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THE IMPORTANCE OF CORRECTLY REPORTING THE CASES OF HEALTH CARE ASSOCIATED INFECTIONS IN THE DRG

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HAI (Health Care Associated Infections) represent the infections that a healthy or sick patient contacts during an episode of hospitalization, except for the pre-existing manifestations. These infections have become a real burden for hospitals in Romania due to the long duration of hospitalization and the high costs of treatment. A big problem of the system is the poor reporting of these cases, both because of the ignorance of the reporting rules and the possible repercussions. Through this study we want to trigger an alarm signal that there is the possibility that many such infections have been omitted, thus justifying the huge difference between the Romanian and European reports. This study was performed using data from a hospital in Romania for the period of 2016. A number of 34578 cases in continuous hospitalization (both acute and chronic) enterde the study, of which a number of 27 were reported as cases of HAI and analyzed in the present study. Of the 27 reported cases, only 10 (37%) had the infectious pathology coded, while 17 (63%) did not have any diagnostic code to detect the presence of an infection; none of the cases were coded with code Y95- Nosocomial disorder.

Keywords: HAI, DRG, Y95, Epidemiology, Public Health

INTRODUCTION

HAI (Health Care Associated Infections) represent the infections that a healthy or sick patient contacts during an episode of hospitalization, except for the pre-existing manifestations. Also within the HAI it would be fair to introduce the infections that appear to the medical personnel, during and for well-defined causes, related in particular to activities or maneuvers specific to the hospital, ambulatory or medical-social units.

The HAI appear as a reflection of the changes in the human ecosystem, as a result of the abuse of antibiotics, the increase of the prevalence of compromised hosts, the decrease of the interest for the daily hygiene, the disturbance of the relations between different categories of pathogens, the increase of the resistance of the microorganisms to antibiotics and chemical agents used for disinfection and sterilization [1].

Diagnosis Related Groups (DRGs) are a method of categorizing and characterizing the episodes of care received by patients admitted to hospitals in the form of continuous hospitalization. In order for this method to remain valid, the definition of each patient category, or DRG, requires changes at a certain time interval to reflect changes in medical, surgical, and coding practices.

The Diagnosis Related Groups system is, as the name suggests, a scheme of classification of patients according to their diagnosis. This system is similar to the International Classification of Diseases (ICD), where diagnoses are classified into classes and subclasses. In contrast, in the DRG system an additional classification criteria is used, namely the cost of resources consumed for patient care. In this way, through the DRG system, patients can be classified simultaneously by pathology and by the cost of care, which ensures the possibility to associate the types of patients with the hospital expenses incurred [2].

According to the coding standards, there is a direct relationship between HAI cases and DRG reporting through the disease codes used in their coding, which is particularly important both in terms of the correctness of reporting and completing the general clinical observation sheet, as well as from a statistical and HAI cross-checking point of view [2].

The purpose of this paper is to verify the concordance between the cases of HAI reported by the hospital and the database of all cases discharged by verifying the hypothesis of omitting the reporting of cases of HAI based on DRG reporting.

MATERIAL AND METHOD

This study was conducted using data of a hospital in Romania for the period of 2016, data obtained through the approval of the hospital management.

Information wise, we required from the hospital the reporting database in the National DRG system and the HAI reporting register for Public Health Direction for 2016, to which we applied a software for encryption of personal data according to the GDPR regulations [3].

The criteria for inclusion of the patients in the study consisted in identifying the cases of HAI from the reporting register in the hospital's DRG database, which we subsequently analyzed in terms of the coding mode.

Also as a result of the analysis, we identified in the DRG database other cases reported similar to those with HAI which raised the suspicion of misreporting.

For filtering cases and identifying comparative cases we used Microsoft Excel software and for statistical processing we used IBM SPSS software. We used the frequency tables to express the data by absolute number and frequency. The qualitative data were analyzed by the chi square test, the level of statistical significance was interpreted at a threshold p below 0.05.

RESULTS

The hospital's DRG database shows that 34578 cases of continuous hospitalization (both acute and chronic) were discharged, of which 27 were reported as cases of HAI (0.078%).

The group of 27 patients with HAI had a mean age of 60.26 years and a standard deviation of 21.66 years, with a maximum of 88 years, and according to the gender there were 9 female patients (33.3%) and 18 (66.7%).

Six deaths were identified, of which 4 (66.6%) had *Klebsiella Pneumoniae* pneumonia, and 2 (33.3%) had a skin infection with *Pseudomonas Aeruginosa and Enterococcus Faecalis*.

During the hospitalization episode 14 cases (52%) underwent surgery, while in the remaining 13 (48%) no surgical procedure was identified.

HCAIs cases were reported from 11 wards (figure 1):

Based on the reporting, 10 germs responsible for the HAI cases were identified, of which: monoinfection (18, 66.6%) and infections with multiple germs (9, 33.3%), (figure 2):

Of the 27 cases reported, only 10 (37%) had the infectious pathology coded, while 17 (63%) had no diagnostic code that would indicate the presence of an infection; none of the cases were coded with code Y95- *Nosocomial disorder.*

The diagnoses used to code the cases reported as HAI were (table 1).

Using these codes, we were able to identify similar coded cases in the rest of the DRG database resulting in table 2.

After checking the database, we identified 14 other diagnostic codes that by definition revealed an infection with antibiotic resistant germs or infections associated with the medical act (table 3).

Figure 1. Distribution on wards of HAIs

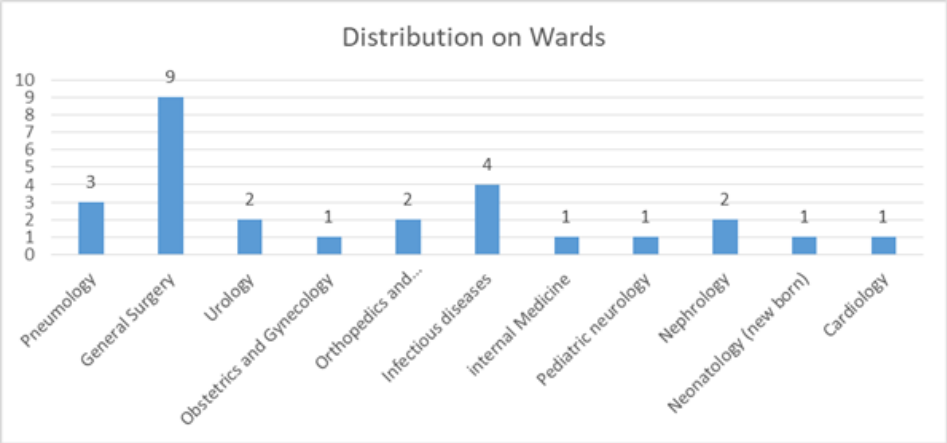

Figure 2. Germs involved in HAIs

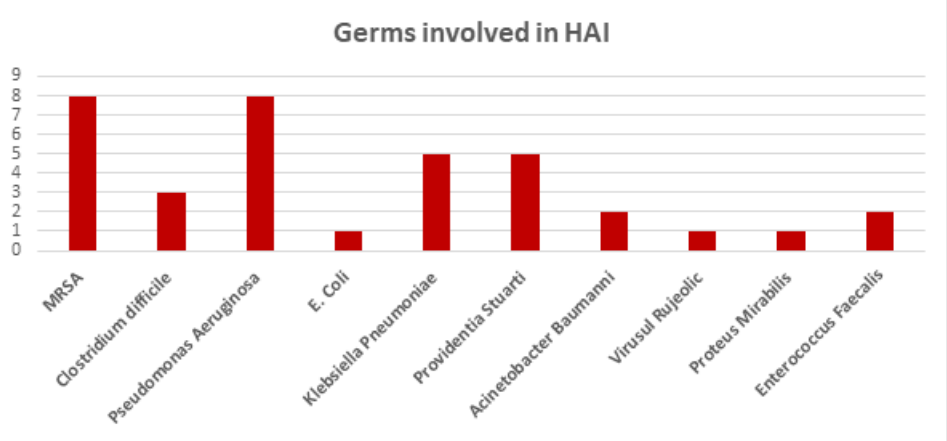

Table 1. Diagnoses used to code the cases reported as HAI

A047	Enterocolitis through *Clostridium difficile*
A410	Sepsis due to *Staphylococcus aureus*
A490	Staphylococcal infection, unspecified
B961	*Klebsiella pneumoniae*, the cause of diseases classified in other chapters
A4152	Sepsis due to *Pseudomonas aeruginosa*
J151	Pneumonia due to Pseudomonas aeruginosa
B965	*Pseudomonas aeruginosa*, *Burkholderia pseudommallei* cause of diseases classified in other chapters
Y883	The sequelae of the surgical and medical procedures as a cause of the patient's abnormal reactions or subsequent complications, without mentioning any accident during the procedure
A044	Other intestinal infections through *Escherichia coli*

DISCUSSIONS

This study is based, on one hand, on the DRG reporting of the hospitalized cases and on the other hand,on the reporting of the cases of MAI from the same hospital.

The hospital's DRG database shows that 34578 cases of continuous hospitalization (both acute and chronic) were discharged, of which 27 were reported as cases of MAI (0.078%) considering that the European average is **5.7%** of the total patients, and in Romania, the official reports, communicated by hospitals, show an average of 0.44% [5].

According to the results, a double distribution of HAI was observed in males.

A very important aspect regarding the occurrence and transmission of infections associated with the medical act is the transfer of patients between wards or hospitals, but especially their hospitalization in the anesthesia and intensive care services, where there has been a very high incidence of HAI cases. [6]

A close connection between the occurrence of HAI and the surgical interventions could be observed. About half of the cases (52%) had surgery, given that at European level the average is 31%. [4].

Regarding the coding of HAI cases one thing is certain; this was done only partially and superficially,

Table 2. Diagnostics used to encode some cases of infection

A047	175	Enterocolitis through *Clostridium difficile*
A410	16	Sepsis due to *Staphylococcus aureus*
A490	69	Staphylococcal infection, unspecified
B961	96	*Klebsiella pneumoniae*, the cause of diseases classified in other chapters
A4152	10	Sepsis due to *Pseudomonas aeruginosa*
J151	10	Pneumonia due to *Pseudomonas aeruginosa*
B965	347	*Pseudomonas aeruginosa, Burkholderia pseudommallei* cause of diseases classified in other chapters
Y883	7	The sequelae of the surgical and medical procedures as a cause of the patient's abnormal reactions or subsequent complications, without mentioning any accident during the procedure
A044	1	Other intestinal infections through *Escherichia coli*
A044	1	Alte infecții intestinale prin *Escherichia coli*

Table 3. Diagnostic codes for other types of infection

A040	19	Enteropathogenic infection by pathogenic Escherichia coli
Z061	12	Multi-drug-resistant *Staphylococcus aureus* infection
Z068	1	Infection with other drug resistant microorganisms
Z069	3	Infection with drug resistant microorganisms, unspecified
Z200	2	Contact with or exposure to infectious bowel disease
P235	2	*Pseudomonas aeruginosa* congenital pneumonia
B9638	15	*Haemophilus influenzae*, H influenzae type B, cause of diseases classified in other chapters
T8141	8	Plague infection as a result of a procedure
T8142	1	Sepsis following a procedure
T827	1	Infection and inflammatory reaction due to other devices, implants and cardiac and vascular grafts
T835	1	Infection and inflammatory reaction due to a prosthetic device, implant and graft of the urinary system
T845	15	Infection and inflammatory reaction due to an internal joint prosthesis
T846	5	Infection and inflammatory reaction due to an internal fixation device any location
T847	8	Infection and inflammatory reaction due to other prosthetic devices, implants and internal orthopedic grafts
T847	8	Infecție și reacție inflamatorie datorită altor dispozitive protetice, implanturi și grefe ortopedice interne

not complying with the coding standards, given that some cases had no diagnosis that would detect the infectious pathology, the Y95 code that would mark the case as HAI has not been coded.

In addition to the statistical significance of a good and correct coding, there is also the problem of tracking cases with multiple hospitalizations or inter-hospital transfers. It also discusses the impossibility of taking measures to prevent and control the infections associated with healthcare by hospitals and their verification by the authorized institutions.

Based on the coding of the cases of HAI reported by the hospital, 731 other cases were identified that had the same diagnoses, this fact raises the suspicion that many of them may have been cases of HAI.

A further 93 cases were identified with clear diagnosis of infections with multidrug resistant germs or post-operative infections, which reinforces the hypothesis that many cases should have been reported as HAI.

If in America, a hospital reporting HAI is awarded, on grounds of civic spirit and fairness, in Romania, if a hospital reports HAI is sanctioned. These reasons could also explain the fact that in hospitals in Romania there is a tendency to underestimate which is associated with the actual methodological deficiencies of the reporting system.

CONCLUSIONS

HAI underreporting is a reality in Romania and is due to:

- failure to apply the standards for defining the cases (due to ignorance, indifference, etc.);

- maintaining the limitation regarding the possibilities of advanced clinical, microbiological and epidemiological investigation;

- methodological deficiencies regarding reporting by using codes that are not correctly recorded;

Thus the need for a systematic analysis of the HAI reporting system arises, establishing correct and coherent criteria to be followed by all the actors of the health system.

Greater attention must to be paid to reporting, regardless of its nature, and everyone involved in health care delivery must assume current trends and the need for accurate coding and reporting, in order to have high-confidence studies to create protocols and actions of public health to increase patient satisfaction and confidence in the health system in Romania.

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