

# PREVALENCE OF ADVERSE EVENTS IN ELDERLY PATIENTS HOSPITALIZED IN MEDICAL SURGICAL UNIT

## PREVALÊNCIA DE EVENTOS ADVERSOS ENTRE IDOSOS INTERNADOS EM UNIDADE DE CLÍNICA CIRÚRGICA

## PREVALENCIA DE EVENTOS ADVERSOS ENTRE ANCIANOS INTERNADOS EN UNIDAD DE CLÍNICA QUIRÚRGICA

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**Objective:** to estimate the prevalence, types, and damages resulting from adverse events in elderly patients hospitalized in the medical surgical unit of a teaching hospital in the Central-West Region. **Method:** it was a cross-sectional retrospective study conducted with 260 hospitalizations between July and December 2013 at the medical surgical unit of a teaching hospital in the Central-West Region of Brazil. Data collection took place between January and April 2014, using the medical records as data source. **Results:** A prevalence of 58.8% of adverse events was estimated. 531 records were identified, corresponding to 2.04 events per hospitalization. Unrelieved acute pain was predominant, 73.1% of adverse events resulted in mild damage and 0.9% led to death. **Conclusion:** the high prevalence of hospitalization of the elderly reflects the need to specialize health practices to ensure the safety of a population vulnerable to adverse events when compared to other life cycles in the care process.

**Descriptors:** Old age assistance. Iatrogenic disease. Patient safety.

*Objetivo: estimar a prevalência, os tipos e os danos decorrentes de eventos adversos ocorridos entre idosos internados na clínica cirúrgica de um hospital de ensino da região Centro-Oeste. Método: estudo transversal, retrospectivo, conduzido com 260 internações ocorridas entre julho e dezembro de 2013, na clínica cirúrgica de um hospital de ensino da região Centro-Oeste. A coleta de dados ocorreu entre janeiro e abril de 2014, tendo os prontuários como fonte de dados. Resultados: estimou-se prevalência de 58,8% de eventos adversos. Identificaram-se 531 registros, correspondendo a 2,04 eventos por internação exposta. A dor aguda não resolvida foi predominante, 73,1% dos eventos adversos resultaram em dano leve e 0,9% levaram a óbito. Conclusão: a alta prevalência de internação de idosos reflete a necessidade de especialização das práticas de saúde para garantir a segurança de uma população vulnerável à ocorrência de eventos adversos, quando comparada a outros ciclos de vida no processo do cuidar.*

*Descritores: Assistência a idosos. Doença iatrogênica. Segurança do paciente.*

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*Objetivo: estimar la prevalencia, los tipos y daños resultantes de eventos adversos ocurridos entre ancianos internados en clínica quirúrgica de un hospital de enseñanza de la región Centro-Oeste, Brasil. Método: estudio transversal, retrospectivo, con 260 internaciones entre julio y diciembre de 2013, en la clínica quirúrgica citada. Recolección de datos entre enero y abril de 2014, teniendo los prontuarios como fuente de datos. Resultados: se estimó prevalencia de 58,8% de los eventos adversos. Se identificaron 531 registros, correspondiendo a 2,04 eventos por internación expuesta. El dolor agudo no resuelto fue predominante, 73,1% de los eventos adversos resultaron en daño leve y 0,9% llevaron a la muerte. Conclusión: la alta prevalencia de internación de ancianos refleja la necesidad de especialización de las prácticas de salud para garantizar la seguridad de una población vulnerable a la ocurrencia de eventos adversos, en comparación con otros ciclos de vida en el proceso del cuidar.*

*Descriptores: Asistencia a los ancianos. Enfermedad iatrogénica. Seguridad del paciente.*

## Introduction

The significant increase in the elderly population and the changes in their epidemiological profile have contributed to the growing process of hospitalization and dependence on care provided by health professionals<sup>(1)</sup>. In the hospital context, elderly patients constitute a group highly exposed to adverse events during the care practice, either by the slower recovery, which prolongs the hospitalization time, by the type of care required, or even by the fragility of the life cycle itself<sup>(2-4)</sup>. Adverse events are understood as incidents resulting from health care that cause some harm to the patient, whether physical, social, or psychological, which includes illness, injury, suffering, disability, or death<sup>(5)</sup>.

Considering only the events related to drug administration detected during hospitalization in emergency services, the additional cost of assistance to the German health system exceeds two billion euros per year<sup>(6)</sup>. Studies conducted in Brazilian, Portuguese, and Canadian hospitals reveal that the most frequently described adverse events during hospitalization of the elderly are infiltration, obstruction or phlebitis in peripheral venous access, pressure injury, loss of nasoenteral tube, fall, and drug administration related events<sup>(2,4,7)</sup>. Systematic review assessing the occurrence of surgical adverse events showed that errors during non-surgical activities are more frequent than errors in surgical procedures<sup>(8)</sup>. Therefore, investigating the magnitude of these events in the health care context of hospitalized elderly people becomes imperative, especially

due to the incipient literature on the safety of this population in a medical surgical environment at both national and international level.

This research is justified by the substantial number of elderly people using health services, the susceptibility to adverse events, the excessive costs related to elderly health care models, and attempts to minimize the effects of adverse events on the patient<sup>(1-4,6)</sup>. Additionally, it may help in the development of more effective strategies to prevent adverse events during hospitalization.

This study aimed to estimate the prevalence, types, and damages resulting from adverse events in elderly people hospitalized in the medical surgical unit of a teaching hospital in the Central-West Region.

## Method

It was a cross-sectional retrospective study conducted at the medical surgical unit of a teaching hospital in the Central-West Region of Brazil. The institution is part of the Sentinel Hospital Network of the National Health Surveillance Agency (Anvisa), it has a Center for Patient Safety and, among its actions, works in the active and qualified notification of adverse events and technical complaints related to health products, as well as in the continuing education for professionals.

The hospitalization of patients in the medical surgical unit was chosen for analysis, being treated independently. Nevertheless, it is worth mentioning that there were no readmissions

associated with adverse events. The following inclusion criteria were considered for selecting the hospitalizations: individuals aged 60 years and older at the time of admission and a minimum stay of 24 hours.

Between July and December 2013, there were 260 hospitalizations of elderly patients, corresponding to 19.9% of all hospitalizations registered in the medical surgical unit in the period (1,305, regardless of the age group), since some elderly patients were hospitalized more than once in the investigation period.

Data collection took place between January and April 2014, with the medical records of the elderly as data source. A structured instrument was used, evaluated for precision, clarity, and objectivity by experts and refined in a pilot study. This instrument consisted of two parts: the first addressed the general characteristics of the patient and hospitalization; while the second included a spreadsheet for investigation and full description of adverse events.

The notes of all health professionals contained in the distinct parts of the medical record (patient identification forms, admission sheet, clinical evolution, care and drugs prescription) have been thoroughly read. Records that presented some evidence of adverse events were transcribed to the worksheet designed, forming the corpus of analysis. To validate the records of adverse events, the World Health Organization (WHO)<sup>(5)</sup> definition was applied. The corpus of analysis was independently evaluated by three specialists in patient safety.

Adverse event was the outcome variable of this study, defined as an incident arising from health care that, necessarily, resulted in some harm to the patient, compromising the structure or part of the body and/or any harmful effects, whether physical, social, or psychological, which includes illness, injury, suffering, disability, or death<sup>(5)</sup>. The damage identification was guided by the explicit record of the consequence of the incident to the patient during hospitalization, and

its classification regarding severity was based on the taxonomy for patient safety proposed by the WHO<sup>(5)</sup>.

Data were analyzed descriptively through the Statistical Package for the Social Sciences (SPSS) version 20.0 for Windows, presenting relative and absolute frequencies for the categorical variables. Regarding the continuous variables, mean, standard deviation, maximum and minimum were calculated. The prevalence of adverse events and the 95% confidence interval were calculated considering the total number of elderly hospitalized as denominator and the number of elderly patients exposed to adverse events as numerator.

Study associated with the project "Analysis of the Occurrences of Adverse Events in a Sentinel Hospital Network in the Central-West Region", it was approved by the Research Ethics Committee of the Hospital das Clínicas of the Federal University of Goiás, under Protocol No. 064/2008. All ethical aspects were followed, in compliance with national and international standards of research ethics involving human beings.

## Results

The analysis comprised 260 hospitalizations of elderly patients, corresponding to 19.9% of all hospitalizations in the period. Predominant hospitalizations consisted of male elderly (50.4%), aged 60-69 years (58.5%), mean age of 68.5 years (+6.65), and with comorbidities (68.5%), whose highest frequency was arterial hypertension and diabetes mellitus. Regarding admissions, they were the emergency type (57.7%), and the most frequent specialties were general surgery (21.9%), followed by vascular surgery (16.2%), proctology (13.8%), and urology (12.3%). Length of hospitalization ranged from 1 to 110 days, with a predominance of 1 to 3 days in 145 hospitalizations (55.8%).

**Table 1** – Characterization of hospitalizations in the medical surgical unit of a teaching hospital in the Central-West Region. Goiânia, Goiás, Brazil – July-Dec 2013. (n=260)

| <b>Variables</b>                  | <b>n</b>   | <b>%</b>     |
|-----------------------------------|------------|--------------|
| <b>Gender</b>                     |            |              |
| Male                              | 131        | 50.4         |
| Female                            | 129        | 49.6         |
| <b>Age group</b>                  |            |              |
| 60-64 years                       | 89         | 34.2         |
| 65-69 years                       | 64         | 24.6         |
| 70-74 years                       | 56         | 21.5         |
| 75-79 years                       | 31         | 11.9         |
| 80-84 years                       | 14         | 5.4          |
| 85 years and older                | 06         | 2.3          |
| <b>Comorbidities</b>              |            |              |
| Yes                               | 178        | 68.5         |
| No                                | 73         | 28.1         |
| No record                         | 09         | 3.5          |
| <b>Type of admission</b>          |            |              |
| Emergency                         | 150        | 57.7         |
| Elective                          | 110        | 42.3         |
| <b>Presence of companion</b>      |            |              |
| Yes                               | 142        | 54.6         |
| No                                | 49         | 18.8         |
| No record                         | 69         | 26.5         |
| <b>Length of hospitalization</b>  |            |              |
| 1-3 days                          | 145        | 55.8         |
| 4-6 days                          | 33         | 12.7         |
| 7-9 days                          | 21         | 8.1          |
| 10-12 days                        | 14         | 5.4          |
| 13 days or more                   | 47         | 18.1         |
| <b>Procedures</b>                 |            |              |
| Surgical intervention             | 209        | 80.4         |
| Antibiotic prophylaxis            | 107        | 41.2         |
| Administration of hemoderivatives | 44         | 16.9         |
| <b>Tubular devices</b>            |            |              |
| Catheter                          | 227        | 87.3         |
| Probe                             | 92         | 35.4         |
| Drain                             | 55         | 21.2         |
| Others                            | 18         | 6.9          |
| <b>Total</b>                      | <b>260</b> | <b>100.0</b> |

Source: Created by the authors.

Among the admissions, 209 out of 260 (80.4%) presented at least one type of surgical intervention. In these admissions, there were 20 (3.8%) surgical suspensions and 5 (0.9%) records of scheduled and non-performed examination. In this case, they were considered as adverse events, as they resulted from failures in clinical administration, caused by the lack of specific materials, defective equipment, human resources, lack of vacancy in the Intensive Care

Unit (ICU), lack of evaluation of the cardiology team, delay in starting the surgical procedure, and incomplete solicitation documents.

The following procedures were registered: antibiotic prophylaxis (41.2%); administration of hemoderivative (16.9%); implantation of peripheral and/or central venous catheter (87.3%); bladder, nasogastric and/or nasoenteral catheterization (35.4%); use of suction, abdominal, or Penrose drain (28.1%) (Table 1).

Among the 260 hospitalizations, 153 had at least one adverse event, with a prevalence of 58.8% (95% CI: 52.8-64.7). In this total, there were 531 adverse events with a mean of 2.04 adverse events per hospitalization. One single hospitalization registered up to 28 adverse events.

Table 2 demonstrates that the most frequent type of adverse event was related to the clinical process (90%). Among these, 80.2% presented record of unrelieved acute pain during the pre- and/or postoperative period, requiring substitution or inclusion of drug therapy. Records of unplanned peripheral venous catheter removal (bladder catheter, nasogastric tube, and suction drain) and peripheral venous catheter obstruction (7.2%) resulted in additional procedures, such as replace the device, new punctures and/or discomfort to the elderly patient. Furthermore, the clinical process category revealed 6 (1.1%) records of failures during technical procedures, resulting from several attempts to pass a nasogastric tube, which led the patients to

vomiting, as well as unsuccessful venipuncture, which caused hematoma and local infiltration.

There were 14 (2.6%) adverse events related to the medication process, which consisted of reactions following the administration of dipyrone analgesics, antibiotics, sedatives, and anti-inflammatories. These events induced the suspension and replacement of the proposed therapy.

In relation to hemoderivatives, 2 (0.4%) adverse events occurred due to lack of blood bags, delaying the treatment prescribed after patient evaluation. The lack of blood derivatives resulted in death.

The 10 (1.9%) cases of hospital infection required additional treatment and prolonged hospitalization, with death as the most severe damage.

Adverse events related to patient accidents were registered to a lesser extent, with 1 (0.2%) case of fall from a standing height and 1 (0.2%) case of pressure injury in the sacral region, which required additional care therapies.

**Table 2** – Adverse events in elderly patients hospitalized in the medical surgical unit of a teaching hospital in the Central-West Region. Goiânia, Goiás, Brazil – July-Dec 2013. (n=260)

| <b>Adverse events</b>                                  | <b>n</b>   | <b>%</b>   |
|--|------------|------------|
| <b>Clinical procedure/process</b>                      |            |            |
| Unrelieved acute pain                                  | 426        | 80.2       |
| Unscheduled removal and obstruction of tubular devices | 38         | 7.2        |
| Errors during technical procedures                     | 06         | 1.1        |
| Surgical wound dehiscence                              | 05         | 0.9        |
| Non-drug allergic process                              | 03         | 0.6        |
| <b>Clinical administration</b>                         |            |            |
| Surgery suspension                                     | 20         | 3.8        |
| Examination scheduled and not performed                | 05         | 0.9        |
| <b>Medication/intravenous fluids</b>                   |            |            |
| Adverse drug reaction                                  | 14         | 2.6        |
| <b>Hospital infection</b>                              |            |            |
| Surgical site infection, Phlebitis and Sepsis          | 10         | 1.9        |
| <b>Hemoderivative</b>                                  |            |            |
| Lack of blood bags                                     | 2          | 0.4        |
| <b>Patient accident</b>                                |            |            |
| Fall   | 01         | 0.2        |
| Pressure injury  | 01         | 0.2        |
| <b>Total</b>   | <b>531</b> | <b>100</b> |

Source: Created by the authors.

The magnitude and severity of the consequences of adverse events were different. Of the 531 adverse events identified, 388 (73.1%) resulted in mild damage and 135 (25.4%) in moderate damage. Severe damage was identified in 3 (0.6%) adverse events. With greater impact, 5 (0.9%) led to death.

In the analyzed charts, there were no records of corrective or preventive measures adopted by the health team and institution regarding the occurrence of adverse events.

## Discussion

The prevalence of adverse events observed in this study (58.8%) was much higher than the World Health Organization estimates of 10%<sup>(9)</sup>. Previous studies corroborate these findings<sup>(3,10)</sup> and indicate that elderly patients are described at high-risk for the occurrence of adverse events during hospitalization. These events occur during the patient's hospital stay and cause temporary or permanent incapacitation, prolong hospital stay, increase hospital costs, and can lead to death<sup>(3)</sup>.

The high rate of elderly patients with comorbidities and the resulting polypharmacy verified in this study may have contributed to this high prevalence of adverse events, since they indicate a possible fragility of these individuals. Polypharmacy should be carefully monitored by the health team, since the prescription of three or more medications daily during hospitalization triples the risk of incidents involving medication<sup>(11)</sup>.

Moreover, the length of hospitalization may also have influenced this high prevalence, which can be both a cause and a consequence of adverse events, since their occurrence during hospitalization often prolongs the permanence in the health institution<sup>(2,3)</sup>. At the same time, the patient's stay in the institution increases the risk of these events<sup>(11)</sup>. Thus, it is essential to know the profile of elderly patients to direct the action of health professionals to a more specialized, individualized, and safe care that may decrease the prevalence of adverse events in the hospital.

In addition to this high prevalence, there was a high incidence of adverse events (531 in total), corresponding to a mean of 2.04 per hospitalization, with a higher frequency of cases related to the clinical process (90%). Study carried out in São Paulo, Brazil, revealed that 55% of hospitalized elderly had adverse events related to the medication process, hospital infections, therapeutic and surgical procedures, and diagnostic procedures or errors<sup>(2)</sup>. On the other hand, multicenter study conducted in three Dutch hospitals verified that the most prevalent adverse events among the hospitalized elderly population were pain, polypharmacy, cognitive loss, urinary catheter-related infection, incontinence, fall, and pressure injury<sup>(10)</sup>.

Understanding the differences in patient safety indicators can positively influence work processes through the socialization of best practices and effective measures for preventing adverse events among hospitalized elderly.

Among the types of events, unrelieved acute pain was predominant in this study (80.2%). Although pain is considered subjective, its adequate management reduces hospitalization time, promotes short recovery, and improves the mobility of elderly patients, especially when the hospitalization was caused by some fracture<sup>(12)</sup>. Effective pain control is one of the evaluation items for accreditation and quality certification in hospital services by Programs such as those proposed by the National Accreditation Organization (ONA) and the Joint Commission International (JCI)<sup>(13)</sup>. There were no records indicating the professionals' behavior regarding the registry of unrelieved acute pain, demonstrating that the evaluation of the proposed treatment does not take place. It is suggested that professionals systematically evaluate the pain intensity of surgical patients for safer and more resolute treatments<sup>(12,14)</sup>.

Additionally, in the category concerning the clinical process, adverse events involving the use of tubular devices were also recorded, corresponding to 7.2% of the cases. The unscheduled removal of these devices is often found in the literature<sup>(14-15)</sup>. Although they have

not resulted in severe damage, parallel use of two or more tubular devices, such as probes, catheters, and drains, facilitates connection errors that cause serious adverse events, as they often result in death of the patient. Reviewing the work processes, using safer equipment, with better quality, and adopting preventive measures adapted to the reality of the work help reduce this type of events<sup>(15)</sup>.

Inefficient clinical management may increase the risk of adverse events during hospitalization<sup>(14,16)</sup>. This study indicated the occurrence of surgical suspension and cancellation of exams. Lack of resources, broken equipment, delays/cancellations of surgeries, delays in performing complementary and specialized examinations, and delays in delivering diagnostic tests<sup>(17)</sup>, as well as financial, family, and social difficulties, increase hospitalization time and the patient's exposure to such events. It is worth highlighting that the WHO considers the prolongation of hospitalization due to factors related to clinical administration an adverse event<sup>(5)</sup>.

Hospital infections and patient accidents found in this research are consistent results with previous studies<sup>(10,14)</sup>. The types of adverse events arising from unsafe assistance are similar, regardless of location, region, and type of service provided.

The nursing team is identified as the main responsible for the prevention and control of hospital infection, for ensuring the use of adequate attire, performing aseptic techniques, adequate training and, mainly, for promoting the development of critical awareness in health professionals for building a culture of prevention<sup>(18)</sup>.

Pressure injuries are common, costly, and negatively impact the health of hospitalized elderly patients. The nursing team is also accountable for monitoring these lesions and their occurrence in hospitalized elderly is estimated at 9%, reaching up to 33% in advanced stages. This number can be reduced by adopting clinical practices, including the elaboration and implementation of protocols for risk assessment,

protocols for therapeutic action, as well as care planning and documentation<sup>(19)</sup>.

Falls represent a common adverse event among hospitalized elderly patients, with an incidence of 16.9%, but can be avoided through improvements in the hospital structure, actions of promotion, prevention, and follow-up of the elderly by nursing<sup>(20)</sup>.

Adverse drug reactions were frequent adverse events during the hospitalization of the elderly. It is estimated that 51.2% of drug prescriptions for the hospitalized elderly population contain drugs that are unfit for their age. Among the patients with inadequate prescriptions, 42.3% had adverse reactions<sup>(21)</sup>. The occurrence of these drug reactions might be related to the use of routine drugs. The treatment prescribed in the hospital, along with the use of routine medication and the fragility of the elderly, may maximize adverse drug reactions during hospitalization. Establishing routines for evaluation and quick response to these reactions may promote patient well-being during hospitalization and avoid the prolongation of complications that may require additional intervention.

Given the elderly susceptibility to develop complications related to the use of medications, the continuous evaluation of the prescription can help reduce potential risks. Drug reconciliation has been encouraged for being an effective measure to identify differences in drug prescriptions, mainly because it includes the evaluation of drugs used routinely by the elderly and for ensuring the prescription assessment in each transition period of the patient within the health institution<sup>(22)</sup>. Moreover, the participation of the nursing, medical, and pharmaceutical team in discussing the cases broadens the possibilities of identifying reportable circumstances related to drug therapy.

The consequences or severity of adverse events are evidenced by their potential to induce damages and losses to the elderly hospitalized. Much of the damage caused by these events is classified as mild<sup>(8,14)</sup>, similar with the results verified in this study. Nonetheless, it has already been proven that unsafe care produces disastrous

damages, such as the 0.9% of deaths due to registered adverse events, which corresponded to 5 elderly who could have their lives preserved through more incisive protocols for preventing adverse events.

Most of the hospitalizations of the elderly in this study maintained the presence of companions, which is considered a key element, since they represent a link with their identity in the extra-hospital environment and minimize the negative impacts of the hospitalization process<sup>(23)</sup>. The presence of companions during the care provides greater security to the patient, but also contributes significantly with information to health professionals about the signs and symptoms presented by the elderly patient, thus helping to improve the quality of care.

In health institutions that encourage a safety culture, the presence of companions is considered a barrier to avoid adverse events during the hospitalization process of the elderly<sup>(23)</sup>. In this regard, the health team needs instruments to establish a proactive link between those involved and, especially, to recognize people/potential companions to develop the decision-making ability and, therefore, the autonomy of this new actor of patient-centered care<sup>(23)</sup>.

Implementing error-based learning systems that include voluntary and prospective notification of an incident, systematic review of events by a multidisciplinary team, and later feedback to the health team has aided the development of the safety culture, reducing underreporting, and improving the perception of health professionals on the need for changes in clinical practice<sup>(24)</sup>.

As limitations, the study shows the lack of record of conducts adopted by the institution's health team in relation to the occurrence of identified adverse events, as well as possible underreporting that may be associated with concern and/or fear of the multiprofessional team in formalizing the occurrence of the event adverse. Such reality alerts to the fact that the actual prevalence of adverse events among the elderly may be even higher.

Concerning health services management, there is a need for a permanent national effort to train and/or professionalize those in management positions, to increase the use of electronic communication and information technologies, and to reduce the instability and turnover of managers in the public area, due to political party implications<sup>(25)</sup>. Overcoming the difficulties related to management is directly associated with the efficiency and effectiveness of the services offered by the health system.

## Conclusion

The results of this study contribute to the construction of scientific knowledge, by identifying new perspectives and needs for health care, especially considering the high prevalence, types, and damages resulting from adverse events in elderly people, predominant in a medical surgical environment.

In a context which the concern about the quality and safety of health care gains global repercussion, knowing the real prevalence of adverse events in a population that lacks health care, compared to other human life cycles, can guide the development of more effective management and evaluation policies, focusing on specialized care that guarantees the safety of hospitalized elderly patients.

Therefore, the challenge of improving the quality of care involves the need for managers to prioritize the continuing education of professionals, focusing on health promotion, protection, maintenance, and rehabilitation, and treatment of diseases, to train and sensitize the multiprofessional team in the development of essential skills to provide harmless care to hospitalized patients. Furthermore, it is necessary to awaken in health professionals the need for attitudinal change, so that the adverse event is notified, reported, and mitigated, hence enabling to explore all forms of prevention, which also depends on the attitude of professionals and the organizational support.



## Collaborations

1. conception, design, analysis and interpretation of data: Cristiane Chagas Teixeira, Ana Lúcia Queiroz Bezerra, Thatianny Tanferri de Brito Paranaguá and Valéria Pagotto;

2. writing of the article and relevant critical review of the intellectual content: Cristiane Chagas Teixeira, Ana Lúcia Queiroz Bezerra, Thatianny Tanferri de Brito Paranaguá and Valéria Pagotto;

3. final approval of the version to be published: Cristiane Chagas Teixeira and Ana Lúcia Queiroz Bezerra.

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