

SELECTED RISK FACTORS FOR ADVERSE EVENTS IN HOSPITALISED PATIENTS IN HEALTHCARE FACILITIES

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ABSTRACT

Recently, adverse events have been a key focus of research. They are an indispensable element of the quality of services provided in healthcare entities. Interest in the issue has increased due to the crucial importance of patients' safety. Due to the actions of various determining factors, patients staying in medical institutions are at risk of adverse events. The phenomenon of adverse events is not fully known in Poland, due to the lack of a uniform system for their reporting and recording. The Council of Europe on 9 June 2009 issued recommendations on patient safety, including the prevention and control of healthcare-associated infections, which clearly state that adverse event monitoring systems should be set up and analysed in European Union (EU) member states to obtain full information on the extent and causes of incidents. In order to improve patient safety in the health system, the European Council recommends a standardised system for monitoring and reporting of adverse events. An analysis of the literature shows that adverse events have a wide variety of risk factors. This gives grounds to conclude that the topic of risk factors for such events is a very broad one. The results of available studies show risk factors on the part of those providing direct patient care, e.g. error on the part of the person performing the procedure or activity, error on the part of those providing indirect patient care, including organisational, management, and system errors, as well as external factors relating to the medical equipment used for patient care, as well as the key risk factors relating to patients themselves. The latter are the subject of the analysis undertaken. The aim of this report is to present selected risk factors for adverse events among inpatients in medical facilities.

Key words: risk factors, adverse events, hospitalisations.

INTRODUCTION

The concept of adverse events in hospital care has become a key focus of research in the context of patients' safety in recent years. It is an important and indispensable element of the quality of medical services provided by healthcare providers. High-quality medical services are characterised by medical, human, infrastructural, and financial resources organised in an efficient manner [1]. A breakthrough in the interest in the issue of adverse events occurred in the 1990s. It was understood that despite the development of medicine and the possibility of treating many incurable diseases, extending life expectancy, there is a risk of failing to provide adequate safety to patients in medical institutions. For every person, safety is a basic need. Every hospitali-

sation carries the risk of an adverse event. Hence, the issue of patient safety and adverse events has become the subject of much analysis and research. In 1999, the Committee on Quality of Medical Care in America, Institute of Medicine issued a report entitled "To Err Is Human. Building a Safer Health System", which shocked the public with its content [2]. It provides a comprehensive analysis of the problem of error generation in the health care chain and shows various methods of prevention. The paper showed data indicating that numerous medical errors were responsible for between 44,000 and 98,000 deaths per year in the United States. The publication indicated that the predominant cause of medical errors was not negligence, or lack of knowledge or skills of medical personnel, but inadequacies in the health care system [3].

The aim of this report is to present selected risk factors for adverse events among inpatients in medical facilities.

ADVERSE EVENTS AND RISK FACTORS

An adverse event according to the Joint Commission for Accreditation of Healthcare Organisations (JCAHO) is harm that occurs during diagnosis and/or treatment that is unrelated to the underlying disease, condition, or risk. This is also the definition provided by the World Health Organization (WHO), adding that an adverse event is understood to be unintended or unexpected [4]. According to the Institute of Medicine, an adverse event is defined as any type of action that results in harm, such as death, life-threatening illness, disability, prolonged hospital stay, etc., resulting from a medical intervention that caused harm to a patient [5]. On the other hand, according to the definition adopted by the Centre for Monitoring Quality in Health Care in its accreditation standards, an adverse event is a defect caused by treatment that is unrelated to the natural course of the disease, the patient's condition, or the risk of occurrence [6].

It is estimated that there are more than 420 million hospitalisations worldwide each year, of which more than 47 million are accompanied by adverse events. The WHO reports that approximately 134 million hospitalisations occur each year in low- and middle-income countries [7-9]. In Poland, which, according to the World Bank, is one of the high-income countries, the number of adverse events is still not fully known, because there is no uniform system for reporting and recording these events. Facilities are not required to register them [9]. According to information from the Patient Ombudsman, in January 2022, patients and their families reported 125 adverse events during hospitalisation [10]. A study by the Centre for Monitoring Quality in Healthcare, on the other hand, indicates that adverse events occur in 7.2% of all hospitalisations in Poland, of which 47.37% could have been prevented [6].

Risk factors are, according to circumstances, legal status, facts, actions, inactions, and external and internal events that may but do not necessarily cause a risk of irregularity. These are the causes of the risk. They increase the likelihood of a given adverse event occurring. The WHO groups risk factors into the following categories:

- Demographic (directly related to the population), e.g. age, gender, educational level, socio-economic status;
- Physiological (related to the body), e.g. high blood pressure, low albumin, high glucose, obesity;
- Behavioural (related to behaviour), e.g. poor diet, smoking, alcohol abuse;

- Environmental (these are physical, biological, economic, social factors), e.g. air quality, availability of sanitation;
- Genetic (resulting from having specific genes or genetic mutations), e.g. diseases caused by genetic inheritance in the family [11-14].

An analysis of the literature shows that adverse events have many different risk factors. This gives grounds to conclude that the topic of risk factors for events is a very broad one, as studies show factors on the part of those providing direct patient care, e.g. the error of the person performing the procedure and those providing indirect care – including organisational, management errors, external factors relating to the medical equipment used in patient care, systemic errors, and key risk factors relating to the patient. The latter are the focus of this research.

Among the non-patient-related risk factors most frequently cited by the authors are the following: the high level of complexity of the treatment process, potential latent inadequacies in health care delivery systems, the disparity between advances in medical knowledge and technology and opportunities for continuous training of medical staff, the general frailty of human nature, the state of health and the fitness of medical staff, and cognitive errors due to the specific functioning of the human brain and sensory organs [15]. The risk of incidents is also related to the unreliability of the medical staff, the presence of conflicts within the team, inadequate interpersonal communication, or faulty medical equipment. Non-ergonomic technical or systemic solutions, e.g. failure to adjust minimum staffing standards to the number of hospitalised patients and the category of nursing care set for patients, can also result in an increased risk of adverse events [16]. What is more, the working conditions and organisation of the medical staff, as well as errors hidden in the system or management of a particular unit, affect the risk of adverse events. Usually, the medical staff are mistakenly blamed for the event, but in many cases the cause may lie elsewhere. Those related to the person taking care of patients may be due to medical staff fatigue through excessive working hours and staff shortages [17].

Another group of risk factors are those relating to the patient – their age, gender, and health status, i.e. underlying disease, co-morbidities, medications taken (type and amount). Risk factors also include the presence of disorders that limit/hinder the patient's daily functioning, i.e. visual impairment, memory impairment, hearing impairment, or balance impairment. The risk of adverse events may be caused by one of the patient's predominant factors or a combination of factors. In addition, extrinsic factors that depend on the nature of the diagnostic, therapeutic, or nursing interventions may also be involved [18].

Grochans *et al.*, in their studies on the adverse event of falls, indicated that it results from a complex set of factors acting simultaneously. It is not usually the effect of a single causal factor. In their study, the authors considered both intrinsic and extrinsic factors, as well as situational circumstances such as the type of activity being performed at the time of the fall. They concluded that the number of falls is mainly influenced by modifying internal risk factors [19]. Aranaz-Andrés and his team, in a study conducted in Spanish hospitals, noted that among

patients with intrinsic risk factors, adverse effects occurred in 13.2%, compared with 5.2% of patients who did not have these factors. According to these researchers, adverse effects were therefore more frequent in patients with intrinsic risk factors than in those without these factors [20]. To encapsulate the complex topic of risk factors affecting patient safety, Table I summarises them, giving characteristics and justification with reference to the scientific publications that have addressed the risk of adverse events [11, 19, 21-58].

Table 1. Patient-related risk factors for adverse events

Risk factors	Characterisation/justification
Gender	<ul style="list-style-type: none"> – Female gender is a major risk factor for falls [21] – Women's skin is softer and therefore there is an increased risk of pressure sores [22] – The incidence of adverse events is reportedly higher in women than in men [23]
Age	<ul style="list-style-type: none"> – The incidence of falls increases with age as a result of progressive changes in the osteoarticular and muscular systems [24] – Older people are less able to assess their spatial location and existing obstacles in their surroundings [25] – The risk of falling has been shown to increase proportionally with age [19] – With ageing, the skin loses elasticity, becomes less hydrated and less well supplied with blood [26] – With age, physiological compensatory mechanisms become impaired, increasing the risk of adverse events [27]
Nutritional status	<ul style="list-style-type: none"> – Low levels of protein and albumin cause nutritional deficiencies thus increasing the risk of pressure sores [28] – Malnutrition increases the risk of pressure sores [29]
– Malnutrition	<ul style="list-style-type: none"> – Loss of thirst occurs with age, resulting in patient dehydration [25]
– Obesity	<ul style="list-style-type: none"> – Obesity increases the risk of falls [30] – Obese people fall twice as often as thin people of the same age [31]
Length of hospitalisation	<ul style="list-style-type: none"> – An adverse event can occur at any stage of hospitalisation [32] – Usually develops pressure sores in the first 2 weeks of hospitalisation. Approximately 30-40% of patients develop sores in the first week while 70% develop them in the second week [33] – Older people are subjected to multiple treatments and have a much longer hospital stay. A longer stay increases the risk of all complications of hospitalisation [34] – Each additional day of hospital stay increases the risk of an adverse event by 3% due to prolonged exposure to other risk factors [35]
Urinary/stool incontinence	<ul style="list-style-type: none"> – Urinary incontinence results in the need for more frequent micturition [36, 37] – Dampness associated with deficits in sphincter performance adversely affects the skin [25]
Visual disturbances	<ul style="list-style-type: none"> – As we age and various diseases, visual impairment occurs. There is a reduction in adaptation to darkness and strong light [38] – Quality of life in patients with visual impairment is significantly reduced, and if untreated leads to other diseases [39] – Visual impairment leads to injury [40] – Visual impairment results in reduced adaptation to darkness and harsh light [38]
Hearing disorders	<ul style="list-style-type: none"> – A direct consequence of hearing impairment is communication difficulties that affect interpersonal relationships and hinder social functioning [41] – Hearing impairment in the elderly is often associated with dizziness [38]
Memory disorders	<ul style="list-style-type: none"> – Memory impairment resulting from a progressive dementia process causes difficulties in communicating with the patient regarding safe movement [42] – Cognitive impairment is a cause of lack of cooperation between staff and patients [36, 37] – Cognitive impairment develops with age [43]
Imbalance	<ul style="list-style-type: none"> – Women have lower levels of physical activity and balance control than men [30, 44] – Women experience a decrease in body weight and muscle strength, with a consequent imbalance [45, 46] – Ageing causes changes that severely impair performance [47] – Imbalance can be an adverse effect of medication [37]
Type of medication taken	<ul style="list-style-type: none"> – Sensitivity to benzodiazepines increases with age – The use of calcium channel blockers among the elderly may cause a reduced baroreceptor response to low blood pressure and consequently lead to orthostatic hypotension [41] – The use of psychotropic drugs, sedatives, analgesics, antibiotics or steroids results in reduced psychomotor performance [33] – Antihistamines have sedative or reflex-impairing effects [48] – Orthostatic hypotonia may occur as a result of the effects of the diuretics taken [42]

Table 1. Patient-related risk factors for adverse events (cont.)

Risk factors	Characterisation/justification
Number of medications taken	<ul style="list-style-type: none"> – Old age is associated with multimorbidity that requires the use of multiple medications, thus increasing the risk of polypharmacy [49] – Taking multiple medications at the same time without considering possible interactions and side effects can be included as behavioural risk factors for falls [11] – Taking 4 or more drugs at the same time increases the risk of falls more than 6-fold [43]
Past surgical procedures	<ul style="list-style-type: none"> – In patients after extensive surgery, acute malnutrition may occur as a result of inadequate supply of protein, energy, vitamins [49] – In the perioperative period, the patient is given analgesics that affect the central nervous system by inhibiting the process of analysing pain signals reaching the brain from the damaged body site [50]
Smoking	<ul style="list-style-type: none"> – Impairs the normal blood supply to tissues [33]
Alcohol dependence	<ul style="list-style-type: none"> – Causes impaired perception of the surrounding world – Causes decreased or increased motor activity [51] – People under the influence of alcohol fall due to temporary imbalances [52]
Category of nursing care	<ul style="list-style-type: none"> – Falls are more common in patients classified in nursing care category III [36, 37, 53] – A loss in the number of fast twitch fibres and a reduction in the speed of muscle shortening reduce the functional capacity of older people [43] – Immobilisation is a consequence of pathological processes in systems and organs [54]
Coexisting diseases	<ul style="list-style-type: none"> – With ageing, the flow of nerve impulses deteriorates [55] – In cancer there is a decrease in tissue oxygenation, which reduces haemoglobin [28] – Depression results in reduced ability to interact with staff [56] – Asthma and chronic obstructive pulmonary disease impair lung ventilation [57] – Metabolic disorders and diabetes cause sensory disturbances [58] – Chronic diseases impair independence in basic life activities over time [43]

SUMMARY AND CONCLUSIONS

Despite huge interest in the issue of adverse events, advances in medicine, and numerous studies and publications, the topic of adverse events continues to be a problem in many healthcare settings around the world. Poland still lacks a structured system for reporting events and, consequently, specific data on the incidence, prolongation of hospitalisation, and increased costs of treatment and care associated with an adverse event. The magnitude of the incidence problem is not fully understood due to many systemic deficiencies still present in individual countries. Therefore, the epidemiological data are highly variable.

Intrinsic risk factors such as the patient's health status, age, medications used, length of hospitalisation, medical procedures, and nutritional status can influence the likelihood of these events occurring. Identification of the incidence, risk factors, and characteristics of adverse events in healthcare is essential to recognise the magnitude of the problem, as well as to propose strategies to mitigate the occurrence of new adverse events and to improve the quality of safety of hospitalised patients [59, 60]. Depending on the types of adverse events analysed, the available research findings on risk factors differ. Therefore, expanding research in this area would help to characterise and attribute relevant risk factors to the types of adverse events that may occur during a patient's stay in a medical facility. However, it is important to remember that each patient is an individual, and the risk of adverse events may vary

depending on a number of factors. That is why it is important to take an individual approach to each patient and monitor the condition regularly. Ensuring patient safety by reinforcing the prevention of adverse events has a positive impact on the hospitalisation of patients. Understanding internal risk factors can help prevent adverse events and improve the quality of healthcare.

Disclosures

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