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Impact of interruptions on the duration of nursing interventions: A study in a chemotherapy unit*

Impacto das interrupções na duração das intervenções de enfermagem: Estudo em unidade de quimioterapia

Impacto de las interrupciones en la duración de las intervenciones enfermeras: Estudio en unidad de quimioterapia

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ABSTRACT

Objective: To investigate interruptions during nursing interventions in a chemotherapy unit (sources and causes); measure their frequency, duration and the total elapsed time to complete the interventions. **Method:** This is an observational analytical study performed using a digital stopwatch. It was conducted in a teaching hospital between 2015/2016. The interventions performed and their interruptions were mapped and classified according to the Nursing Interventions Classifications (NIC) taxonomy. **Results:** There were 492 interruptions recorded in the 107 hours observed, especially in indirect care interventions. They were mainly caused by nursing professionals (n = 289; 57.3%) to supply materials (n = 65; 12.8%) and exchange care information (n = 65; 12.8%). The duration of interruptions ranged from 0:08 to 9:09 (average 1:15; SD 1:03) minutes. On average, interventions took 2:16 (SD 0:27) minutes to complete without interruption; however, the average was 5:59 (SD 3:01) minutes when interrupted. **Conclusion:** The interruptions were constant during the nursing work in the chemotherapy unit, including during the preparation and administration of medications, and increased the time to complete the interventions by an average of 163.9%.

DESCRIPTORS

Nursing Process; Nursing Service, Hospital; Nursing Staff, Hospital; Workflow; Oncology Nursing; Standardized Nursing Terminology.

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INTRODUCTION

Interruptions are constant in the nursing team's practice, making it difficult to complete an intervention and leading to a break in workflow continuity[1]. Because it is a noticeable reason for disturbance[2-4], it impacts on the quality of care[5] provided and generates dissatisfaction and stress[6] in the professional, who loses control of the rational flow of their activities to be performed[3,6-7]. Interruptions also interfere with patient safety, which constitutes a fundamental aspect of the care process[1,4].

Interruptions correspond to the occurrence of external events capable of discontinuing a previous planned intervention[2,8], unlike distractions in which professionals perceive external events but do not attend to them[8-9]. In the hospital context, the nursing team itself is mentioned among the sources of interruptions (often motivated by the need for communication and material supply)[2], environmental noise (telephone, television, cell phones and equipment)[9] and attending to urgent patient needs[2,9].

In outpatient chemotherapy units (CU) for drug infusion, nursing professionals are protagonists in the process of caring for and administering drugs, especially cytotoxic drugs, which require strict safety protocols. Indicators are usually monitored[7,10-12] for eliminating errors in drug administration, reducing the number of cases of phlebitis and extravasations, and decreasing the rate of falls. However, they are not immune to errors even in the case of actions classified as high risk. Studies[5,11] infer that such errors usually occur by the same determinants: carelessness in drug preparation and administration, and interruptions.

The effects of interruptions[3,6,13] on work's workflow and productivity and patient safety have been widely investigated in different nursing practice settings, such as emergency units[14], intensive care units (ICUs)[12] and operating room[6,13], but there are few publications referring to the theme in the CU. Thus, elucidating the nature of interruptions and their impacts provides nursing managers with the insight needed to improve care and time management indicators[4,11-12] in these units.

This study was conducted considering the implications of interruptive processes in alternating activities and limiting opportunities for critical thinking and programmed care[1,6,10]. It is linked to the Management of Health and Nursing Services research group (*GESTSAÚDE*) and proposes to answer the following questions: *What is the frequency and duration of interruptions during workflow in a Chemotherapy Unit? What are the main sources, causes and interventions interrupted? What is the time required to complete the nursing interventions with and without interruptions?* The study aims to investigate interruptions during nursing interventions in a CU regarding sources and causes; measure their frequency and duration and the total elapsed time to complete the interventions.

METHOD

Study design

This is a quantitative study implementing an analytical observational modality.

Scenario

The study involved the CU of a general teaching hospital in the interior of the state of São Paulo, Brazil, with quaternary coverage as its scenario. The unit operates on an outpatient basis from Monday to Friday, between 7 am and 9 pm, providing intravenous chemotherapy infusion to 17 adult patients simultaneously, performing an average of 1,200 monthly infusions. Eleven (11) nursing professionals work in this scenario: eight nurses and three nursing technicians.

Selection criteria

Nursing professionals from the CU with minimum institutional affiliation of six months were included. The interventions performed by residents or paid trainees were not followed-up and/or measured.

Data collection

The observational study began with prior work monitoring of the nursing professionals from the CU for six hours by one of the researchers in order to obtain a listing and record of the main interventions and activities performed. The observed records were subsequently corresponded to the standardized language of the NIC taxonomy[15] through cross-mapping. This transposition enabled constructing the structured instrument for data collection.

The timing technique[15] was adopted using a digital timer in order to measure the time spent on interventions. Minute-by-minute measurement was considered a more reliable method than work sampling to map interruptions[1], since nursing interventions are characterized by short duration and successive alternation, and interruptions are notably unforeseen[1,16].

The timer began when the nursing professional started an intervention and was interrupted in its completion. The start and end time in the event of an interruption was recorded, as well as the subject and its reason. Thus, we performed interrupted or repetitive reading with the timer returning to zero at the end of each observed moment. Each team member was individually monitored on their regular work shift at intervals ranging from 30 minutes to 4.5 hours by the same researcher who conducted the prior observation.

Data collection was conducted between June 2015 and March 2016, and then interruptions were categorized by: Domains[15]: Basic and Complex Physiological, Behavioral, Safety, Family, and Health System; Type of care[15]: direct (through interaction with the patient) and indirect (actions performed away from the patient, but for their benefit, capable of supporting the direct care interventions); Sources[1,5-7,12,16]: patients; family members (companions and/or caregivers); nursing professionals; multiprofessional staff (physicians, psychologists, pharmacists) and technology (computer system and equipment failure); Causes[3-6,8-9,17]: *Emergency demand*: pain complaints, phlebitis, and anaphylactic reactions; *Physiological demand*: disconnecting infusions to use the toilet; nausea or vomiting; *Assistance for ambulation*; *Educational demand*: guidance to patients and family members regarding treatment and

home care; guidance to professionals and students on procedures; *Emotional demand*: expression of treatment-related anxieties and feelings, either in person or over the phone; *Drug and process control*: drip change and control; Peripheral Venous Access (PVA) care; prescription checking; *Control of the environment*: comfort measures (adjustment of the air conditioner temperature, inclining their seat, blankets), *Exchange of information about patients*: communication about treatment protocols, complications, alteration of medical prescription, among others; *Material supply/disposal*: forgetting material, needing to replace missing material; *Parallel conversation*: subjects not associated with work activities; and *Personal mobile phone use*.

Data analysis and processing

The obtained results were analyzed using descriptive statistics. The chi-square test was used for analysis between domains and time for nursing interventions. P-values ≤ 0.05 were considered significant. Data were computed by the IBM SPSS Statistical Package v.22 program (IBM Corporation, Armonk, NY). Time information was transcribed in hours, minutes and seconds (hh:mm:ss).

Ethical aspects

This study was approved by the Research Ethics Committee through Opinion No. 980.660/15. All participants signed the Informed Consent Form (ICF), respecting the precepts of Resolution no. 466/12 of the National Health Council.

RESULTS

The 11 study participants were mostly nurses (n = 8) and women (n = 9), ranging in age from 22 to 40 years (M = 30.7; SD = 7.5 years). A total of 107 hours of workflow of these professionals were observed. In this period, 72 activities related to 33 nursing interventions described in the NIC[15] were identified, performed 4033 times.

There were 308 (61.1%) interruptions in indirect care activities. Nursing professionals corresponded to the largest source of interruption (n = 289; 57.3%), both in direct nursing care interventions (n = 107; 21.2%) and in indirect care interventions (n = 182; 36.1%). The most frequent causes were related to exchanging patient care information (n = 65; 12.8%) and material supply or disposal (n = 65; 12.8%) (Table 1).

Table 1 – Frequency of interruptions during nursing activities/interventions according to sources, causes and types of care – São José do Rio Preto, SP, Brasil, 2016.

Sources	Causes	Nursing Activities/Interventions		Total n(%)
		Direct care n(%)	Indirect care n(%)	
Patients	Demands: - Emergency	8(1.6)	12(2.4)	20(4.0)
	- Physiological	24(4.8)	22(4.4)	46(9.1)
	- Educational	16(3.2)	16(3.2)	32(6.3)
	- Emotional	4(0.8)	2(0.4)	6(1.2)
	Environment control	5(1.0)	11(2.2)	16(3.2)
	Assistance for ambulation	-	7(1.4)	7(1.4)
	Subtotal	**57(11.3)**	**70(13.9)**	**127(25.2)**
Relatives	Telephone call	1(0.2)	3(0.6)	4(0.8)
	Demands: - Educational	11(2.2)	5(1.0)	16(3.2)
	- Emotional	4(0.8)	3(0.6)	7(1.4)
	Subtotal	**16(3.2)**	**11(2.2)**	**27(5.4)**
Nursing professionals	Exchange information	23(4.6)	42(8.3)	65(12.8)
	Parallel Conversation	4(0.8)	17(3.4)	21(4.2)
	Personal cellphone use	2(0.4)	7(1.4)	9(1.8)
	Supply/Disposal of Materials	32(6.3)	33(6.5)	65(12.8)
	Medical Control / Processes	18(3.6)	37(7.3)	55(10.9)
	PVA Care	14(2.8)	24(4.8)	38(7.5)
	Check Prescription	3(0.6)	8(1.6)	11(2.2)
	Environmental control	3(0.6)	2(0.4)	5(1.0)
	Educational demand	8(1.6)	12(2.4)	20(4.0)
	Subtotal	**107(21.2)**	**182(36.1)**	**289(57.3)**
Multiprof. team	Exchange information	13(2.5)	25(5.0)	38(7.5)
	Telephone	2(0.5)	17(3.3)	19(3.8)
	Subtotal	**15(3.0)**	**42(8.3)**	**57(11.3)**
Technology	Computer system / equipment failure	1(0.2)	3(0.6)	4(0.8)
	Subtotal	**1(0.2)**	**3(0.6)**	**4(0.8)**
	Total	**196(38.9)**	**308(61.1)**	**504(100)**

Legend: medical/processes – medicines and processes; PVA – peripheral venous access; Multiprof. Team – multiprofessional team.

Twenty-eight (28) of the 107 observed hours (26.4%) were consumed in interruptions. Nurses were interrupted on average 4.9 times per hour, while nursing technicians 3.8 times/hour (Table 2).

Table 2 – Distribution of interruptions by professional category, total observation hours, hours interrupted and number of interruptions observed per hour – São José do Rio Preto, SP, Brazil, 2016.

Professional Category	Number of interruptions	Hours Observed		Hours interrupted		Interruptions per hour
	n(%)	h:min:sec	%	h:min:sec	%	n
Nurses	386(78.5)	79:14:08	74.5	23:08:33	21.7	4.9
Nursing technicians	106(21.5)	27:44:07	25.5	4:53:27	4.7	3.8
Total	**492(100)**	**106:58:15**	**100**	**28:02:00**	**26.4**	**4.6**

A total of 492 of the 4033 interventions observed were interrupted, revealing an average of 8.2 interruptions per intervention. Among the NIC Domains[15] presented in Table 3, there was a predominance of interruptive processes during Drug Administration (n = 120), Venous Puncture (n = 57) and Central Venous Access Control (n = 30) interventions, all in the Complex Physiological Domain. Regarding the time variation in the Behavioral Domain without interruptions, the interventions took on average 2:37 (SD 1:13) minutes to be completed; however, the average time increased to 10:04 (SD 8:41) minutes during interruptions.

In the Safety Domain, the most frequently interrupted interventions were Protection from Infection (n = 53) and Monitoring of Vital Signs (n = 8). In the Domain Health System, the interventions Documentation (n = 74) and Care upon Admission (n = 69) were the most interrupted. We found time variations in Health System Domain interventions from 2:51 (SD 3:20) minutes without interruption to 6:16 (SD 6:29) minutes with interruption (Table 4).

The following interruption values were found in the domains by nursing intervention: Basic Physiological – 17.2; Complex Physiological – 8.1; Behavioral – 3.0; Safety – 12.3; and Health System – 5.7.

Table 3 – Frequency and time spent in nursing interventions in the domains: *Basic Physiological, Complex Physiological, Behavioral and Family* performed in the presence or absence of interruptions – São José do Rio Preto, SP, Brazil, 2016.

Interventions	Interventions performed *without* interruptions			Interventions performed *with* interruptions		
	n(%)	Variation (min:sec)	M(SD) (min:sec)	n(%)	Variation (min:sec)	M(SD) (min:sec)
Basic Physiological Domain						
Ambulation	25(1.1)	0:56 - 3:10	2:00(0:34)	-	-	-
Transfer	9(0.4)	1:17 - 3:04	2:11(0:41)	-	-	-
Urinary Elimination	91(4.1)	0:21 - 4:12	1:08(0:26)	12(0.5)	1:39 - 5:30	2:23(1:24)
Food	90(4.0)	0:31 - 4:50	2:25(0:54)	4(0.2)	3:47 - 5:52	4:40(0:55)
Environment Control	89(4.0)	0:09 - 2:04	0:37(0:24)	1(0.04)	2:01 - 2:01	2:01
Pain control	20(0.9)	0:51 - 4:28	1:54(0:44)	-	-	-
Vomiting Control	3(0.1)	0:51 - 1:05	1:00(0:08)	-	-	-
Subtotal	327(14.6)	0:09 - 4:50	1:49(1:05)	19(0.8)	1:39 - 5:52	3:46(1:44)
Complex Physiological Domain						
Hypoglycemia Control	8(0.4)	1:30 - 2:17	1:47(0:17)	1(0.04)	4:48 - 4:48	4:48
Collect venous blood	4(0.2)	2:34 - 9:18	5:01(3:43)	1(0.04)	4:21 - 4:21	4:21
Chemotherapy Control	119(5.3)	1:25 - 8:55	2:45(1:46)	19(0.8)	2:56 - 23:35	8:42(7:17)
Administration of medications	1202(53.8)	0:09 - 6:24	1:09(0:59)	120(5.4)	0:45 - 9:12	3:24(1:48)
Oxygen therapy	5(0.2)	2:08 - 3:11	2:47(0:27)			
Venous puncture	339(15.2)	0:07 - 4:38	1:24(1:09)	57(2.6)	0:52 - 6:26	3:46(1:21)
Central venous access control	167(7.6)	0:44 - 10:03	3:15(2:08)	30(1.3)	1:30 - 9:57	5:00(2:33)
Subtotal	1844(82.7)	0:07 - 10:03	1:48(1:26)	228(10.2)	0:45 - 23:35	3:27(2:07)
Behavioral Domain						
Emotional support	21(0.9)	0:50 - 8:55	3:28(2:32)	9(0.4)	5:44 - 23:35	06:13(8:12)
Teaching: Prescription Drugs	18(0.8)	0:44 - 3:25	1:45(0:47)	4(0.2)	3:02 - 4:25	3:56(0:47)
Subtotal	39(1.7)	0:44 - 8:55	2:37(1:13)	13(0.6)	3:02 - 23:35	10:04(8:41)
Family Domain						
Caregiver support	23(1.0)	0:49 - 8:55	2:00(1:45)	1(0.04)	9:08 - 9:08	9:08
Subtotal	23(1.0)	0:49 - 8:55	2:00(1:45)	1(0.04)	9:08 - 9:08	9:08
Total	**2233(100)**	**0:07 -10:03**	**2:09(1:04)**	**261(11.7)**	**0:45 - 23:35**	**6:36(3:28)**

Legend: M(SD) - Mean (Standard deviation).

Table 4 – Frequency and time spent on nursing interventions in the Safety and Health System domains performed in the presence or absence of interruptions – São José do Rio Preto, SP, Brazil, 2016.

Interventions	Interventions *without* interruptions			Interventions *with* interruptions		
	n(%)	Variation (min:sec)	M(SD) (min:sec)	n(%)	Variation (min:sec)	M(SD) (min:sec)
Safety Domain						
Triage: Phone	12(0.7)	1:03 - 4:32	2:39(1:07)	-	-	-
Monitoring vital signs	83(4.6)	0:27 - 1:04	0:43(0:07)	8(0.4)	1:05 - 4:01	2:34(1:01)
Anaphylaxis Control	14(0.8)	2:36 - 9:18	5:13(2:31)	1(0.06)	9:20 - 9:20	9:20
Protection against infection	584(32.4)	0:07 - 2:33	0:33(0:24)	53(3.0)	0:37 - 4:58	1:51(1:08)
Environment Control	118(6.5)	0:16 - 4:48	0:54(0:53)	6(0.3)	0:47 - 4:28	1:52(1:09)
Patient Identification	77(4.3)	0:26 - 2:40	0:56(0:21)	4(0.2)	1:35 - 3:09	3:02(1:34)
Subtotal	888(49.3)	0:07 - 9:18	2:34(2:38)	72(4.0)	0:37 - 9:20	3:13(2:29)
Health System Domain						
Care upon admission	331(18.4)	0:21 - 4:12	1:44(1:01)	69(3.8)	0:57 - 9:47	3:38(2:01)
Check emergency car	12(0.7)	1:13 - 6:13	3:39(1:51)	2(0.1)	5:44 - 7:45	6:45(1:26)
Preceptor: Students	28(1.5)	0:52 - 7:16	2:26(1:34)	4(0.2)	2:04 - 13:22	9:28(6:25)
Preceptor: Employee	8(0.4)	0:51 - 3:05	1:47(0:42)	-	-	-
Doctor support	45(2.6)	0:54 - 3:26	2:02(0:41)	-	-	-
Supply Control	46(2.6)	0:21 - 4:18	1:24(0:47)	1(0.06)	2:19 - 2:19	2:19
Employee Supervision	4(0.2)	10:56 - 5:43	13:19(3:23)	2(0.1)	11:02 - 9:27	25:15(20:05)
Shift change	27(1.5)	1:21 - 5:44	3:27(1:08)	3(0.2)	4:04 - 4:38	4:19(0:17)
Documentation	112(6.2)	1:06 - 17:32	4:51(2:51)	74(4.1)	2:01 - 19:51	8:41(4:23)
Exchange care information	299(16.6)	0:17 - 9:52	1:38(1:02)	4(0.2)	2:09 - 3:35	2:46(0:37)
Subtotal	912(50.7)	0:17 - 17:32	2:51(3:20)	159(8.8)	0:57 - 39:27	6:16(6:29)
Total	**1800(100)**	**0:07 – 9:53**	**3:03(3:25)**	**231(12.8)**	**0:37 - 39:27**	**7:59(3:04)**

Legend: M(SD) – Mean (Standard deviation).

A total of 228 of the 492 identified interruptions (46.3%) occurred in the Complex Physiological Domain. The duration of interruptions ranged from 0:08 seconds to 9:09 minutes. On average, nursing interventions without interruption took 2:16 (SD 0:27) minutes to complete; however, the time increased to 5:59 (SD 3:01) minutes when interrupted (Table 5).

Table 5 – Frequency and duration of interruptions and change in time for completing nursing interventions in the absence and presence of interruptions (min:sec; %) – São José do Rio Preto, SP, Brazil, 2016.

NIC Domains	Duration of the Interruptions		Change in Time			
	N(%)	M(SD)	No M(SD)	With M(SD)	Min:Sec(%)	P
Basic Phys.	19(3.9)	1:01(0:31)	1:49(1:05)	3:46(1:44)	+ 1:57(107.3)	≤0.01
Complex Phys.	228(46.3)	1:10(0:52)	1:48(1:26)	3:27(2:07)	+ 1:39(91.7)	≤0.01
Behavioral	13(2.6)	2:24(2:26)	2:37(1:13)	10:04(8:41)	+ 7:27(284.7)	≤0.01
Safety	72(14.6)	1:00(0:45)	2:34(2:38)	3:13(2:29)	+ 0:39(25.3)	Ns
Family	1(0.2)	0:53	2:00(1:45)	9:08	+ 7:08(356.7)	≤0.01
Health System	159(32.4)	1:27(1:12)	2:51(3:20)	6:16(6:29)	+ 3:25(119.8)	≤0.01
Total	**492(100)**	**1:15(1:03)**	**2:16(0:27)**	**5:59(3:01)**	**+ 3:43(163.9)**	**≤0.01**

Legend: M(SD) – Mean(Standard deviation); P – significance coefficient; Basic Phys. – Basic Physiological; Complex Phys. – Complex Physiological; Ns – non-significant coefficient P.

DISCUSSION

In the investigated CU there was a higher concentration of interventions in the NIC domains aimed at safe drug administration[18-19]. There was a high frequency of interventions involving an encouragement of expressing questions, emotional support, guidance on drug action and management of side effects, highlighting actions in nursing care to minimize drug problems through patient and patient's family education[18-19].

Interruptions occur from a wide variety of sources and causes[9,20-22]. In line with some findings[4,17,22], in this study the nursing professionals themselves were the most frequent source, a condition assessed as being critical to the work process[4,17]. It is reported[17,23] that these professionals are the most interrupted when compared to the other members of the multiprofessional team, and are also the ones who interrupt the most[17,23]. The dialogues for exchanging information about nursing care[3] are pointed out as a recurring cause of these interruptions[10,17,23]. The main reason points to complicity among peers, providing greater opinion sharing, emergency help and advice[9,21].

Among the other causes listed in the CU, there is supplying materials, which is also cited in the literature[3,17]. Such interruptions result from a lack of stocking replacement, the professional's forgetfulness of the materials required for a given intervention or pharmacy distribution problems. Adopting checklist-type inspection[2,21-22] is suggested to avoid this recurrence, which reflects delays in performing care[17]. External noise such as telephone and cellphone ringing is presented in international analyzes[6,10,20-21] as the

main cause of interruptions, which were not confirmed in this investigation.

It was observed that the CU nursing team was interrupted an average of 4.6 times/hour, which led to 8.2 interruptions per intervention, impacting more on nurses' performance (4.9 interruptions/hour). Values between 0.4 to 18 interruptions/hour have been reported in other practice scenarios[1,3,4,13]. However, the studies found do not classify NIC domain interruptions, which makes comparisons difficult.

It is worth mentioning the predominance of interruptions in indirect nursing care interventions identified herein. This data supports the current characterization of nursing activities, in which the time required for indirect care is increasing[1,24]. Such interruptions can minimize patient risks, as practitioners may have time to prevent errors before directly interacting with patients[17].

Medication administration and documentation were the most discontinued interventions in the CU. It is estimated that nurses use up to 11% of their time spent on medication administration to manage interruptions[22]. Studies conducted in ICUs[11,17] have also identified this alarming rate of interruptions, and reinforce that this is a high risk process for patient safety[4,19]. When an interruption occurs during the drug process, there is a risk of omitting or repeating some steps[2,24-26]. This is because the individuals' working memory requires time to remember where they were before the interruption when returning to a previous activity[20-22,25].

Documentation has also been confirmed in the literature as a constantly interrupted intervention[3,17]. The risk of failures inherent to discontinuations in filing documents[11], which are instruments to support professional practice contributing to teaching and research strategies, and are the targets of audits and legal actions are highlighted[17].

It is recognized that time management at work is a crucial tool in hospital organizations and aims to improve processes and productivity[17,20]. Almost a third of the time was spent on interruption management in the CU, a figure higher than previous studies, showing that interruptions consume 6.4%[4] to 22%[9] of professionals' working time.

This study reaffirms the view that more than 75% of interruptions last less than one minute[17,20]. An analysis[13] indicates that only interruptions caused by telephone calls lasted more than one minute. This short duration may favor resumption of the initial activity, since the cognitive effort to remember what was being done is smaller[17,23,25].

It was observed that the time required to complete an intervention in the CU was approximately three times longer when there were interruptions. Similarly, a recent analysis[17] showed that the average duration of activities was one minute, while the time to complete them in the event of interruption was three minutes. This raise implies an increase in healthcare costs and workload, as well as interference in productivity[14], as interruptions can decrease the desired productivity by up to 40% and threaten patient safety[14].

Safety has been an emerging theme in recent decades[8,21] and current protocols[9,14] include reducing interruptions as one of the main measures. Completing a new task increases the risk of error in one or both tasks because interruption stress causes cognitive fatigue and can lead to omissions and errors[8,23,25]. A significant number of nursing professionals interviewed in ICUs[17] mention having made an error or failure as a result of interruptions in their work activities. Among them, it is reported forgetting to perform some procedure, incomplete notes, diet change and medication errors[17].

There may even be a tacit expectation that skilled professionals are those who are able to effectively handle interruptions[2]. However, humans have a limited ability to manage multiple simultaneous assimilations of activities[4], emphasizing the need for strategies to reduce them[1]. Changes in the work process and the environment surrounding nursing professionals[8-9] may interfere with interruptions and quality of care. Increasing staff numbers and structural improvement, with spaces which minimize avoidable interruptions, were observed as measures that could reduce errors[14,17].

It is emphasized that strategies to minimize interruptions will be effective when the multiprofessional team is trained (both those who suffer interruptions and those who cause them), aware of priorities, knowing when interruptions should be avoided[17] and when there is greater risk to patient safety[3-4].

According to studies[4,8], the ability to cope with interruptions is progressive, depending on the length of professional practice, and recent graduates are more vulnerable to interruptions[22]. Thus, implementing undergraduate courses which address this theme is suggested, aiming at training professionals who know the need to prioritize tasks and deal with alternating activities[20-21].

It is also important to emphasize the incentive for behavioral change of patients and family members[11,22] and the adoption of error checking systems such as a checklist[20-21]. By addressing the important points during critical tasks, this instrument acts as a reference for the team that, when leaving a task and returning to complete it, allows them to visualize the step where it stopped[20-21]. Silence Zones have also been implemented in hospital institutions[21-22]. They are physical spaces with limited access aimed at reducing interruptions in medication preparation. The use of "do not disturb" vests aimed at reducing interruptions of patients, family members and multidisciplinary staff has also been cited[23].

A limitation of this investigation is the analysis of interruptions of a single CU. It is recognized that results may vary in other practice scenarios. However, the findings bring a substantial contribution to team management, favoring understanding of the causes and sources of interruption processes in order for minimization strategies to be implemented. It also encourages structural and work processes reformulation so as to make better use of time, which will impact the process of safe care. Interruption mapping using the NIC taxonomy[15] provides uniform measurement for comparability between studies. It also corroborates the interruptive process as one of the factors that influence the workload, evidenced by measuring the time spent in nursing interventions.

CONCLUSION

Interruptive processes were frequent, lasting an average of one minute. Most of them occurred during indirect nursing

care activities and had the nursing professionals themselves as their main source, motivated by communication about care protocols and material supplies. They implied in an average increase of 163.9% of time to complete the interventions.

Further studies are needed to better elucidate the impact of interruptive processes on care and to stimulate effective and easily applicable management strategies concerning them.

RESUMO

Objetivo: Investigar interrupções durante intervenções de enfermagem em uma unidade de quimioterapia (fontes e causas); mensurar frequência e duração das mesmas e o tempo total transcorrido para a finalização das intervenções. **Método:** Trata-se de estudo observacional analítico, realizado com uso de cronômetro digital. Foi conduzido em hospital de ensino entre 2015/2016. As intervenções realizadas e suas interrupções foram mapeadas e classificadas conforme taxonomia da Nursing Interventions Classifications (NIC). **Resultados:** Nas 107 horas observadas, ocorreram 492 interrupções, especialmente nas intervenções de cuidados indiretos. Foram causadas, principalmente, por profissionais de enfermagem (n=289; 57,3%), para suprir materiais (n=65; 12,8%) e trocar informações de cuidados (n=65; 12,8%). A duração das interrupções variou de 0:08 a 9:09 (média 1:15; Dp 1:03) minutos. Em média, sem interrupção, as intervenções demandaram 2:16 (Dp 0:27) minutos para serem concluídas; quando interrompidas, a média foi 5:59 (Dp 3:01) minutos. **Conclusão:** As interrupções mostraram-se constantes no decorrer do trabalho de enfermagem na unidade de quimioterapia, inclusive durante o preparo e administração de medicamentos, e elevaram, em média, 163,9% o tempo para a finalização das intervenções.

DESCRITORES

Processos de Enfermagem; Serviço Hospitalar de Enfermagem; Recursos Humanos de Enfermagem no Hospital; Fluxo de Trabalho; Enfermagem Oncológica; Terminologia Padronizada em Enfermagem.

RESUMEN

Objetivo: Investigar interrupciones durante intervenciones de enfermería en una unidad de quimioterapia (fuentes y causas); medir la frecuencia y duración de las mismas y el tiempo total transcurrido para la finalización de las intervenciones. **Método:** Se trata de estudio observacional analítico, realizado con el empleo de cronómetro digital. Se llevó a cabo en hospital universitario entre 2015/2016. Las intervenciones realizadas y sus interrupciones fueron mapeadas y clasificadas según la taxonomía de la Nursing Interventions Classifications (NIC). **Resultados:** En las 107 horas observadas, ocurrieron 492 interrupciones, especialmente en las intervenciones de cuidados directos. Las causaron, en general, los profesionales enfermeros (n=289; 57,3%), para suplir materiales (n=65;12,8%) e intercambiar informaciones de cuidados (n=65;12,8%). La duración de las interrupciones varió de 0:08 a 9:09 (promedio 1:15; Dp 1:03) minutos. En promedio, sin interrupción, las intervenciones requirieron 2:16 (Dp 0:27) minutos para concluirse; cuando interrumpidas, el promedio fue 5:59 (Dp 3:01) minutos. **Conclusión:** Las interrupciones se mostraron constantes en el curso del trabajo de enfermería en la unidad de quimioterapia, incluso durante la preparación y administración de fármacos, y elevaron, en promedio, el 163,9% el tiempo para la conclusión de las intervenciones.

DESCRIPTORES

Procesos de Enfermería; Servicio de Enfermería en Hospital; Personal de Enfermería en Hospital; Flujo de Trabajo; Enfermería Oncológica; Terminología Normalizada de Enfermería.

REFERENCES

1. Cornell P, Herrin-Griffith DMSN, Courtney K, Petschonek S, Sanders AM, D´Mello S, et al. Transforming nursing workflow, Part 1: the chaotic nature of nurse activities. J Nurs Adm. 2010;40(9):366-73.
2. Biron AD, Loiselle CG, Lavoie-Tremblay M. Work interruptions and their contribution to medication administration errors: an evidence review. Worldviews Evid Based Nurs. 2009;60(2):70-86.
3. Sassaki RL, Perroca MG. Interruptions and their effects on the dynamics of the nursing work. Rev Gaúcha Enferm [Internet]. 2017 [cited 2019 Mar 19];38(2):e67284. Available from: http://www.scielo.br/pdf/rgenf/v38n2/en_0102-6933-rgenf-1983-144720170267284.pdf
4. Monteiro C, Avelar AFM, Pedreira MLG. Interruptions of nurses' activities and patient safety: an integrative literature review. Rev Latino Am Enfermagem [Internet]. 2015 [cited 2018 Mar 5];23(1):169-79. Available from: http://www.scielo.br/pdf/rlae/v23n1/0104-1169-rlae-23-01-00169.pdf
5. Spooner AJ, Corleu A, Chaboyer W, Hammond NE, Fraser JF. Measurement of the frequency and source of interruptions occurring during bedside nursing handover in the intensive care unit: An observational study. Aust Crit Care. 2015;28(1):19-23.
6. D'Antonio S, Bagnasco A, Bonetti L, Sasso L. Observational study on interruptions during nurses work in two surgical wards of a hospital in Liguria. Prof Inferm. 2014;67(4):211-8.
7. Johnson M, Sanches P, Langdon R, Manias E, Levett T, Weidmann G, et al. The impact of interruptions on medication errors in hospitals: an observational study of nurses. J Nurs Manag. 2017;25(7):498-507.
8. Beyea SC. Distractions, interruptions, and patient safety. AORN J. 2007;86(1):109-12.
9. Brixey JJ, Robinson DJ, Johnson CW, Johnson TR, Turley JP, Zhang J. A concept analysis of the phenomenon of interruption. ANS Adv Nurs Sci. 2007;30(1):E26-42.
10. Oliveira RM, Leitão IMTDA, Silva LMSD, Figueiredo SV, Sampaio RL, Gondin MM. Strategies for promoting patient safety: from the identification of the risks to the evidence-based practices. Esc Anna Nery Rev Enferm [Internet]. 2014 [cited 2018 Sep 29];18(1):122-9. Available from: http://www.scielo.br/pdf/ean/v18n1/en_1414-8145-ean-18-01-0122.pdf
11. Buchini SBNS, Quattrin RMNS. Avoidable interruptions during drug administration in an intensive rehabilitation ward: improvement project. J Nurs Manag. 2012;20(1):326-34.
12. Novaretti MCZ, Santos EV, Quitério LM, Daud- Gallotti RM. Sobrecarga de trabalho da Enfermagem e incidentes e eventos adversos em pacientes internados em UTI. Rev Bras Enferm. 2014;67(5):692-9. DOI: http://dx.doi.org/10.1590/0034-7167.2014670504

13. Dante A, Andrigo I, Barone F, Rossella B, Antonio DC, Michela N, et al. Occurrence and duration of interruptions during nurses' work in surgical wards: findings from a multicenter observational study. J Nurs Care Qual. 2016;31(2):174-82.

14. Cole G, Stefanus D, Gardner H, Levy MJ, Klein EY. The impact of interruptions on the duration of nursing interventions: a direct observation study in an academic emergency department. BMJ Qual Saf. 2016;25(6):457-65.

15. Bulechek GM, Butcher HK, Dochterman J, Wagner CM. NIC: Nursing Interventions Classifications. Rio de Janeiro: Elsevier; 2000.

16. Desjardins F, Cardinal L, Belzile E, McCusker J. Reorganizing nursing work on surgical units: a time-and-motion study. Nurs Leadersh (Tor Ont). 2008;21(3):26-38.

17. Prates DO, Silva AEBC. Interruptions of activities experienced by nursing professionals in an intensive care unit. Rev Latino Am Enfermagem [Internet]. 2016 [cited 2019 Mar 26]; 24:e2802. Available from: http://www.scielo.br/pdf/rlae/v24/0104-1169-rlae-24-02802.pdf

18. Souza CA, Jericó MC, Perroca MG. Nursing intervention/activity mapping at a chemotherapy center: an instrument for workload assessment. Rev Latino Am Enfermagem [Internet]. 2013 [cited 2018 Aug 26];21(2):492-9. Available from: http://www.scielo.br/pdf/rlae/v21n2/0104-1169-rlae-21-02-0492.pdf

19. Guimarães RCR, Gonçalves RPF, Lima CA, Torres MR, Silva CSO. Nursing actions facing reactions to chemotherapy in oncological patients. Rev Online Pesq Cuid Fundam [Internet]. 2015 [cited 2019 Mar 16];7(2):2440-52. Available from: http://www.seer.unirio.br/index.php/cuidadofundamental/article/viewFile/3589/pdf_1559

20. Grundgeiger T, Dekker S, Sanderson P, Brecknell B, Liu D, Aitken LM. Obstacles to research on the effects of interruptions in healthcare. BMJ Qual Saf. 2016;25(6):392-5.

21. Baethge A, Rigotti T, Roe RA. Just more of the same, or different? An integrative theoretical framework for the study of cumulative interruptions at work. Eur J Work Organ Psychol. 2014;24(2):308-23.

22. Raban MZ, Westbrook JI. Are interventions to reduce interruptions and errors during medication administration effective? A systematic review. BMJ Qual Saf. 2014;23(5):414-21.

23. Currie L. Reducing interruptions during medication administration: the white vest study. J Res Nurs. 2014;19(3):262-3.

24. Kakushi LE, Évora YDM. Direct and indirect nursing care time in an intensive care unit. Rev Latino Am Enfermagem [Internet]. 2014 [cited 2018 May 22];22(1):150-7. Available from: http://www.scielo.br/pdf/rlae/v22n1/0104-1169-rlae-22-01-00150.pdf

25. Potter P, Wolf L, Boxerman S, Grayson D, Sledge J, Dunagan C, et al. An analysis of nurses' cognitive work: a new perspective for understanding medical errors. New York: Agency for Healthcare Research and Quality; 2010. p. 39-50.

26. Hayes C, Jackson D, Davidson PM, Power T. Medication errors in hospitals: a literature review of disruptions to nursing practice during medication administration. J Clin Nurs. 2015;24(21-22):3063-76.