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OCCUPATIONAL ALOPECIA IN HEALTHCARE WORKERS DUE TO CHEMICAL EXPOSURE

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ABSTRACT

Background: It is pointed out that the importance of professional alopecia may sometimes be underestimated. Different types of professional alopecia depending on the causal agent are distinguished: physical, chemical, biological and pharmacological. **Aims and objectives:** 1) To know the prevalence of alopecia in healthcare workers. 2) To study the correlation between hair fall and chemical usage. 3) To study possible causes of alopecia in healthcare workers. **Materials and methods:** A cross-sectional survey was conducted amongst 150 Healthcare workers in our hospital between September 1st 2016 to March 30th 2017. Self-reported incidents, occupational exposure and post exposure management were sought by use of filling up of questionnaire form. **Results:** 114 respondents have history of hair fall, 36 respondents do not have history of hair fall. 78 respondents have history of hair fall for more than 1 year, 22 respondents have history of hair fall for 1 year, and 14 respondents have history of hair fall for 6 months. 100 were exposed to chemical agents frequently. 48 respondents reported have been exposed to chemicals for more than 4 hours, 28 respondents reported have been exposed to chemicals for less than 2 hours, 24 respondents reported have been exposed to chemicals for 2-4 hours. **Conclusion:** Participants knowledge about the chemical occupational risk factors they are exposed to is still insufficient. To minimize this situation, this theme should be included in undergraduate nursing course curricula and permanent in-service education, explaining appropriate safety measures to decrease occupational risks, particularly chemical risks, and their harmful effects on workers' health.

KEYWORDS: Alopecia, Healthcare workers, Chemical usage, Safety precautions.

INTRODUCTION

Alopecia indicates a pathological absence of hair in a restricted area but this term is also used to illustrate a mild and widespread reduction of hair.[1] We would like to point out that the importance of professional alopecia is sometimes underestimated.[1]

Professional alopecia can be grouped, depending on the causal agent, into: physical (trauma, burns, radiations), chemical, biological (tuberculosis, tinea) and pharmacological (antimetabolites, anticoagulants).[1]

Traumatic alopecia is due to a physical trauma on the scalp. Some authors described traumatic alopecia caused by caps or strings worn over a long periods at work.[3]

Burns may be responsible for cicatricial alopecia, especially in: radiologists, surgeons, orthopaedists, dentists and radiology technichians due to exposition over long periods to small doses of radiation without sufficient protection. These radiations can damage the germinative layer of epidermis and cause a dialatation of blood vessel in dermis with release of histamine that provokes erythema.[4]

Biological agents may occasionally cause a professional alopecia in medical personnel, e.g. doctors, nurses, technichians who are exposed to infections like tuberculosis or tinea.[8]

Several chemical agents may be involved in professional alopecia.[5]

Antimetabolites like colchicine may produce a widespread alopecia.[9]

Anticoagulants like coumarin, contained in rat pesticides, can develop a widespread alopecia 2 months after exposure.[9]

Nursing workers in hospitals are exposed to different occupational risk agents/factors, including chemical substances, which can be inhaled, digested or come in contact with the skin, causing health damage.[2]

Some circumstances favor this kind of occupational exposure, such as prolonged use of latex gloves; handling of detergents and solvents; manipulation of ultimate generation antineoplastic and antibiotic drugs; inhalation of anesthetic gases; exposure to formaldehyde and glutaraldehyde vapors and sterilizing gas, among others.[2,6]

This exposure does not always entail harmful effects on health, which depend on factors like: type and concentration of chemical agent, frequency and duration of exposure, work practices and habits and individual susceptibility.[6]

Prevention is one way of avoiding occupational health problems caused by exposure; however, for prevention to be effective, workers need to be aware of the risks posed by chemical substances.

AIMS AND OBJECTIVES

1) To know the prevalence of alopecia in healthcare workers.
2) To study the correlation between hairfall and chemical usage.
3) To study possible causes of alopecia in healthcare workers.

MATERIALS AND METHODS

A cross-sectional survey was conducted amongst 150 Healthcare workers working in our hospital. The study group was divided into different sectors such as ICU staff, Operation staff, Emergency staff and Dialysis unit staff. The study period taken is from September 1st 2016 to March 30th 2017. Healthcare workers were asked to fill questionnaire form which includes duration of hair fall, treatment history of medical illness, recent history of surgery, history of anti-psychiatric, anti-hypertensive, anti-thyroid, anti-platelets intake, history of patchy hair loss or fungal infection, frequent exposure to chemical agents, duration of exposure, use of safety precautions while working.

RESULT

114 out of 150 respondents have history of hair fall, 36 out of 150 respondents do not have history of hair fall.

78 out of 114 respondents have history of hair fall for more than 1 year, 22 out of 114 respondents have history of hair fall for 1 year, 14 out of 114 respondents have history of hair fall for 6 months.

None of the respondents have any treatment history for medical illness.

None of the respondents have any recent history of surgery.

None of the respondents are taking any anti-psychiatric, anti-platelets, anti-thyroid, anti-hypertensive drugs for more than 6 months.

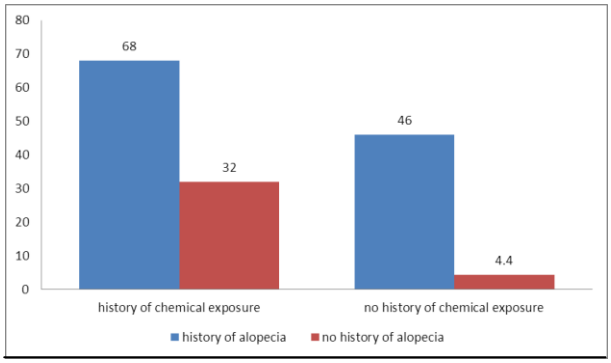
None of the respondents have any history of patchy hair loss or fungal infection.

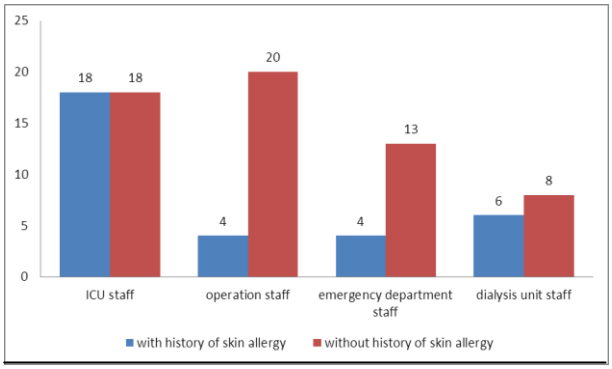
100 out of 150 respondents were exposed to chemical agents frequently.

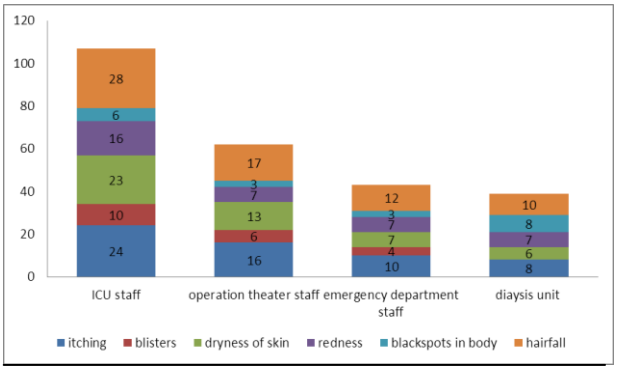
48 out of 100 respondents reported have been exposed to chemicals for more than 4 hours, 28 out of 100 respondents reported have been exposed to chemicals for less than 2 hours, 24 out of 100 respondents reported have been exposed to chemicals for 2-4 hours.

All respondents have been using safety precaution (apron, gloves, mask, googles, gown) while working.

The other health alterations were itching, blisters, dryness of skin, redness, black spots in body, hair fall.







DISCUSSION

The five most frequently mentioned chemical agents were: antibiotics and benzene, iodine, latex/talc and glutaraldehyde. These are frequently found in hospitals and are used for medication treatment (antibiotics), skin degreasing (benzene), material cleaning/disinfection (glutaraldehyde and sodium hypochlorite), skin asepsis (iodine) and hand protection (latex gloves). In spite of its frequent use in hospital practice, there was little mention of alcohol.

Few workers indicated ether and alcohol as possible causes of occupational health problems, possibly because they are commonly used in different nursing tasks and, thus, tend to be depreciated.

Antineoplastic agents are constantly used because of their therapeutic properties; however, these substances exert mutagenic, carcinogenic and teratogenic effects, which pose risks to the workers handling them when appropriate safety measures are not observed.[2,6,7]

Cytostatic agents, anesthetic gases and sterilizing agents are some of the main causes of reproductive problems, like abortions and congenital malformations, in exposed workers, which confirm the danger of handling these substances.[7,10]

Due to the increased use of gloves in hospitals as a result of biosafety concerns, latex has come up as one of the causes of dermatitis and occupational urticaria. Hypersensitivity can be due to latex, talc used in internal glove layers or chemical substances added during rubber processing.[11]

Immunological tests can be carried out to identify susceptible workers and, thus, minimize the appearance of these problems. Participants identified blood alterations as the main problem produced by handling antineoplastic agents. However, these drugs are responsible for several health problems, mainly in terms of human reproduction.[7,10,12,13]

Occupational exposure risks involve inhalation of aerosols, direct contact with skin and mucous membranes and ingestion of food and medication contaminated with their residues. These can provoke health damage, including chromosome alterations, mutagenicity, infertility, abortion, menstrual disorders and immediate symptoms like dizziness, headache, nausea, mucous alterations and allergic reactions.[12] The frequency of menstrual irregularities and amenorrhea is higher among nurses manipulating these agents.[13] Spontaneous abortions can occur, mainly during the first three months of pregnancy, besides chromosome alterations and congenital malformations.[2,7,14,15]

Other manifestations include skin, mucous and eye irritations; hair fall and decreased immunological resistance, increased drug resistance, pharyngitis, hoarseness, herpes and cancer.[16]

Risks can come from the excretions of chemotherapy patients, since part of these substances continue unaltered or take the form of inactive metabolites, found in patient's feces, urine and vomit. Hence, protective equipment has to be used to handle them.[2]

Nurses can inhale, digest or come in skin contact with antibiotics, causing sensitivity. Cephalosporin can cause allergies and allergic rhinitis in anyone exposed.[17] Participants associated antibiotics with episodes of diarrhea and allergic reactions, which could also be related to rhinitis.

Another risk is posed by exposure to anesthetic gases (nitrous oxide, halothane), which can cause negative reproductive effects, especially in surgical center workers (nurses, anaesthetists, technicians). These substances reduce fertility and increase the incidence of abortions and congenital malformations.[2] Spontaneous abortion can occur as a consequence of occupational exposure, mainly in nurses, during the first term of pregnancy.[18]

They also mentioned benzene and iodine as other causes of abortion. Sterilizing solutions, vapors or gases also constitute occupational risk agents. Formaldehyde vapors irritate mucous nose, mouth and eye membranes; they can produce symptoms of sickness, even at low concentrations, and cause dermatitis, edema or larynx spasm, obstructive bronchitis and, occasionally, pulmonary edema.[2]

Glutaraldehyde can also be a cause of these symptoms; exposure to this substance at 2% among workers at an endoscopy unit revealed eye watering, rhinitis, dermatitis, respiratory difficulties, nausea and headache.[19]

Occupation exposure to ethylene oxide is a pertinent source of concern, as this substance causes serious health damage, such as increased cutaneous injuries and conjunctivitis; presence of leukemia, lymphoma, gastric and esophageal neoplasms, liver and kidney dysfunctions, respiratory diseases and decreased hemoglobin, due to the degeneration of amino acids; in case of acute intoxication, symptoms include dyspnea, alterations in level of conscience, nausea, vomiting, diarrhea, lymphocytosis, peripheral neuritis and encephalopathy.[20]

CONCLUSION

Many healthcare workers indicated they came in contact with chemical substances at their work place. The five most mentioned products were: antibiotics and benzene, iodine, latex/talc and glutaraldehyde. As to what chemical substances can cause health problems, antineoplastic agents were indicated as causes, as well as

formaldehyde, glutaraldehyde, ethylene oxide, antibiotics and latex/talc, among others. Healthcare workers believed the following signs and/ or symptoms can be caused by chemical products: cutaneous allergic reactions caused by latex/talc; blood alterations by antineoplastic agents; diarrhea by antibiotics; eye watering, nausea and/or vomiting and spontaneous abortions by nitrous oxide and eye watering by formaldehyde and glutaraldehyde, among others. However, participants did not indicate clinical alterations mentioned in literature, which shows that their knowledge about the chemical occupational risk factors they are exposed to is still insufficient. To minimize this situation, this theme should be included in undergraduate nursing course curricula and permanent in-service education, explaining appropriate safety measures to decrease occupational risks, particularly chemical risks, and their harmful effects on workers' health.

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