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The Importance of Using ZOUSH Ointment in Burn Wound Infection Treatments

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ABSTRACT

Background: *Pseudomonas aeruginosa* is an opportunistic bacterium which is one of the most important bacterial infections. As the incidence of MDR and XDR strains were reported and antibiotic resistant is a global issue we research about the new drug.

Materials and methods: Data about Iranian herbal medicine were obtained by searching databases. In this research, we study about 88 papers from different databases.

Results: The result of our study indicated that ZOUSH ointment which includes herbal medicine such as *Satureja khuzestaniea*, *Zataria multiflora*, *Mentha mozaffariani* Jamzad can use for controlling burn wound infections.

Conclusion: ZOUSH ointment will be used as a common ointment for healing burn wound infections.

Keywords: *Pseudomonas aeruginosa*, Antibiotic, Carvacrol

INTRODUCTION

For the first time, antibiotic use in the 1940s has created tremendous advances in the pharmaceutical industry. Bacteria are single cell living organisms which exist everywhere [1]. There are three groups of bacteria in the universe, Pathogen, non-pathogen and environmental bacteria. For those bacteria which are pathogens, we need antibiotics lead to inhibits their growth and their infections. Although antibiotic usage is very common nowadays, if antibiotics use more than specific dose, an overdose of them leads to antibiotic resistance step by step [2], so previous antibiotic's dose couldn't be effective and more dosage is needed, after that, we confront antibiotic resistance. Recently antibiotic resistance is a global issue [3].

Pseudomonas aeruginosa is an opportunist, gram-negative and bacillus bacteria, which is showed widely antibiotic resistance. Recently incidence of MDR and XDR strain were been reported by the researcher [4]. Thus, in this study, we search to find alternative ointment instead of common ointment for healing wound infections.

MATERIALS AND METHODS

The searching process was conducted to introducing a new drug, ZOUSH ointment, for healing burn wound infections. We were used Google Scholar, Science Direct, Web of Science, MEDLINE, PubMed, Scopus, Cochrane Library and the Scientific Information Database. The original and review articles which are published in English and Persian were included in our research. The keywords such as *Satureja khuzestaniea*, *Zataria multiflora*, *Mentha mozaffariani* Jamzad, ointment, burn infection and *Pseudomonas aeruginosa* were been used for the searching process. The same searching was done with similar strategies and related Persian keywords among Iranian databases. We searched magiran (http://www.magiran.com) and Irandoc (http://www.irandoc.ac.ir), Scientific Information Database (http://www.sid.ir), Iranmedex (http://www.iranmedex.com).

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RESULTS

Plants have always been one of the main sources of drugs that are used traditionally or in the form of pure chemical products. According to the World Health Organization, about 80% of the world's population uses herbal medicines as part of their treatment. Iran with 11 different climates and more than 7500 plant species is a very good base for obtaining valuable medicinal and rare species. Currently, 25% of the existing drugs have herbal sources and 12% of the drugs are made from microbial sources [5]. Studies included in this review were from all over the world. All of 14 selected studies focused on *Satureja khuzestanica*, *Zataria multiflora*, *Mentha mozaffariani* Jamzad [6] **(Figure 1)**.

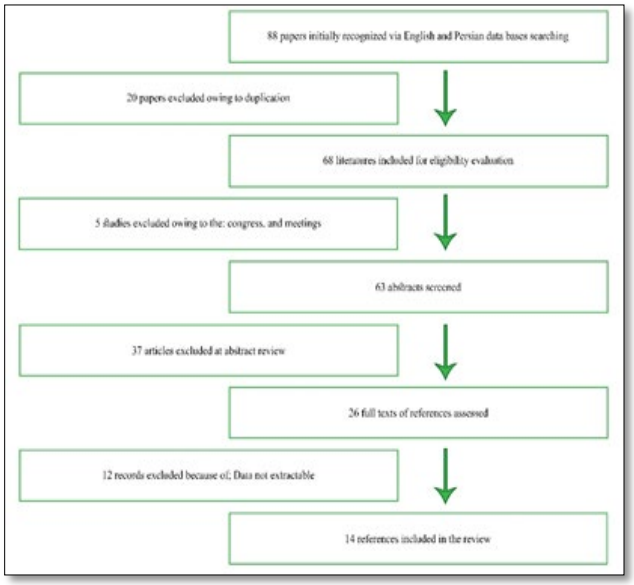

Figure 1. A diagram of inclusion process of selected studies in the review.

DISCUSSION

Burn is one of the most serious medical conditions, which affects whole physical and mental aspects and is capable of infecting people of all ages.

Prevention of bacterial infection spread in hospital settings is difficult due to the intrinsic and acquired resistance of this bacterium to many antibiotics. Given the fact that the main way of controlling infection is the use of antibiotics, the emergence of MDR and XDR strains is a current worldwide problem. The prevalence of these strains is on the rise due to the antibiotic selective pressure and elevated dosage.

Despite many scientific advances in the treatment of burns, it remains one of the major public health problems around the world, especially in developing countries.

Achieving an effective and efficient method is needed for the immediate treatment of these bacteria due to therapeutic dilemmas, drug resistance and high mortality due to bacteria. Traditional medicine plays an important role in the treatment and prevention of these bacteria.

Our study showed that the Carvacrol is a major component of the *S. khuzestaniea* extract, which inhibits the ATPase activity and increases the bacterial cell membrane permeability, and hence enhances the membrane permeability for antibacterial agents [1-6]. As Salarbashi et al. showed in their research that *Z. multiflora* extracts had significant antibacterial effects on regular and IMP-producing *Pseudomonas aeruginosa* strains [7].

In the other hand, Carvacrol has an anti-fungal (such as *C. albicans*) property [8] in addition to its antibacterial (such as *Pseudomonas aeruginosa* properties) [9]. Also, this component can be antimicrobial effectiveness against gram positive and gram negative bacteria [10]. The results of Arman et al.'s [11] research in 2013 indicated the *Mentha mozaffariani* oil exhibited high antimicrobial activity against gram positive and gram negative bacteria, according to the disk diffusion method and MIC values [11].

Our review study indicate that *Satureja khuzistanica* can reduce the expression level of various genes such as *exoS*, *lasA*, *lasB*, *mexA* and *mexR* genes in *Pseudomonas aeruginosa* [12-14].

CONCLUSION

Our review study indicated that herbal medicine such as *Satureja khuzestaniea*, *Zataria multiflora*, *Mentha mozaffariani* Jamzad can control infection of *Pseudomonas aeruginosa* in a different way such as reducing the level of different gene expression. Thus we can use this herbal medicine to produce an ointment which can heal burn wound infection. So we decided to formulation herbal ointment, ZOUSH, to control and healing burn infection with *Pseudomonas aeruginosa*.

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