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Research Article

Medicine for novel therapy

Comparison Of Prevalence Of Nosocomial Infections In Opioid Addicts And Non-Addicts Admitted To Intensive Care Units

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Abstract: Acquired nosocomial infections include all clinical infections that the patient does not have at the time of admission to the hospital and hours after admission, the patient's natural flora acquires characteristics that become the source of bacterial infections for the patient himself. Nosocomial infections dramatically cause illness and death and impose high costs on the hospitalized patient. Hence, this study tends to compare the prevalence of nosocomial infections in opium consumers and healthy patients admitted to intensive care units in Bahonar hospital of Kerman in 2018.This cohort study was performed on two groups of 100 patients including one group of opioid addicts and one group of non-addicts hospitalized in intensive care units of Bahonar hospital in Kerman. The two groups were compared in terms of nosocomial infections, site of infection, and type of infectious agent, while in intensive care units. In this study, 197 patients were studied, of whom 161 (81.7%) were male and 36 (18.3%) were female; 98 (49.75%) had a history of opioid addiction, while 99 (50.25%) of them had no drug use. Of 197 patients studied, 118 (59.9%) had no infection while 79 (40.1%) had nosocomial infections. Of 98 addicted patients, 41 (41.8%) were uninfected and 57 (58.2%) were infected. Out of 99 non-addict patients, 77 (77.8%) were uninfected and 22 (22.2%) were infected. Fisher exact test showed that incidence of infection was significantly higher in addicted patients (p-value = 0.001) but there was no significant difference between the two groups in type of infection agent (p-value = 0.547). The results of our study showed that prevalence of nosocomial infections in opium addict patients was significantly higher than non-addict patients, with the highest frequency being pneumonia, UTI, wound infection and sepsis, respectively.

Keywords: *nosocomial infections, opium addict patients, intensive care units.*

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1. INTRODUCTION

Acquired nosocomial infections include all clinical infections that the patient does not have at the time of admission in the hospital and hours after admission, the patient's natural flora acquires characteristics that become the source of bacterial infections for the patient himself[1]. Infections that appear within 48 hours after admission are considered infectious hospital acquired infections, and infections that occur after discharge from the hospital are considered as hospital-borne infections[2]. Nosocomial infections dramatically cause illness and death and impose high costs on the hospitalized patient. Some theorists estimate that the rate of mortality doubles in nosocomial infections, although factors such as underlying diseases and their severity play an important role in prognosis[2]. In developed countries, the rate of these infections is currently estimated at about 5% to 15% and in developing countries at about 25%[3]. Although only 5% of hospital beds belong to ICU and less than 10% of patients are treated in this ward, more than 25% to 33% of hospital infections are attributed to ICU. Common factors in ICU patients which increase the risk of acquiring nosocomial infections are: severity of illness, response to physiological (injury and illness) and psychological stress (noise, pain, anxiety and isolation), age, misuse of antibiotics, ulcer stress treatment, sleep deprivation, malnutrition (calorie-protein deficiency)[4]. These factors increase the risk of nosocomial infections due to altered immune response. Horizontal condition of patients in bed (angle less than 30°) and low level of consciousness of patients (due to prescribing sedatives) are risk factors for nosocomial infections in ICU[5]. The prevalence of infection in ICU is 5 to 10 times higher than in general wards, with the use of mechanical ventilation, urinary catheters and intravenous devices being the major causes of this difference. According to the Centers for Disease Control, nosocomial infections account for death of two million people and more than 11 billion fatalities annually in US hospitals[6]. The three major sites for nosocomial infections are: the urinary tract (31%), the respiratory system (24%) bloodstream (16%), skin and other organs[7]. It is not possible to completely eliminate these infections anywhere in the world, but successful prevention requires attention to sources of infection and proper and comprehensive use of infection control methods. Appropriate measures, such as washing hands by hospital staff, adhering to personal hygiene by patients, and controlling hospital environment health and preventing the overuse of antibiotics can reduce the rate of these infections[8]. Awareness of situations that improve infection control and prevention of infection is a key step[9]. Addiction is one of the major problems of human societies. In Iran, widespread use of opium began in the Safavid era, but before that it was used only as a sedative[10]. The prevalence of addiction in Iran has been reported at about 6%. Drug use has been on the rise, with an average growth rate of 8% every 8 years and doubling every 12 years[11]. Inhaling, oral and injectable drugs are consumed in our country and the major problem is that injectable drug use has increased by about 330% from 1988 to 1998; the cause of 60% of hospitalized patients has been acute infectious complications[12]. Drugs have many side effects in various organs, especially the immune system. In lab animals, it has been shown that proliferation of blood lymphocytes increased by 85% after injection of 30 mg/kg morphine, also immunoglobulins decreased and especially gastrointestinal infection increased[13]. Since hospitals are the most important center of health care, because of special conditions for admitting people with different diseases and the presence of different service providers, visitors and patient companions, they are considered as an infection transmission center[14,15,16]. Technological advances, the decline of human resistance, the emergence of new drugs and, consequently, reduction of body immune resistance have added to diversity and number of nosocomial infections[17]. One of the major problems is the lack of accurate information on pattern of resistance of microorganisms to antibiotics[18]. Considering the clinical significance of above problems and lack of exact statistics of nosocomial infection in the country, particularly in Kerman Province, this study is conducted to compare the prevalence of nosocomial infections in opioid addicts and non-addicts admitted to intensive care units of Bahonar Hospital in Kerman during 2018-2019.

2. MATERIALS AND METHODS

The present study was a cohort study approved by Kerman University of Medical Sciences (ethics code: IR.KMU.AH.REC.1398.083) for two years (2018 and 2019) on 200 patients (age older than 18 years) hospitalized for more than 48 hours in intensive care units of Bahonar Hospital of Kerman. Written consent from was obtained from the patient, if the patients were unconscious, the consent form was obtained from legal guardians. Patient privacy was kept confidential at all stages. These patients were assigned to opioid addicts and non-addicts according to DSM5 criteria based on patient self-report (if conscious and able to respond) or close companions who had complete knowledge of previous patient behaviours. Opioid addicts were people who were using opiate (inhaling or oral), methadone and morphine according to the scientifically defined pattern (DSM5); type of drug used and duration of use were also recorded. If these patients developed nosocomial infections during their stay in ICU (including infections that occurred 48 hours after admission)[8], the site of infection and the type of bacteria were identified based on sepsis. The required information in the checklist included data including age, gender, history of opiate addiction, type of infection (urinary tract infection, pneumonia, sepsis, wound infection), type of infectious mass (based on culture results) were recorded.

3. STATISTICAL ANALYSIS

The data obtained was analyzed using medical software (SPSS version 20) . Fisher exact test and independent T-test was used for analysis of comparison. The data were presented as mean ±standard deviation (SD).probability value (P) of less than 0.05 was considered statically significant.

4. RESULTS

In this study, 197 patients were studied, of whom 161 (81.7%) were male and 36 (18.3%) were female (Figure 1).

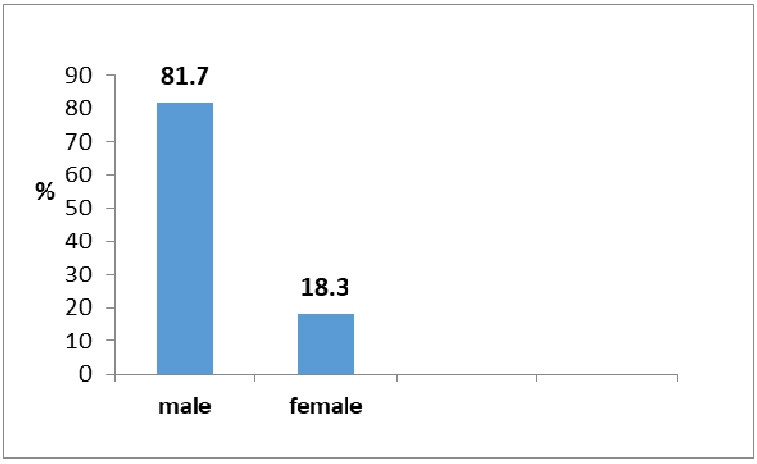

Fig 1. Distribution of the studied patients in terms of gender

In this study, 197 patients were studied, of whom 98 (49.75%) had a history of drug use while 99 (50.25%) were not drug users (Figure 2).

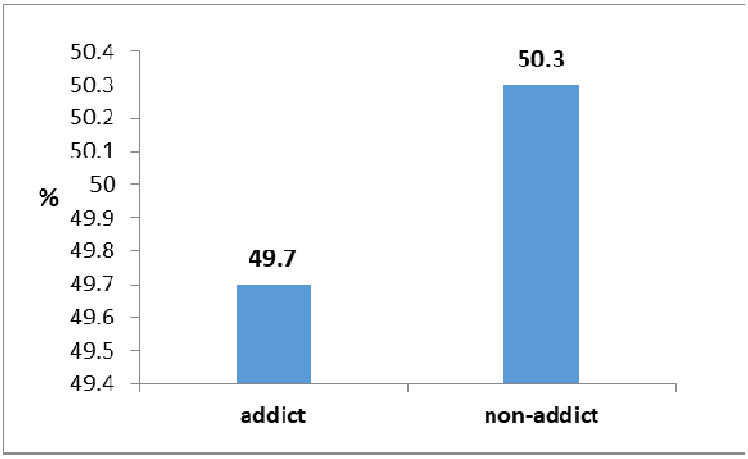

Fig 2. Distribution of the studied patients in terms of addiction

Of 197 patients studied, 118 (59.9%) had no infection while 79 (40.1%) had nosocomial infections (Figure 3).

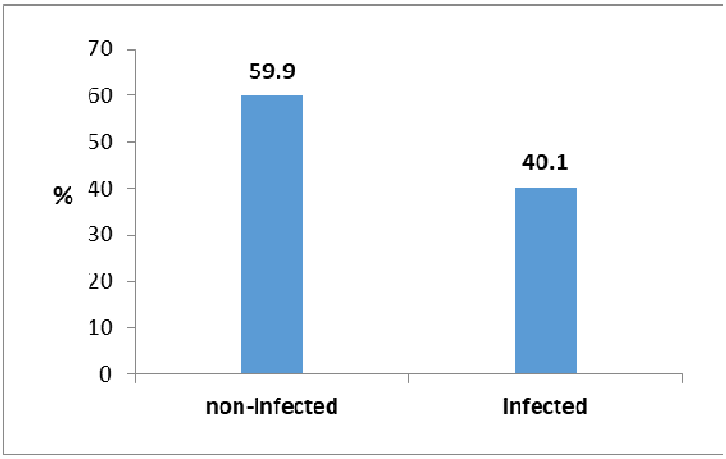

Fig 3. Distribution of the studied patients in terms of infection

Table 1. Comparison of mean of addicted and non-addicted patients

Group	N	Age (year) mean±SD	t-test
Addicted	98	41.73±11.70	P=0.65; t=-0.45
Non-addicted	99	42.61±15.01	

According to Table 1, the results of independent t-test showed that the mean of age of addicts and non-addicts was not significantly different (p = 0.65).

Table 2. Comparison of distribution of male and female addicts and non-addicts

Group	Male	Female	Sum	Fisher's exact test
Addict	82 (83.7)	16 (16.3)	98 (100)	P=0.58; df=1; x=0.48
Non-addict	79 (79.8)	20 (20.2)	99 (100)	
Sum	161 (81.7)	36 (18.3)	197 (100)	

According to Table 2, of 98 addicted patients, 82 (83.7%) were male and 16 (16.3%) were female. Moreover, out of 99 non-addict patients, 79 (79.8%) were male and 20 (20.2%) were female. No relationship was found between gender and drug addiction (p = 0.58).

Table 3. Distribution of addicted and non-addicted patients in terms of infection

Group	Non-infected	Infected	Sum	Fisher's exact test
Addicted	41 (41.8)	57 (58.2)	98 (100)	P<0.0001; df=1; x=26.48
Non-addicted	77 (77.8)	22 (22.2)	99 (100)	
Sum	118 (59.9)	79 (40.1)	198 (100)	

According to Table 3, out of 98 addicted patients, 41 (41.8%) were non-infected and 57 (58.2%) were infected. Of 99 non-addict patients, 77 (77.8%) were non-infected and 22 (22.2%) were infected. Fisher exact test showed that the incidence of infection was significantly higher in addicted patients (p<0.001).

Table 4. Comparison of type of infection in addicted and non-addicted groups

Type of infection	Group		P-value
	Addicted (%)	Non-addicted (%)	
Pneumonia	30 (30.6)	13 (13.1)	0.001
Wound infection	5 (5.1)	2 (2)	
UTI	17 (17.3)	6 (6.1)	
Sepsis	5 (5.1)	2 (2)	

According to Table 4, In the addicted groups, 30 (30.6%) patients had pneumonia, 17 (17.3%) had urinary tract infection, and 5 (5.1%) had wound infection and 5 (5.1%) had sepsis; in the non-addicted group, 13 (13.1%) had pneumonia, 6 (6.1%) had urinary tract infection, 2 had wound infection and 2 (2%) had sepsis. There was no statistically significant difference between the two groups (p = 0/001).

Table 5. Comparison of type of infectious mass in two addicted and non-addicted groups

Type of mass	Group		P-value
	Addict (%)	Non-addict (%)	
Acinetobacter	21 (35.5)	11 (47.8)	0.547
Pseudomonas	5 (9.3)	2 (8.6)	
E.coli	10 (17.9)	5 (21.7)	
Staphylococcus epidermidis	1 (1.8)	1 (4.3)	
Klebsiella	16 (28.6)	3 (13)	
Staphylococcus aureus	2 (8.6)	1 (4.3)	
Proteus	1 (4.3)	0	

According to Table 5, the most infectious masses were Acinetobacter (35.5%), Klebsiella (28.6%) and E.coli (17.9%) in the addicted patients and Acinetobacter (47.8%), E.coli (21.7%) and Klebsiella (13%) in the non-addicted patients. There was no significant difference between two groups (P-value=0.547).

5. DISCUSSION AND CONCLUSION

Drug abuse is one of the major problems of modern societies in developed and developing countries, a problem that destroys millions of lives and spends huge national capital on fighting, healing and the resulting damage. Drug abuse, in addition to harming people's health, increases the risk of transmission of AIDS in the community by injecting drugs by users[19]. The problems of addicts are doubled when they are sick, particularly in need of intensive care. Meanwhile, comorbidity of the current disease and its complications, along with damages caused by addiction and impairment of normal functioning of the body, will lead the patient to widespread complications[20]. In this study, 197 patients admitted to the ICU during 2018 were studied of whom 99 were non-addicts and 98 were addicts. Moreover, 161 (81.7%) were male and 36 (18.3%) were female. Of 197 patients studied, 118 (59.9%) were not infected, while 79 (40.1%) were infected during hospitalization. In a study by Laripour et al.[21], the results showed that out of 250 patients admitted to intensive care units, 89 patients (35.6%) had nosocomial infections. Askarian et al showed that the prevalence of nosocomial infections in the intensive care unit was 32%[22]. Of 98 addicts, 41 (41.8%) were non-infected and

57 (58.2%) were infected. Of 99 non-addict patients, 77 (77.8%) were non-infected and 22 (22.2%) were infected. Fisher exact test showed that the incidence of infection was significantly higher in addicted patients (p-value = 0.001). In a study by Zaman et al., the results showed that the incidence of nosocomial infections in addict patients was much higher than the incidence of nosocomial infections in non-addicted patients[14]. Yousefi et al. found that nosocomial infections was much higher in patients admitted to ICUs than patients admitted to other wards; in addition, it was higher in addicts that other patients. However, this difference was not significant between addicted and non-addicted patients[15]. In our study, the prevalence of nosocomial infections was significantly higher in addicted patients, which was consistent with the above study. According to the above results, 30 (30.6%) addicted patients had pneumonia, 17 (17.3%) had urinary tract infection, and 5 (5.1%) had wound infection and 5 (5.1%) had sepsis. In the non-addicted group, 13 (13.1%) had pneumonia, 6 (6.1%) had urinary tract infection, 2 had wound infection and 2 (2%) had sepsis. There was no statistically significant difference between the two groups. The results of our study were consistent with similar studies. A study by Amini et al showed that the most frequent nosocomial infections were pneumonia (41%) and urinary tract infections (21%) in addicts admitted to ICU, whereas in non-addicted patients only 6% developed pneumonia[23]. In a study by Afhami et al., the results showed that ventilator-associated pneumonia was significantly higher in addicted patients, especially those who inhaled opium, compared to non-addicted patients[24]. The results of the above studies also confirmed the results of our study. The most frequent infectious masses were Acinetobacter (35.5%), Klebsiella (28.6%) and E.coli (17.9%) in the addicted patients and Acinetobacter (47.8%), E.coli (21.7%) and Klebsiella (13%) in the non-addicted patients. There was no statistically significant difference between the two groups (p-value = 0.547). In studies conducted by Afhami et al.[24] and Amini et al.[22], the most prevalent infectious masses were Klebsiella and E. coli. Finally, the results of our study showed that the frequency of nosocomial infections was significantly higher in opiate addict patients than non-opiate patients. The most frequent nosocomial infections were pneumonia, urinary tract infection, wound infection and sepsis, respectively.

6. AUTHOR CONTRIBUTION STATEMENT:

Dr. M.Ahmadinejad conceptualized and gathered the data of this study. Dr.M.Ahmadipour analyzed these data and necessary inputs were given towards the designing of the manuscript. Dr.S.M.Sohrevardi discussed the methodology and results and contributed to the final manuscript.

7. ACKNOWLEDGMENT

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8. CONFLICT OF INTEREST

Conflict of interest declared none.

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