineoplásica: conhecimento dos enfermeiros. Rev Bras Cancerol. [Internet]. 2016 [cited in 20 June 2020]; 62(2):137-45. Available from: <https://rbc.inca.gov.br/revista/index.php/revista/article/view/169>
4. Biskup E, Cai F, Vetter M, Marsch S. Oncological patients in the intensive care unit: prognosis, decision-making, therapies and end-of-life care. Swiss Med Wkly [Internet]. 2017 [cited in 20 June 2020]; 147:w14481. DOI: <https://dx.doi.org/10.4414/smw.2017.14481>
5. Oliveira PP, Santos VEP, Bezerril MS, Andrade FB, Paiva RM, Silveira EAA. Segurança do paciente na administração de quimioterapia antineoplásica e imunoterápicos para tratamento oncológico: scoping review. Texto & Contexto Enferm. [Internet]. 2019 [cited in 20 June 2020]; 28:e20180312. DOI: <https://dx.doi.org/10.1590/1980-265X-TCE-2018-0312>
6. Ministério da Saúde (Brasil), Agência Nacional de Vigilância Sanitária. Resolução - RDC N° 36, de 25 de julho de 2013. Institui ações para a segurança do paciente em serviços de saúde e dá outras providências [Internet]. Brasília, DF: Ministério da Saúde; 2013 [cited in 13 June 2020]. Available from: https://bvsms.saude.gov.br/bvs/saudelegis/anvisa/2013/rdc0036_25_07_2013.html
7. Silva ABS, Santos EM, Soriano FR, Lizarelli FL, Gomes AC, Carvalho Filho AE, et al. Análise da qualidade em serviço por meio do SERVQUAL com a aplicação do teste de Wilcoxon. Braz J Develop. [Internet]. 2018 [cited in 3 June 2021]; 4(6):2965-77. Available from <https://www.brazilianjournals.com/index.php/BRJD/article/view/302/261>

8. Ministério da Saúde (Brasil), Conselho Nacional de Saúde. Resolução N° 466, de 12 de dezembro de 2012 [Internet]. Brasília, DF: Ministério da Saúde; 2012 [cited in 13 June 2020]. Available from: https://bvsms.saude.gov.br/bvs/saudelegis/cns/2013/res0466_12_12_2012.html
9. Fernandes MNS, Beck CLC, Weiller TH, Coelho APF, Vasconcelos RO, Pai DD. Caracterização sociodemográfica e motivações de residentes multiprofissionais em saúde. REAS [Internet]. 2020 [cited in 3 June 2021]; 12(11):e4405. Available from: <https://acervomais.com.br/index.php/saude/article/view/4405>
10. Souza NR, Bushatsky M, Figueiredo EG, Melo JTS, Freire DA, Santos ICRV. Emergência oncológica: atuação dos enfermeiros no extravasamento de drogas quimioterápicas antineoplásicas. Esc Anna Nery Rev Enferm. [Internet]. 2017 [cited in 13 June 2020]; 21(1): e20170009. DOI: <https://doi.org/10.5935/1414-8145.20170009>
11. Ministério da Saúde (Brasil). Protocolo coordenado pelo Ministério da Saúde e ANVISA em parceria com FIOCRUZ e FHEMIG. Anexo 3: Protocolo de segurança na prescrição, uso e administração de medicamentos [Internet]. Brasília, DF: Ministério da Saúde; 2013 [cited in 27 Sep 2021]. Available from: <https://www20.anvisa.gov.br/segurancadopaciente/index.php/publicacoes/item/seguranca-na-prescricao-uso-e-administracao-de-medicamentos>
12. Ministério da Saúde (Brasil), Agência Nacional de Vigilância Sanitária. RDC N° 220, de 21 de setembro de 2004. Aprova o Regulamento técnico de funcionamento dos Serviços de Terapia Antineoplásica [Internet]. Brasília, DF: Ministério da Saúde; 2004 [cited in 13 June 2020]. 11p. Available from: <https://www20.anvisa.gov.br/segurancadopaciente/index.php/legislacao/item/resolucao-rdc-n-220-de-21-de-setembro-de-2004>
13. Instituto Nacional do Câncer José Alencar Gomes da Silva (Brasil). Exposição ao risco químico na central de quimioterapia: conceitos e deveres [Internet]. Rio de Janeiro: INCA; 2015 [cited in 01 Sep 2020]. (Manual de boas práticas). 32p. Available from: <https://docs.bvsalud.org/biblioref/coleciona-sus/2015/33697/33697-1505.pdf>
14. Borges GG, Silvino ZR, Santos LCG. Conhecimentos, atitudes e práticas dos enfermeiros na central de quimioterapia frente ao risco químico. Enferm Atual [Internet]. 2016 [cited in 13 June 2020]; 77:29-36. DOI: <https://doi.org/10.31011/reaid-2016-v.77-n.15-art.371>
15. Costa AG, Costa MSCR, Ferreira ES, Sousa PC, Santos MM, Lima DEOB, et al. Conhecimento dos profissionais de enfermagem sobre segurança do paciente oncológico em quimioterapia. Rev Bras Cancerol. [Internet]. 2019 [cited in 01 Sep 2020]; 65(1):e-04274. Available from: <https://rbc.inca.gov.br/revista/index.php/revista/article/view/274>
16. Ferreira AR, Vasques CI. Avaliação do conhecimento de enfermeiros sobre medidas de biossegurança na administração de antineoplásicos: estudo transversal. [monography]. Brasília, DF: Universidade de Brasília; 2015. 17p.
17. Ministério da Saúde (Brasil), Agência Nacional de Vigilância Sanitária. Resolução da Diretoria Colegiada da Agência Nacional de Vigilância Sanitária N° 222 de 28 de março de 2018. Regulamenta as Boas Práticas de Gerenciamento dos Resíduos de Serviços de Saúde e dá outras providências [Internet]. Brasília, DF: Ministério da Saúde; 2018 [cited in 01 Sep 2020]. Available from: http://portal.anvisa.gov.br/documents/33880/2568070/res0306_07_12_2004.pdf/95eac678-d441-4033-a5ab-f0276d56aaa6
18. Ministério da Saúde (Brasil), Agência Nacional de Vigilância Sanitária. Resolução N° 306, de 7 de dezembro de 2004 [Internet]. Dispõe sobre o Regulamento Técnico para o gerenciamento de resíduos de serviços de saúde. Brasília, DF: Ministério da Saúde; 2004 [cited in 01 Sep 2020]. Available from: https://bvsms.saude.gov.br/bvs/saudelegis/anvisa/2004/res0306_07_12_2004.html

19. Sangoi TP, Gehlen MH, Stobäus CD. Riscos ocupacionais para trabalhadores da enfermagem em oncologia: uma revisão narrativa. *Discipl Scientia Saúde* [Internet]. 2016 [cited in 01 Sep 2020]; 17(2):301-17. Available from: <https://periodicos.ufn.edu.br/index.php/disciplinarumS/article/view/2038/1884>

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CONTRIBUTIONS

Vanessa Galdino de Paula, Louise Pereira de Souza and Sandra Regina Maciqueira Pereira contributed to the design, collection and analysis of data, writing and reviewing. **Luana Ferreira de Almeida, Karla Biancha Silva de Andrade and Danielle Galdino de Paula** collaborated in the writing and reviewing.

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