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The Association between Psychological Weakness and Occupational Dermatitis in Healthcare Workers: Bibliographic Review

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ABSTRACT

Healthcare personnel is frequently prone to suffer from skin conditions related to constant exposure to irritants such as soaps, sanitizers, and prolonged use of protective gear. Lesions or damage on the skin can cause emotional distress and thus limitations in developing their professional skills consequently compromising their job performance. The main objective of this research was focused on elaborating a bibliographic review based on research papers published from 2015 until May 2022, regarding occupational contact dermatitis in healthcare workers. Methodology: out of 45 initial research papers, 20 were selected which reported values of the prevalence of occupational contact dermatitis in healthcare personnel. Results: the nursing personnel showed a prevalence of 26.4% as the group who most frequently developed contact dermatitis among all healthcare workers, followed by surgeons and cleaning staff. Thus, methods of prevention and treatment were described as well as it was indicated the impact of the COVID 19 pandemic. Conclusion: Despite occupational contact dermatitis being preventable, it represents a predominant skin condition, especially in healthcare workers; for this reason, it is advisable to continue further research regarding this topic in Ecuador.

Keywords: contact dermatitis, healthcare workers, skin conditions.

INTRODUCTION

One of the branches of medicine is occupational health, which deals with pathologies associated with occupational exposures; within these conditions we have skin diseases, which occupy second place after musculoskeletal conditions (1). Contact dermatitis is part of the group of inflammatory skin diseases and is caused by contact with irritants or allergens that trigger eczema, pruritus, burning, lichenification of the skin and pain (2). The dermatitis that is associated with occupational exposure will be called occupational contact and this is a cause of important concern in several industries because it can generate alteration both in the health of the worker, in the productivity of this and therefore can economically affect the employer and the employee.

Occupational contact dermatitis accounts for 90% of all cases of work-related skin disorders (3). In Ecuador there is no variety of studies that measure prevalence of this disease, for this review we found data from two Ecuadorian studies that report that 86.7% and 100% of their workers respectively have presented some skin damage due to the use of personal protective equipment (4), (5). Taking data from the United States of America (USA) and Europe we can say that the prevalence of skin diseases in workers is 20 to 40% of all occupational diseases reported (1). In Germany, for example, of the occupational diseases reported in 2010, 33% were skin diseases and these are only those that have caused alterations in work activities, this would indicate that non-severe cases and underdiagnosed cases due to lack of knowledge would be left aside (6). In the USA, dermatitis affected more than 15 million workers in

2010, and its prevalence varied according to demographic characteristics, industry and occupation of employment, with a high incidence in the group of health professionals (7). In 2019, the skin-related cases that were reported to THOR (The Health and Occupation Research Network) were predominantly cases of contact dermatitis with a very high frequency in health personnel and according to occupation, nursing staff is more affected compared to the rest (8).

Health workers are considered as professionals who work in a humid environment (9), for this reason they are at high risk of developing skin lesions, especially on the skin of the hands. This risk increased during the COVID 19 pandemic, as hygiene measures such as hand washing, the use of disinfectants and the use of protective equipment including masks and gloves which create an easily developing environment for contact dermatitis were intensified and this has become an emerging problem, for this reason this article contains a specific section with information that has been published specifically in relation to the COVID 19 pandemic (10).

The importance of carrying out this review article is based on the fact that in Ecuador there is no registry of cases of the pathology under study. Therefore, to carry out future research, a conceptual basis on the subject is required and that is the objective of this article that has been developed through a bibliographic review of articles published in the period 2015-May 2022. The result of this research is an updated summary of specific concepts such as prevalence, treatment, prevention and the impact of the COVID 19 pandemic in relation to occupational contact dermatitis; which will serve as a source of basic information so that health personnel can identify this pathology and have an idea of how to prevent it and can recognize the need for treatment; In addition, it will be a source of information for students of careers related to the area of health with special interest in occupational health.

METHODS

For the preparation of this article, the documentary analysis method was applied, processing the information of the selected bibliography from the search for publications with full-text articles, written in any language, from 2015 to May 2022 in regional and international databases such as, Medline, Scopus, Google scholar, Scielo, Latindex. 45 articles were analyzed, but 20 were selected as these indicate prevalence values specifically. The search was based on the following keywords: contact dermatitis, contact dermatitis, occupational dermatitis, occupational dermatitis, health workers, health workers.

RESULTS

CONCEPTUALIZATION OF OCCUPATIONAL CONTACT DERMATITIS

The World Health Organization (WHO) defines occupational disease as "any disease contracted primarily as a result of exposure to work-related risk factors" (11). Contact dermatitis refers to any dermatitis that arises from direct exposure of the skin to a substance. Dermatitis can be allergic or induced by irritants; The latter accounts for 80% of contact dermatitis cases. In allergic contact dermatitis (ABI), an allergen induces an immune response, while in irritant contact dermatitis (INN), the triggering substance itself directly damages the skin (12).

CDI produces direct injury to epidermal cells which will trigger the activation of the innate immune system initiating an inflammatory cascade in response to various external stimuli. ACD is characterized by the generation of a delayed hypersensitivity reaction of type IV to a specific allergen or several. At the time of making the diagnosis only focusing on the clinic it can be difficult to identify which type of dermatitis we are observing. So you can help diagnostic tools that are exposed in the following section (13).

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DIAGNOSIS OF OCCUPATIONAL CONTACT DERMATITIS

The diagnosis is based on the elaboration of a correct clinical history, that is, on a good anamnesis correlated with an adequate and complete physical examination, which should include an evaluation of the entire skin and not be limited to the areas that the patient refers as affected, focus on daily activities to identify which is the irritative or allergic substance to avoid it. Signs and symptoms will usually be: erythema, edema, vesicles, blisters, epidermal necrosis, stinging, burning, pain, hyperkeratosis, lichenification; Decrescendo phenomenon which means that the healing process begins and is improved shortly after the elimination of the harmful substance (12).

Depending on the analysis of what was found, support is provided with diagnostic tests. To make the differential diagnosis between allergic or irritative dermatitis. The patch test is indicated as Gold standard, it allows the identification of some type of allergen that is associated as a causative agent of the manifestations on the skin. This test should be performed by trained and qualified specialists, such as dermatologists, occupational or allergists. Patch diagnostic testing is recommended for patients who have eczema for more than three months or who have relapsed. Depending on the occupational exposure, it is recommended to complement additional series of allergens to evaluate the greatest possible causes and to be able to identify the correct one and try to avoid it completely so that improvement in the skin of those affected can be evidenced (17).
Skin biopsy is not performed routinely, but depending on suspicion may become required to differentiate an irritant dermatitis from psoriasis or other types of inflammatory dermatoses. Photographic documentation by the patient and the physician is recommended in order to visually evaluate the evolution (12), (14).

PREVENTION MEASURES FOR CONTACT DERMATITIS

It is recommended to use hypoallergenic gloves such as nitrile or vinyl, the use of creams or petroleum jelly to improve the appearance and help maintain the protective function of the skin. For these measures to be effective, special attention must be given to the development of education programs for workers on the subject (12), (15). Workers diagnosed with occupational skin diseases were followed for 3 years, people who completed an individual prevention program and showed a decrease in disease severity, returned to work (97%) and (75%) retained their original occupation (16).

TREATMENT FOR CONTACT DERMATITIS

Treatment should be early, as skin that has lost its integrity is more likely to have bacterial colonization (15). Lifestyle change may be an option if it makes it easier to move away from allergens or irritants that have been identified with the diagnosis. As we are talking about occupational exposure, the event must be notified to the corresponding authority to evaluate the possibilities of changing the job, but if it is not possible, complying with the prevention measures, the worker can remain in his job.
The choice of the right emollient should be based on having a high lipid content so that rapid healing can occur. The use of corticosteroids for short periods of time is recommended because they interfere with the relationship of the stratum corneum of the epidermis and would trigger atrophy with long-term use. The application can be 1 time a day in the case of allergic contact dermatitis, in the case of irritant contact dermatitis the effectiveness of topical corticosteroids in experimental settings is low and nonexistent (17).

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POPULATION AND PREVALENCE

Table 1.- Distribution of the study population according to the country in which it was carried out.

COUNTRIES	POPULATION UNDER STUDY	PERCENTAGE %
Australia	2862	10,6
Canada	728	2,7
China	4306	16,0
Ecuador	123	0,5
Spain	1213	4,5
India	710	2,6
England	2000	7,4
Mexico	809	3,0
Portugal	1741	6,5
Sweden	9553	35,4
Turkey	1001	3,7
USED	1945	7,2
TOTAL	26991	100,0

Table 2.- Prevalence according to the country in which the study was conducted.

COUNTRIES	# OF CASES
Australia	1014
Canada	195
China	1843
Ecuador	111
Spain	122
India	51
England	80
Mexico	632
Portugal	62
Sweden	2371
Turkey	480
USED	595
TOTAL	7556

The total population studied in the reviewed articles is 26 842, of this group 7556 health workers have presented contact dermatitis related to their work representing a prevalence of 28%.

Of the 20 studies, 6 based the diagnosis of contact dermatitis using the patch test, the others were based on surveys that allow the participant to self-identify if he has presented skin lesions according to images and questions shown in the respective surveys. The countries that used patch test for diagnosis were England, Australia, USA and India (18), (19), (20), (21).

The countries where a larger population has been studied are European countries; First, we have Sweden with 2 studies that contribute 9553, followed by Turkey with 1001, Australia 2862, China 4306, England 2000, Portugal 1741, Spain 1213 and in the end come Mexico 809, India 710 and Ecuador contributing with a study of 123 people (22), (23), (24), (25), (26), (27), (28), (29), (30).

Seven of the articles reviewed do not specify or detail the gender variable in the report of their results, but they do indicate that no significant or direct association was found between being male or female and contact dermatitis (29), (30), (23), (24), (20). Of the other thirteen articles, which did take into account the variable sex, we obtained the following values: of all the people identified with occupational contact dermatitis, the male group was 1946 people and the female group was 2122; which indicates a difference 176 people. What can be related to the fact that the populations were mostly composed of women; In addition, the professional group with the highest incidence of occupational contact dermatitis is reported to the nursing group, followed by the group of nursing and cleaning assistants; labour sectors in which there is a predominance of women.

Regarding the age variable, the average age of people with occupational dermatitis in the health workers sector is 38.5 +/- 10 years. Age to which most of the working population belongs, which agrees that this is a pathology of an occupational nature, which appears at the time of exposure or in the near future; That is, workers are not required to have been exposed for extended periods of time such as 10, 20, or 30 years for symptoms to begin to appear. Therefore, it is a pathology that will interfere with the tasks of people in the time that would be destined to work, which can cause an early retirement from their functions, altering not only their physical health, but also their emotional health and their economy due to the impossibility of continuing to develop in their job.

According to the analysis carried out in relation to the agents that most often caused allergic contact dermatitis are listed below in order, from the most to the least frequent: Formaldehyde; which is a well-known occupational carcinogen and an important irritant compound especially for sensitive people (33), Tiuram which functions as an accelerator of rubber vulcanization, are allergens capable of causing allergic contact dermatitis in susceptible individuals (34), fragrances, nickel, quaternary, carba mix, rubber and its derivatives, acrylates, tetraethylthiuram disulfide and partherian. In the different studies some types of compounds vary depending on the patch test panel they have used, however, the compounds named are those that coincide in all as frequent causal factors in personnel working in the health area. To obtain these data has been used can the information of the studies that used patch tests to identify the cases which were only six of twenty; Some of the authors indicate that the reason for not having performed patch tests is the lack of resources to do so, since it is an expensive procedure; Therefore, they chose to identify cases of occupational contact dermatitis through internationally validated surveys, which allow the participant to self-identify their signs and symptoms.

IMPACT OF THE COVID 19 PANDEMIC

The transmission of infections at the hospital level is a very clear and studied issue, to avoid contagion several protective measures have been taken that during the pandemic by (SARS-CoV-2) became very intense especially for

health personnel, since for this group of people isolation was not an option. Among the most important recommendations given by the World Health Organization and the CDC is hand hygiene, which involves contact with water, antiseptic soaps, detergents, alcohol-based disinfectants and different chemical agents that allow to fulfill the objective of avoiding or reducing the spread of infectious diseases. The increase in the frequency of hand washing predisposes workers to have skin lesions, the most common zoma affected has been at the level of the hands, this prior to the pandemic. However, skin lesions may occur in other areas of the body as described by several articles developed during the pandemic. The articles we have reviewed for this study indicate that the main skin areas affected by these lesions were the skin of the face in the nasal area and the skin of the hands with a prevalence between 75% and 90% (31), (32). The articles agree that prolonged use of personal protective equipment for more than 6 hours significantly increases the risk of developing dermatoses. Allergic contact dermatitis has been reported to elastic straps, glue and formaldehyde released from the mask fabric. Regarding studies that specifically evaluate the prevalence of dermatitis in these areas of the body, several were not found, in this study three have been validated. None indicate evidence that contact with COVID patients increases the risk of dermatitis, but it is clear that staff working in COVID areas will have a higher frequency of hand washing and will wear PPE for a longer time, which has shown an important association as a cause of dermatitis (27)

CONCLUSIONS

Occupational contact dermatitis is a skin condition caused by direct exposure of the skin to a substance. This can be allergic or irritative, the latter being the most common.
The prevalence values of ODID in Ecuador are very high compared to the values obtained in other countries, one cause could be that the Ecuadorian studies were carried out during the COVID 19 pandemic, time in which high rates of skin lesions are reported due to the prolonged use of protective equipment, By frequent hand washing, the use of disinfectant agents that are irritating and destroy the protective layer of the skin.
There are no Ecuadorian studies that evaluate the prevalence of OBOD in large populations, studies in Ecuador are very limited so you can not expand their information and assume that it is the reality of the Ecuadorian population.

The diagnosis of contact dermatitis is based on clinical judgment from a correct anamnesis and physical examination, however, sometimes it can be difficult to differentiate the two types or both may be present at the same time and the patch test is used to identify allergens. It should focus on the work environment and assess the need to extend the patch test for more specific allergens related to the source of exposure. Although these are the recommendations, due to economic resources, the patch test has not been applied in all studies. This information is important to take into account when planning purchases in the institutions responsible for ensuring the health of the worker so that this type of tests is taken into account in order to identify DCO in health workers and identify which products are those that should be avoided in order to protect their skin from the aggressions to which it is exposed in their work environment.

The procedure to be followed in terms of prevention measures has been summarized, anyone who reads this document will understand how to act against a case of occupational contact dermatitis. These measures are relatively easy to implement, but the impact they have is very high. These measures are part of treatment as well. People who have applied a specific plan that includes the recommendations of emollients, protection such as gloves and the evasion of the causative agent, have been able to keep their job or have managed to reintegrate into the workplace.

Due to the COVID 19 pandemic, health personnel were required to intensify protective measures and extend the time of use of these, these are the main causes for the increase in cases of contact dermatitis in health personnel during this period of time. The areas in which DCO was reported were the hands and face, especially in the nasal bridge. In order to protect themselves from contagion while working, injuries occurred that would later not allow proper use of their protective equipment, here again the great importance of education in order to learn how to prevent TOCD is evidenced.

Education is the instrument to reduce cases of contact dermatitis, to keep those already affected in their jobs and avoid emotional and labor complications for those affected.

DISCUSSION

In a 1994 review, a very high prevalence was reported compared to that calculated in this study, we have 72% 28 years ago and 26.4 currently (35). What could indicate that with the passage of time, technological advances and advances in medicine especially in the branch of occupational health has been able to prevent the development of contact dermatitis in health personnel. However, since the beginning of the COVID 19 pandemic we have an increase in the incidence of contact dermatitis that even extends beyond hand injuries as was previously the case, covering other areas such as the face, a situation that would be expected to be avoided by all the years of knowledge and recommendations given that are very similar to those presented in current guidelines.

The high prevalence value years ago closely resembles the values reported by the two Ecuadorian studies in this review. It can be intuited that in Ecuador the relationship of work with this type of pathology has not been socialized and how important it is to be able to prevent and control them. It is suggested the motivation to develop research projects that can show a reality at the national level and motivate institutions to develop educational projects aimed at employees and employers that aim to educate to prevent.

The causative agents of allergic contact dermatitis reported in this study coincide with other studies that also indicate that chemical compounds in rubber, preservatives such as isothiazolinones, formaldehyde and fragrances are the most reported (36).

In this work a universal prevalence is given including studies of countries from different continents, the content is current and includes very specific concepts such as diagnosis, prevention, treatment, impact of the COVID 19 pandemic that will help the reader to understand occupational contact dermatitis.

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