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ORIGINAL

Effectiveness of the use of rosemary in otomycosis. Abel Santamaría Cuadrado Hospital

Efectividad del uso del romerillo en la otomicosis. Hospital Abel Santamaría Cuadrado

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ABSTRACT

Plants have played a fundamental role in the development of man. Currently, according to the WHO, it is estimated that 80 % of the world's population depends on traditional medicine for their primary health care needs. Bidens pilosa Linné, popularly known as rosemary, has recognized medicinal properties in its digestive, cholera, antiulcer, antifungal and antibacterial action. It is used in the form of herbal medicine, syrup, tincture and fluid extract. Among the diseases diagnosed in the Otorhinolaryngology service of the Abel Santamaría Hospital, natural medications are only prescribed for a small number, given the limited knowledge about scientific evidence that supports their use, so we proposed to evaluate the effectiveness of the use of rosemary in patients with otomycosis at the "Abel Santamaría Cuadrado" General Teaching Hospital during the period from January 2021 to January 2024, for which a non-experimental, descriptive, longitudinal, prospective research was carried out, with data from a database created for the follow-up of patients with otomycosis treated in the emergency room of the "Abel Santamaría Cuadrado General Teaching Hospital". The sample consisted of 900 patients diagnosed with otomycosis. Patients between 48 and 57 years old predominated (26,4 %), male (61,2 %) and humidity was presented as the main predisposing factor (80,1 %). There was a predominance of good clinical evolution (57,8 %).

Keywords: Otomycosis; Rosemary; Natural and Traditional Medicine.

RESUMEN

Las plantas han jugado un papel fundamental en el desarrollo del hombre, actualmente, según la OMS, se estima que el 80 % de la población mundial depende de la medicina tradicional para sus necesidades de atención primaria en salud. La Bidens pilosa Linné, conocida popularmente como romerillo, posee propiedades medicinales reconocidas en su acción digestiva, colérica, antiulcerosa, antifúngica y antibacteriana. Se usa en forma de medicamento vegetal, jarabe, tintura y extracto fluido. Entre las enfermedades diagnosticadas en el servicio de Otorrinolaringología del Hospital Abel Santamaría, solo para un reducido número se prescriben medicamentos naturales, dado el escaso conocimiento sobre evidencias científicas que avalen su uso, por lo que nos propusimos evaluar la efectividad del uso del romerillo en pacientes con otomicosis en el Hospital General Docente "Abel Santamaría Cuadrado" durante el periodo de enero de 2021 a enero de 2024, para lo cual se realizó una investigación no experimental, descriptiva de corte longitudinal, prospectiva, con datos de una base de datos creada para el seguimiento de los pacientes con otomicosis tratados en el cuerpo de guardia del Hospital Docente General Abel Santamaría Cuadrado. La muestra estuvo constituida por 900 pacientes diagnosticados con otomicosis. Predominaron los pacientes entre los 48 y 57 años (26,4 %), del

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sexo masculino (61,2 %) y la humedad se presentó como el principal factor predisponente (80,1 %). Hubo un predominio de la evolución clínica buena (57,8 %).

Palabras clave: Otomicosis; Romerillo; Medicina Natural y Tradicional.

INTRODUCTION

Plants have played a fundamental role in the development of humanity. Therefore, the importance of utilizing floristic diversity by societies since pre-Hispanic times is undeniable. Through continuous learning about their use, traditional knowledge of flora has been generated to meet numerous needs, which remains valid in indigenous and rural communities. Among the most valuable plants are those used for medicinal purposes, mainly in low-income populations lacking access to basic health services.[1,2]

Since 1976, the World Health Organization (WHO), as well as other prestigious organizations that promote and finance development plans, has been promoting, as part of Primary Health Care (PHC) programs, the use of appropriate forms of traditional systems of medicine with the aim of substantiating, through due scientific rigor, the use of medicinal plants.[2,3,4] Currently, according to WHO, it is estimated that 80 % of the world population depends on traditional medicine for their primary health care needs.[5,6]

Chinese documents dating back to 3700 B.C.E. have been found, stating that for each disease, there was a corresponding plant used as a natural remedy. Therefore, medicinal botany has always been a primary therapeutic arsenal for many ancient peoples and civilizations.[7,8,9]

Although for centuries, the different cultures of the world have made use of herbal and natural products as part of the heritage of Natural and Traditional Medicine, it has not been until the present that scientists and professionals of the medical sciences have increased their interest in this field due to the recognition of the real benefits they bring to health.[10,11] It is estimated that around 10 000 plant species are used worldwide for medicinal purposes.

It is estimated that around 10 000 plant species are used worldwide for medicinal purposes.[12] Plants have played a fundamental role in the development of humanity; therefore, the importance of utilizing floristic diversity by societies since pre-Hispanic times is undeniable. Through continuous learning about their use, traditional knowledge of flora has been generated to meet numerous needs, which remains valid in indigenous and rural communities. Among the most beneficial plants are those used for medicinal purposes, particularly in low-income populations that lack access to basic health services. 1 It is estimated that some 10 000 plant species are used worldwide for medicinal purposes.[12]

The use of medicinal plants and products derived from them continues to grow in developed countries; in the United States of America, it was reported that sales of medicinal plants and botanical dietary supplements increased by 4,5 % in 2011.[13] The Cuban population has deep-rooted traditions of using plants for medicinal purposes, especially among those in rural areas. The use of medicinal plants is every day in the population of Cuba; the migration of people from the countryside to the cities brought with it the expansion of their habits and customs so that, at present, in any part of the national territory, people treat health conditions with natural resources, often cultivated in backyards and plots. However, many of them are unaware of their properties, forms of use, and methods of application.[14,15,16]

There are scientific studies on the use of medicinal plants in Otorhinolaryngology. Of the plants traditionally used, some studies support their use in the case of Citrus aurantifolia (lemon), Bidens pilosa (rosemary), Thymus vulgaris (thyme) and Luffa operculata (Buchanan), whose effects justify and are in correspondence with their widespread use; besides Oreganum vulgare (oregano) and Eucalyptus camaldulensis.[17,18]

Among them, rosemary is a treasure for health; the elders of families always advise using rosemary to combat affections in the throat and tonsillitis. It is also highly appreciated as a remedy for sore throats and canker sores that cause significant discomfort. It has medicinal properties recognized in its digestive, choleretic, antiulcer, antifungal, and antibacterial action. It is used in the form of herbal medicine, syrup, tincture, and fluid extract.[19]

Otorhinolaryngological pathologies have a high incidence of both acute and chronic conditions, accounting for approximately 40 % of total consultations.[20] The external part of the ear canal is covered by skin similar to that of the scalp, has ceruminous glands, and presents a normal or commensal flora composed of a great variety of bacteria, among which are included coagulase-negative staphylococci, micrococci, corynebacteria and, less frequently, Fungi are also commonly found in the external ear as colonizers since in this region concur many of the requirements necessary to allow fungal growth: proteins, carbohydrates, humidity, temperature and adequate pH.[21,22]

Fungal colonization of the ear canal is not permanent. It may undergo variations in quality and quantity related to environmental factors and hygienic habits.[23,24] The frequency and proportion of etiologic agents vary

according to the geographic area, but Candida albicans and Aspergillus niger predominate.[25]

Under certain circumstances, fungi can behave as secondary pathogens, especially when the skin undergoes alterations of any kind, such as mechanical injuries, excessive earwax accumulation, previous bacterial infections, or dermatological diseases, leading to an infectious process known as fungal otitis externa or otomycosis.

The use of medicinal plants in Otorhinolaryngology has been incorporated into the therapeutic arsenal of specialists, with scientific support for treating both infectious and inflammatory diseases, yielding excellent results and patient acceptance.

Among the diseases diagnosed in the Otorhinolaryngology service of the Hospital Abel Santamaría", only a small number are prescribed natural medicines, given the scarce knowledge of scientific evidence to support their use; however, in the population, there is the traditional use of a considerable variety of plants for the relief of various ailments, such as rosemary.

Otomycosis has become a growing medical, public health, social, and economic health problem, especially in our country. Despite the proposed treatments, the evolution of patients is not always favorable, so it is necessary to explore other treatment alternatives, such as Natural and Traditional Medicine modalities, to improve or achieve a complete cure for otomycosis.

Otomycosis is the first cause of external otitis externa, in addition to economic overload with prolonged treatments, which is why new therapeutic alternatives are needed to improve or cure the disease.

The use of rosemary is an effective natural remedy for treating otomycosis, which helps improve and prevent complications in the external ear.

Therefore, the following research arises to evaluate the effectiveness of the use of rosemary in patients with otomycosis in the General Teaching Hospital "Abel Santamaría Cuadrado" during the period from January 2021 to January 2024.

METHOD

A descriptive, non-experimental, prospective, longitudinal research was conducted, with data obtained from the creation of a database of the follow-up in consultation of patients with a diagnosis of otomycosis in the period from January 2021 to January 2024 to evaluate the effectiveness of the use of rosemary in patients with otomycosis in the General Teaching Hospital "Abel Santamaría Cuadrado" during the period from January 2021 to January 2024.

Universe and sample

The population under study is the one on which the research results or conclusions are intended to be based, and the sample is the part of this population that is directly observed. The study universe consisted of 5040 patients diagnosed with mycotic otitis externa during the study period, and the sample was intentionally selected, comprising 900 patients to whom the fluid extract of rosemary was randomly applied and who met the following criteria:

Inclusion criteria

- Patients over 18 years of age with a diagnosis of otomycosis who express their consent to participate in the research in written form.
- Patients who do not present any contraindications to rosemary.

Exclusion criteria

- Patients with psychiatric disorders.
- Patients who do not wish to participate in the study.

Exit criteria

- Voluntary dropout from the study.

Collection techniques

The information was collected through the creation of a database with the follow-up of patients seen in the on-call department of the Hospital Docente General Abel Santamaría Cuadrado.

Analysis technique and discussion of the results

The data were analyzed using the previous information of the author and tutor of the work. The discussion was carried out by justifying the objectives and using the scientific information provided by national and international studies that were consulted, which allowed us to reach conclusions and issue recommendations.

Ethical considerations

The research was justified from the ethical point of view:

It was carried out in accordance with what is established in the National Health System and foreseen in Law No.41 of Public Health.

This research respected the ethical foundations that appear in the Declaration of Helsinki 2008. Its essential objective is scientific. The participants are informed of their freedom to participate and to leave, at the moment they wish, without any consequence.

Informed consent: informed consent for participation in the research was taken into account at all times.

Confidentiality of the information: the confidentiality of the information and the anonymity of the patients were guaranteed. The information obtained was only used for scientific and educational purposes.

RESULTS

Scientific development has made it possible to demonstrate the therapeutic efficacy and safety of medicinal plants, which has made Phytotherapy an alternative or complementary therapeutic branch to synthetic drugs.

In the study, the incidence of mycotic otitis externa is higher in the age range of 48-57 years with 26,4 % of the total number of patients who presented it; 60,2 % treated the disease with rosemary.

In terms of sex, there was a tendency for the male sex to prevail over the female sex, with 61,2 % male representation of the total sample and 64,2 % of patients treated with Romerillo.

Table 1 shows the distribution of patients according to skin color with a predominance of white color with 52,6 % of the sample.

Table 1. Patients with mycotic otitis externa according to skin color

Skin color	Mycotic otitis externa treated with rosemary tea		Mycotic otitis externa treated with rosemary tea		Total	
	No.	%	No.	%	No.	%
Black	193	35,6	243	65,4	427	47,4
White	349	64,4	124	34,6	473	52,6

Table 2 shows the distribution of patients according to predisposing factors, with a predominance of local factors over general factors and within these, humidity was the most represented with 80,1 %, followed by manipulation with 75,8 %; in the general factors, the presence of diabetes mellitus was the most relevant predisposing factor with 24,8 % of the sample.

Table 2. Patients with mycotic otitis externa according to predisposing factors

Predisposing Factors		Mycotic otitis externa treated with rosemary tea		Mycotic otitis externa not treated with rosemary tea		Total	
		No.	%	No.	%	No.	%
Premises	Humidity	431	59,8	290	40,2	721	80,1
	Handling	219	32,1	463	67,8	682	75,8
	Use of prosthesis	3	5,6	51	94,4	54	6
	Foreign bodies	209	49,6	212	50,4	421	46,7
General	Diabetes Mellitus	95	42,6	128	57,4	223	24,8
	Immunosuppression	1	10	9	90	10	1
	Deficiency disorders	27	50	27	50	54	6

When analyzing the behavior of the symptoms and signs (table 3), a high incidence of pruritus and sensation of a blocked ear was found for 91,2 % and 87,6 % respectively. The most frequent signs were suppuration of the external auditory canal in 457 patients (50,8 %), followed by congestion of the external auditory canal in 431 cases for 47,8 %.

Table 3. Patients with mycotic otitis externa according to symptoms and signs

Symptoms and Signs	Mycotic otitis externa treated with rosemary tea		Mycotic otitis externa not treated with rosemary tea		Total	
	No.	%	No.	%	No.	%
Stinging	418	50,9	403	49,1	821	91,2
Otodinia	93	29	228	71	321	35,7
Otorrhea	211	46,2	246	53,8	457	50,8
Hearing loss	471	65,8	244	34,2	715	79,4
Busy ear	539	68,3	250	31,7	789	87,6
Fetidity	51	42,1	70	57,8	121	13,4
CAE congestion	123	28,5	308	71,5	431	47,8

Complications are infrequent, reaching 10 % to 20 % of the cases according to the series. Table 4 shows the appearance of these complications in the patients of the sample, where 37,3 % developed acute diffuse otitis externa during their evolution and follow-up.

Table 4. Patients with mycotic otitis externa according to the appearance of complications

Complications	Mycotic otitis externa treated with rosemary tea		Mycotic otitis externa not treated with rosemary tea		Total	
	No.	%	No.	%	No.	%
Acute diffuse diffuse otitis externa	121	36	215	64	336	37,3
Acute circumscribed otitis externa	0	0	77	100	77	8,5
Malignant otitis externa of diabetics	4	16	21	84	25	2,7

The clinical evolution of the patients studied behaved satisfactorily since 57,8 % of the sample presented a favorable evolution and within this, 82,7 % of those treated with the rosemary extract (table 5).

Table 5. Patients with mycotic otitis externa according to clinical evolution

Clinical evolution	Mycotic otitis externa treated with rosemary extract		Mycotic otitis externa not treated with rosemary extract		Total	
	No.	%	No.	%	No.	%
Good	431	82,7	90	17,3	521	57,8
Regular	90	31,8	193	68,2	283	31,4
Bad	21	21,9	75	78,1	96	10,6

DISCUSSION

The current market for the use of medicinal plants is very high, and there is a high level of consumption. Therefore, there should be a professional adequately trained to advise on the pharmacological activity and therapeutic indications of phytomedicines while also being able to detect possible interactions, side effects, and contraindications.[26]

There was an incidence of mycotic otitis externa in the sample studied in the range of fifty years, coinciding with studies consulted with a mean age of 47 years and a standard deviation of 11 years and differing from other studies reviewed, such as that of Fuentes Anaya et al.[27,28] where the average age was 31 years.

Regarding sex, the considerations tend to the prevalence of the female sex over the male sex, with a ratio (males: females) of 1:1.4, which differs from the present study, where the male sex represents 61,2 %, as in the study by Álvarez et al. with 67,3 % male representation.[27,28]

In the literature reviewed, no data are available for this variable, which is why its study is novel.

Some authors have attributed the higher incidence of Otomycosis in hot countries to a change in cerumen composition secondary to increased sweating. The pH of cerumen changes from acidic to alkaline, and its soft consistency makes it more prone to being cleaned during bathing and/or swimming. In the past, cerumen was thought to help protect against the growth of microorganisms in the CAE; however, studies have been conducted that suggest cerumen may promote the in vitro growth of microorganisms.[28,29]

According to a study by Guzman et al., patients with Otomycosis Were found to have a significant risk factor for the development of the disease, in addition to climatic conditions, which involve manipulation of the ear. Bathing in salt water was not a significant factor, and he notes a substantial increase in the disease since the widespread use of topical preparations began 20 years ago.[28]

The clinical picture does not differ significantly from that of any otitis externa and affects individuals of all ages, with no gender preference. They are usually unilateral, but up to 12 % may be bilateral. Pruritus has long been considered a pathognomonic symptom, although it is not always present; in reviewed articles, the results vary between 23 % and 93 % for this symptom.[28,29]

The most frequently presented signs, such as suppuration of the external auditory canal and congestion of the external auditory canal, coincide with the results of other authors.[30]

Most otologists agree that topical therapy is beneficial for treating Otomycosis. Still, no single preparation has been widely accepted, and little is known about the safety of most antifungal agents. The most important part of treatment is the cleansing of the CAE, and the second goal of treatment is the elimination of the infectious agent.[30]

In the past, several antifungal treatments were prescribed that included the application of antiseptics such as gentian violet, boric acid, cresylate, and aluminum acetate (Burow's solution); however, these drugs have ototoxicity, primarily when associated with tympanic membrane perforation.[30]

Most of the antifungals (polyenes, imidazoles, 5-fluorocytosine, and tolnaftate) have been used with very variable results, and the duration of treatment has not been established.[30]

CONCLUSIONS

It is identified that the age of presentation of Otomycosis is similar to that of populations in developed countries where the incidence of cases has increased exponentially, with the male sex being the most affected; in addition, local factors such as humidity and manipulation continue to be the most important, as well as pruritus and the sensation of busy ear as the main symptoms. The clinical evolution was good in more than half of the patients studied, with a high percentage in those treated with the fluid extract of rosemary.

BIBLIOGRAPHIC REFERENCES

1. Alma I, García S, Gheno Y, Martínez R, Tizbe T, Reyes A. Plantas medicinales usadas para las afecciones respiratorias en Loma Alta, Nevado de Toluca, México. Acta Bot Mex. 2016; 114.

2. Yanni Duran Pérez y col. Intervención educativa sobre el uso racional de medicamentos herbarios en pobladores de Baracoa durante el 2016. Revista Cubana de Plantas Medicinales. 2019;24(3): e713.

3. Organización Mundial de la Salud Tradicional. Complementary and alternative medicines and therapies. Washington DC. Regional de la OMS para Las Américas. OPS (Grupo de Trabajo OPS/ OMS); 1999.

4. Tania Otero Silveira y col. Potencial terapéutico de plantas utilizadas en herboristería por el Gallego Otero. Revista Cubana de Plantas Medicinales. 2019;24(3): e847

5. Carla Maldonado, Narel Paniagua-Zambrana, Rainer W. Bussmann, Freddy S. Zenteno-Ruiz & Alfredo F. Fuentes. La importancia de las plantas medicinales, su taxonomía y la búsqueda de la cura a la enfermedad que causa el coronavirus (COVID-19). Ecología en Bolivia 55(1): 1-5. Abril 2020. ISBN 2075-5023.

6. Organización Mundial de la Salud. Estrategia de la OMS sobre medicina tradicional 2014-2023 Ginebra: OMS; [Internet]. 2013 [Consultado 07/04/2023]. Disponible en: https://apps.who.int/iris/bitstream/handle/10665/95008/9789243506098_spa.pdf

7. Ulin H. Uso y manejo actual de las plantas medicinales en el poblado Iquinuapa, Jalpa de Méndez, Tabasco [Tesis]. Tabasco: Universidad Juárez Autónoma de Tabasco; 2006.

8. Migdalia Rodríguez Rivas, Pedro Sánchez Freire, Rayza Méndez Triana, Rayza Marrero Toledo, Liset Jaramillo Hernández, Osmany Garcés Guerra. Las plantas medicinales en la prevención y el tratamiento de la COVID-19. Acta Médica del Centro / Vol. 16 No. 3 Julio-Septiembre 2022.

9. Tello Ceron G, Flores Pimentel M, Gómez Galarza V. Uso de las plantas medicinales del distrito de Quero, Jauja, Región Junín, Perú. Ecol Apl [Internet]. 2019 [Consultado 07/04/2023];18(1):11-20. Disponible en: http://www.scielo.org.pe/scielo.php?script=sci_arttext&pid=S1726221620190000100002. Morón F. ¿Son importantes las plantas medicinales en la actualidad? Rev Cub Plant. Med. 2010; 15(2).

10. Velázquez Vázquez G, Pérez Armendáriz B, Ortega Martinez LD, Nelly Juarez Z. Conocimiento etnobotánico sobre el uso de plantas medicinales en la Sierra Negra de Puebla, México. Bol Latinoam Caribe Plantas Med Aromát [Internet]. 2019 [Consultado 07/04/2023];18(3):265-276. Disponible en: https://www.blacpma.mseditions.cl/index.php/blacpma/article/view/88

11. Morón F. Las plantas medicinales como recurso de bajo costo para el adulto mayor. Rev Cub Plantas Med. 2012; 17(4).

12. Escalona L, Tase A, Estrada A, Almaguer M. Uso tradicional de plantas medicinales por el adulto mayor en la comunidad serrana de Corralillo Arriba. Guisa, Granma. Rev Cub Plantas Med. 2015; 20(4).

13. Calderin Campbell JE, Calderin Campbell E. De materia verde. Fitoterapia y apiterapia. La Habana: Edición Científico Técnica; 2018. p. 302

14. Corrales Reyes IE, Reyes Pérez JJ, Piña González R. PLANTAS MEDICINALES DE INTERÉS ESTOMATOLÓGICO. Revista 16 de abril¬. 2014: 53(256); 78-99.

15. Carrero Figueroa MV, Hinojosa Sabournit L, Perdomo Delgado J. Rescate del uso tradicional de plantas medicinales en el patrimonio inmaterial de Baracoa, Cuba. Rev Cubana Med Nat Trad [Internet]. 2020 [Consultado 07/04/2023];3(1):e121. Disponible en: http://www.revmnt.sld.cu/index.php/rmnt/article/view/121

16. Mustelier Cardona L, Sánchez Perez A, Peraza Corrales JA. Uso de plantas medicinales en enfermedades Otorrinolaringológicas. Revista Cubana de Otorrinolaringología. 2020; 21(3): e170.

17. Cabieses Molina F. Plantas beneficiosas para el aparato respiratorio. Científica [Internet]. 2017 [Consultado 07/04/2023];14(2):45-48. Disponible en: https://revistas.cientifica.edu.pe/index.php/cientifica/article/view/522

18. El romerillo encierra un tesoro para la salud. Disponible en: https://salud.msp.gob.cu

19. PINEDA-GEA, Fernanda. Aspectos clínico epidemiológicos de las patologías ambulatorias del oído frecuentes en adultos. Rev. ORL [Internet]. 2021[Consultado 07/04/2023];12(1): 19-33. Disponible en: https://dx.doi.org/10.14201/orl.23063.

20. Yamashita K. Fungal flora in the ear, nose, throat and mouth of man. Japan J Med Mycol 1963; 4: 136-149

21. Gregson AE, La Touche CJ. Otomycosis: a neglected disease. J Laryngol Otol 1961; 75: 45-69.

22. Palacio-Hernanz del A. Otomicosis. En: Torres-Rodríguez JM, Palacio Hernanz del A, Guarro-Artigas J, Negroni Briz R, Pereiro Miguens M. Micología médica. Barcelona: Masson, 1993: 75-81.

23. García-Martos P, Delgado D, Marín P, Mira J. Análisis de 40 casos de otomicosis. Enferm Infecc Microbiol Clin 1993; 11: 487-489.

24. Anselmo R, Huertas F, Raquel E. Actividad antimicótica del extracto etanolico de las hojas de la Manthustruxillensisen las cepas de Candidas albicans y el Aspergillus brasiliense. Universidad Irece Garcilaso de la Vega. Lima, Perú. Tesis. 2018. [Consultado 07/04/2023]. Disponible en: http://repositorio.uigv.edu.pe/handle/

25. Caro RA, Carrera JP, Cabello MM, Guerrero BV, Ovelar C, Ennme I, Jiménez MD. Uso de plantas medicinales en la provincia de Sevilla. Rev Esp Cien Farm. 2020;1(2):138-47

26. Lucero Escobar A1, Erika Celis A2, José Alarid C1, Lesly Jiménez G2, Gaudencio Díaz P2, Víctor Muñoz E4. Estudio clínico y micológico de otomicosis en diabéticos: Una serie de 17 casos Rev. Otorrinolaringol. Cir. Cabeza Cuello 2018; 78: 36-42

27. Fuertes-Anaya M, García-Calderón-Sandoval M. Otomicosis: Prevalencia, etiología y terapéutica en el Servicio de Otorrinolaringología del Hospital Nacional Hipólito Unanue. Sociedad Peruana de Otorrinolaringología y Cirugía Facial REPORL IV Época –Año XXIX-W 1, Junio 2005.

28. Boronat-Echeverría Nuria Esperanza, Kageyama-Escobar Alfonso Miguel, Méndez-Tovar Luis. Otitis externa micótica en pacientes con otitis media crónica. AN ORL MEX Vol. 50, No. 1, 2005

29. Vega-Nava CT, Borrego-Montoya CR, Vásquez-Del Mercado E, Vega-Sánchez DC, Arenas R. Otitis externa de origen fúngico. Estudio de 36 pacientes en un hospital general. An Orl Mex 2015;60:175-178.

30. Héctor Eduardo Álvarez Amador; Jorge Santana Álvarez; Luis Castillo Toledo; Eneyda Guarina García García; María Antonieta Álvarez Urbay. Comportamiento de la otitis externa en pacientes diabéticos. AMC [Internet]. sep-oct. 2010 [Consultado 15 sept 2023]; 5(14): 1025-0255. Disponible en: http://www.redalyc.org/articulo.oa?id=211116131009

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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