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An intervention epidemiological study of occupational dermatoses at Zagazig university hospitals

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Abstract

Background: Occupational skin diseases are a burden for the society and are reported to be an important predictor for long term unemployment.

Aim of the work: to determine the most prevalent occupational skin problems among service workers at the Zagazig University Hospitals, and the associated risk factors, in addition to implementation and evaluation of the effect of a skin care intervention program.

Materials and methods: Two hundreds and forty service workers were classified into 2 groups: (A) the intervention group; (120 workers) randomly selected from full time, permanent hospital service workers. (B) The control group; (120 workers) randomly selected from non hospital workplaces. They were subjected to Nordic occupational skin questionnaire and skin examination. Group (A) received a program which includes; 1- Health education sessions and pamphlets. 2- Proper usage of protective clothes and gloves. 3- Treatment of cases, and three months later, a post test questionnaire was done for evaluation of their knowledge.

Results: occupational dermatoses were higher (50.0%) among the intervention group compared with (19.2%) among the control group. Contact dermatitis especially of hands was the most common followed by tinea pedis, paronychia and onychomycosis. Significant risk factors were work hours per week, daily wet work hours (>2 hours), and associated skin lesions. Current job duration was higher than in control group but with no significant difference. Atopic history had no significant impact on the incidence of occupational dermatoses. They were more prevalent among females and illiterate (can hardly read and write) workers but with no significant association while they were significantly higher among workers in inpatient wards rather than those who work in other services e.g. laundry and kitchen. Daily non aggressive hand washing was effective for prevention of occupational

dermatoses while irregular use of protective gloves was not effective. Correct knowledge was lacking which significantly improved after the intervention program. Change of attitude was manifested in the more concern about risk factors and the increased frequency of use of protective clothes and gloves.

Conclusion: The most important risk factors for occupational dermatoses among the hospital service workers are: work hours per week, job place and frequent use of water and cleansers .Protective gloves should be worn for shorter periods in wet tasks, while reducing unnecessary glove usage for dry tasks. The lacking health knowledge among the hospital service workers reflects their need for intervention with health educational programs through mass media and face to face approach.

Introduction

Occupational dermatoses can be defined as: "Any abnormality of the skin induced or aggravated by the work environment "[1]. Occupational dermatoses can be also defined as: "A pathological condition of the skin for which occupational exposure can be shown to be a major causal or contributory factor"[2].

Almost no occupation can be considered entirely free from the hazard of skin diseases. Work related skin diseases are common and constitute up to 30% of all occupational diseases for which compensation is payable [3,4], They are believed to be an important predictor for long term unemployment and estimated to be responsible for 25% of all lost work days[5,6].

The importance of occupational skin diseases regarding their public health impact arises from the facts that, they are common, potentially disabling [7,8], having an economic impact for society and individuals, and they are amenable to public health interventions [2].

The most common work related dermatosis is contact dermatitis reported to be 12.9 per 100,000 workers [1]. Occupational contact dermatitis is most often localized to the hands [9] and employees in wet work are at increased risk of this disease [10,11].

Occupational skin diseases affect workers of all ages in a wide variety of work settings such as; hairdressing, medical, dental, veterinary, agriculture, cleaning, printing, painting, construction, food preparation and catering, etc [6].

Epidemiological and clinical studies have identified risk factors for skin affection in wet occupations. Occupational factors range from soaps, cleansers, hand disinfectants rubber latex and skin care products over water to food stuffs [8,12,13].

The nature of the substance, the degree, the duration and frequency of exposure to the substance and the individual susceptibility determine the degree of skin damage which results from a particular substance [3].

It was reported that over washing and use of cleansers may lead to change of the skin pH, removal of surface lipid layer and damage of the skin barrier function, allowing greater water loss through the epidermis to the skin surface, from where it evaporates[14,15].The de-fatted skin will become excessively dry, and so become more prone to infections. Irritant contact dermatitis may develop, as provoked by the dry skin itself or by a particular surfactant in the cleanser. Allergic contact dermatitis may also develop to a component of the cleanser or latex gloves [13,16].

Experimental studies have identified preventive measures that may reduce the risk of getting occupational dermatoses. On the basis of these studies, evidence based skin care programs have been developed [17,18]. Implementation of the skin care program was achieved by using selected specification from an occupational health and safety management system [9].

Aim of the Work

The objectives of this study are:

- 1) To determine the most prevalent occupational skin problems among service workers at Zagazig University Hospitals.
- 2) To elucidate the personal and occupational risk factors associated with the detected skin problems.
- 3) To propose, implement and evaluate the effect of a skin care intervention program.

Subjects and Methods

This study was conducted through two phases:

- Phase I: A cross-sectional study
- Phase II: An intervention educational program.

1) Study design:

In phase I; a cross-sectional study was conducted at Zagazig University Hospitals of Surgery, Gynecology, Pediatric, and Internal Medicine, including the laundry and kitchen of these buildings to assess the prevalence of skin disease among service workers and their current knowledge, attitude and practice. This was followed by phase II (intervention educational program).

2) Subjects; two groups:

Group (A): hospital service workers (Intervention group)

It included both sexes, who were assigned as full time permanent workers affiliated to the selected workplace, for duration not less than one year. One hundred and twenty workers were fulfilling these criteria.

Group (B): control group

A corresponding control group of 120 subjects was selected from non hospital workplaces (The academic building of Faculty of Medicine, Zagazig University) to match the hospital workers regarding age, sex, residence, and social class.

3) Methods:

Phase I: included Nordic Occupational Skin Questionnaire (NOSQ, 2002) [20] for interviewing of both groups of the study and skin examination.

A- Nordic Occupational Skin Questionnaire (NOSQ, 2002): for the following;

- 1) Personal data (name age, marital status, and educational level).
- 2) Occupational history: including the nature of the job, duration, worked hours per day, and past occupations.
- 3) History of atopic manifestations: hay fever, allergic rhinitis, eye allergy, bronchial asthma, past history and family history of skin diseases.
- 4) Knowledge level about work related skin diseases.
- 5) Self reported skin lesions such as scaling, fissures, redness and itching.

B- Comprehensive skin examination: of the two groups with a special relevance to the exposed skin (face, upper and lower limbs).

Phase II: The intervention educational program: for group (A) alone including:

1- Health education:

The educational program was addressed to the most prevalent misconception, unsound attitude and unhygienic practice of the examined subjects as revealed from the questionnaire and medical examination.

The purpose was to give the sound knowledge about the nature of the substances which the subjects are exposed to during their work such as detergents, disinfectants, etc., their health hazards on the skin, and raising the awareness of the workers for early recognition of the symptoms and signs of occupational dermatoses, and limiting unnecessary exposure or contact with noxious substances.

The educational program was given in the form of small groups of (5-10) workers in each workplace by direct personal communication aided by the use of posters, figures, and other relevant educational material.

2- Sound occupational health practice:

Practical instructions were given regarding correct hand wash, use of disinfectants, moisturizers, and proper use of protective cotton gloves during their work. Sufficient protective gloves and appropriate medications for the diagnosed cases were freely supplied.

3- Post test questionnaire:

After three months of the educational program, a post test questionnaire was done for group (1) - the intervention group -for evaluation of their knowledge.

4) Statistical analysis:

The data were collected, presented, analyzed using SPSS (Statistical Package for Social Science) version 11. Comparison between proportions was done by the chi-square test and corrected chi-square test when needed. The comparison between group means was done using student's t-test. The results were considered significant when p value is < 0.05.

Results

The general sociodemographic characteristics of the studied subjects are presented in **table (1)**. There were no statistically significant age, gender, residence, education, marital status, smoking habits and family history of skin diseases difference between both groups.

Table (1): General sociodemographic characteristics of the hospital service workers and control group.

General characteristics	Hospital workers (n=120)		Control group (n=120)		χ^2	P-value
	No	%	No	%		
Age(years):						
<30	22	18.3	31	25.8	2.89	0.23 (NS)
30-	34	28.3	37	30.8		
40-	64	53.3	52	43.3		
Gender:					0.60	0.44 (NS)
Female	53	44.2	59	49.2		
Male	67	55.8	61	50.8		
Residence:					0.03	0.87 (NS)
Rural	96	80.0	97	80.8		
Urban	24	20.0	23	19.2		
Education:					3.85	0.15 (NS)
Illiterate	33	27.5	39	32.5		
Read & Write	74	61.7	60	50.0		
School	13	10.8	21	17.5		
Marital status:					0.29	0.59 (NS)
Married	103	85.8	100	83.3		
Unmarried	17	14.2	20	16.7		
Smoking:					0.09	0.77 (NS)
Smoker	32	26.7	30	25.0		
Non smoker	88	73.3	90	75.0		
Family history:					2.16	0.14 (NS)
Positive	12	10.0	6	5.0		
Negative	108	90.0	114	95.0		

NS: non significant

Concerning the work elements;

The current job duration was not significantly different between the two studied groups. On the other hand, hospital workers have a higher work hours/week than the control group with significant difference between them (**table 2**).

Table (2): Means and standard deviations($X \pm SD$) of current job durations/year and work hours/week among the hospital service workers and control group.

	Hospital workers (n=120)	Control group (n=120)	t test	P value
job durations (year):				
X	15.15	16.16	0.69	
\pm SD	10.44	12.2		0.5 (NS)
Work hours/ week				
X	50.35	44.09	4.82	
\pm SD	12.32	7.06		0.001 (HS)

NS: non significant

HS: highly significant

Table (3) shows that the daily wet work hours were statistically significantly higher in hospital workers than the control group.

Table (3): Frequency distribution of the daily wet work hours as a risk factor among the hospital service workers and control group.

	Hospital workers (n=120)		Control group (n=120)		χ^2 for trend	P value
	No	%	No	%		
Wet work						
<½h	16	13.3	54	45.0		
(½-2h)	23	19.2	50	41.7	64.4	0.000 (HS)
>2h	81	67.5	16	13.3		

HS: highly significant

Concerning the skin affection;

The hospital workers had a higher rate of self reported skin manifestations including dryness, fissures, redness and itching than the control group (**table 4**).

Table (4): Number and percent distribution of the self reported skin disease manifestations among the hospital service workers and control group.

Reported skin manifestations	Hospital workers (n=120)		Control group (n=120)		χ^2	P value
	No	%	No	%		
Dryness and fissures:						
Yes	44	36.7	29	24.2	4.43	0.03(S)
No	76	63.3	91	75.8		
Redness and Itching:						
Yes	28	23.3	9	7.5	11.54	0.001(HS)
No	92	76.7	111	92.5		

S: significant

HS: highly significant

On comparing the incidence of skin diseases; **table (5)** shows the highly significant percentage of positive skin diseases among the hospital service workers compared with the control group.

Table (5): Frequency distribution of the skin diseases among the hospital service workers and control group.

	Hospital workers (n=120)		Control group (n=120)		χ^2	O.R. (95% C.I.)	P-value
	No	%	No	%			
Skin diseases:							
Yes	63	52.5	23	19.2	28.9	4.6 (2.52-8.68)	0.000 (HS)
No	57	47.5	97	80.0			

HS: highly significant

Different types of skin diseases were found in both groups. However, the difference between both groups is highly statistically significant only for contact dermatitis and for cases with more than one type of skin disease (**table 6**).

Table (6): Number and Percent distribution of types of skin diseases among the hospital service workers and control group.

Types of skin diseases	Hospital workers (n=120)		Control group (n=120)		χ^2	P-value
	No	%	No	%		
Contact dermatitis	33	27.5	10	8.3	12.06	0.000 (HS)
Tinea pedis	13	10.8	8	6.7	0.8	0.37 (NS)
Paronychia & Onychomycosis	4	3.3	2	1.6	Fischer exact	0.68 (NS)
More than one type of skin disease	13	10.8	0	0.0	10.43	0.001 (HS)

- HS: highly significant NS: non significant

The hand was the commonest site of skin diseases among both the hospital service workers and control groups, and the difference between them is statistically significant for the hands and both hand and feet (**table 7**).

Table (7): Frequency distribution of site of skin diseases among the hospital service workers and control group.

Site of skin diseases	Hospital workers (n=120)		Control group (n=120)		χ^2	P-value
	No	%	No	%		
Hand	31	25.8	14	11.6	5.66	0.01(S)
Feet	14	11.6	9	7.5	1.20	0.27(NS)
Both hand and feet	18	15.0	0	0.0	19.4	0.000 (HS)

- S: significant NS : non significant HS: highly significant

Factors related to occupational diseases within group (A)

The risk of developing skin diseases was found to be associated with gender (being a female), illiteracy, marriage and workers who live in urban area more than other factors. However, the association was not significant (**table 8**).

Table (8): The relationship between the general sociodemographic characteristics of the hospital service workers and frequency of skin diseases.

General characteristics	Total No	Skin diseases				χ^2	O.R. (95% C.I.)	P-value
		Positive (n=63)		Negative (n=57)				
		No	%	No	%			
Gender:								
Female	53	31	58.5	22	41.5	0.304	1.22 (0.59-2.5)	0.58 (NS)
Male	67	32	47.8	35	52.2			
Marital Status:								
Married	103	57	55.3	46	44.7	1.713	2.02 (0.69-5.8)	0.19 (NS)
Not Married	17	6	35.3	11	64.7			
Residence:								
Rural	96	47	49.0	49	51.0	3.333	2.36 (0.92-6.0)	0.06 (NS)
Urban	24	16	66.7	8	33.3			
Smoking:								
Smoker	32	16	50.0	16	50.0	1.534	0.59 (0.26- 1.3)	0.22 (NS)
Non Smoker	88	47	53.4	41	46.6			
Education:								
Illiterate	33	21	63.6	12	36.4	2.61	1.96 (0.8-4.84)	0.11 (NS)
Read and Write	87	42	48.3	45	51.7			
Age(years):	120	63	52.5	57	47.5			
<30	22	10	45.5	12	54.5	1.03	1.0	
30 –	34	16	47.1	18	52.9		1.07 (0.32-3.6)	0.9 (NS)
40 +	64	37	57.8	27	42.2		1.54 (0.62-3.88)	0.31 (NS)

- NS: non significant

The type of occupation also affected the frequency of skin diseases in terms of higher statistical significant frequency of skin diseases among subjects working with patient care than those who work away from patient care. Although hospital service workers with past relevant occupations were at higher risk of skin diseases than those without past occupation, the difference between both was not significant (**table 9**).

Table (9): Occupational characteristics of the hospital service workers and frequency of skin diseases.

Occupational characteristics	Total No	Skin diseases				χ^2	O.R. (95% C.I)	P-value
		Positive (n=63)		Negative (n=57)				
		No	%	No	%			
Job place:								
With patient care	90	54	60.0	36	40.0	8.12	3.5 (1.33-9.4)	0.004 (HS)
without patient care	30	9	30.0	21	70.0			
Past relevant occupation:								
Yes	69	41	59.4	28	40.6	3.12	1.93 (0.87-4.3)	0.07 (NS)
No	51	22	43.1	29	56.9			

With patient care: (Internal Medicine-Surgery-Pediatric-Gynecology-Emergency -Out patient clinic).

Without patient care: (Laundry-Kitchen-Lab-Physician residence).

- HS: highly significant
- NS: non significant

As regard the relation between job duration and incidence of skin diseases, Hospital workers for more than 10 years were at increased risk of skin diseases compared to those who worked less than 10 years but the difference was not significant. There was a significant increased trend between work hours per week and frequency of skin diseases (**table 10**).

Table (10): The relationship between the current job durations in years, work hours/week and frequency of skin diseases among the hospital service workers.

Occupational characteristics	Total n	Skin diseases				χ^2	O.R (95% C.I)	P value
		Positive (n=63)		Negative (n=57)				
		No	%	No	%			
Current job durations/y								
≤10y	53	23	43.4	30	56.6		0.07	
>10y	67	40	59.7	27	40.3	3.15	1.93 (0.87-4.3) (NS)	
Work hours/week:								
≤40h	15	3	20.0	12	80.0		1.0	
(41-55)h	60	29	48.3	31	51.7		5.7(1.11-55.1)	
>55h	45	31	68.9	14	31.1	12.7	8.8(1.9-54.4) 0.001 (HS)	

χ^2 for trend

- NS: non significant
- S: significant
- HS: highly significant

Hospital workers who work for more than 2 hours daily at wet work had higher risk of skin diseases than those who work for less than ½ hour per day, but the difference was not significant. (**table 11**).

Table (11): The number and percent distribution of the daily working hours of the hospital service workers at wet work and frequency of skin diseases.

Wet work	Total No	Skin diseases				χ^2 for trend	O.R (95% C.I.)	P-value
		Positive (n=63)		Negative (n=57)				
		No	%	No	%			
<½h	16	6	37.5	10	62.5	2.71	1.0	
(½-2h)	23	12	52.2	11	47.8		1.82(0.41-8.23)	0.36 (NS)
>2h	81	45	55.5	36	44.5		2.08(0.62-7.62)	0.18 (NS)

- NS: non significant

Exploring atopy as a risk factor in the frequency of skin diseases among service workers (**table 12**); there was non significant difference in the percentage of skin diseases among atopic workers (50%) and non atopics (52.8%).

Table (12): The relationship between atopy as a risk factor and frequency of skin diseases among the hospital service workers.

Atopic history	Total No	Skin diseases				χ^2	O.R (95% C.I.)	P-value
		Positive (n=63)		Negative (n=57)				
		No	%	No	%			
Yes	12	6	50.0	6	50.0	0.03	1.12 (0.29-4.24)	0.85 (NS)
No	108	57	52.8	51	47.2			

- NS: non significant

There was no statistically significant difference regarding the use of protective gloves between workers with and without skin diseases. There was a higher risk of skin diseases among workers whose work needs frequent hand washing (> 5 times daily) than those who wash up to 5 times daily. However, the difference between both was not significant (**table 13**).

Table (13): Frequency distribution of the use of protective gloves, daily hand washing and frequency of the skin diseases.

	Total n	Skin diseases				χ^2	O.R (95%C.I.)	P-value
		Positive (n=63)		Negative (n=57)				
		No	%	No	%			
Protective gloves:								
Yes	65	35	3.8	30	46.2	0.10	1.13 (0.51-2.46)	0.74 (NS)
No	55	28	50.9	27	49.1			
Hand wash/d:								
5 times	10	2	<u>10.0</u>	8	<u>90.0</u>	Fisher exact	10.12 (1.12-223)	0.01 (S)
> 5 times	110	61	<u>53.6</u>	49	49.1			

* χ^2 for trend.

- S: significant
- NS: non significant

After logistic regression analysis of factors affecting frequency of occupational dermatoses among the hospital service workers revealed that the risk of skin diseases was higher among workers who work more hours per week. The significance of this finding was positively related to the number of working hours per week (**table 14**).

Table (14): Logistic regression analysis of factors affecting frequency of occupational dermatoses among the hospital service workers.

Variable	B	SE	Wald	Sig.	R	O.R (95%C.I.)
Job place(with patient care)	0.80	0.49	2.62	0.10	0.06	2.2 (0.84-5.9)
Work hours/ w						
<40h			8.03	0.018	0.15	
(41-55)h	1.75	0.81	4.71	0.030	0.13	5.7 (1.18-28.4)*
>55h	2.33	0.83	7.82	0.005	0.18	10.3 (2.0-53.1)**
Hand wash/d >5 times	1.63	1.19	1.88	0.16	0	5.12 (0.49-52.8)

* P<0.05: significant

** P<0.001: highly significant

The intervention program:

After the intervention program for group I (hospital service workers) the frequency of correct knowledge about occupational skin diseases and the use of protective gloves was highly significantly higher among them after than before the program (**table 15**).

Table (15): Change of knowledge and attitude regarding eczema among the hospital service workers.

Knowledge and attitude	Pre test (n=105)		Post test (n=105)		P*
	No	%	No	%	
Eczema definition :					
Yes	23	21.9	95	90.5	0.000
No	82	78.1	10	9.5	(HS)
Cause:					
Correct	21	20.0	89	84.7	0.000
Incorrect	84	80.0	16	15.2	(HS)
Symptoms:					
Correct	13	12.4	88	83.8	0.000
Incorrect	92	87.6	17	16.2	(HS)
Exaggeration at work:					
Correct	1	0.95	83	79.04	0.000
Incorrect	104	99.0	22	20.9	(HS)
Complication:					
Correct	2	1.90	91	86.7	0.000
Incorrect	103	98.0	14	13.3	(HS)
Season:					
Correct	8	7.61	91	86.6	0.000
Incorrect	97	92.4	14	13.3	(HS)
Protective gloves:					
Yes	65	61.9	90	85.7	0.000
No	40	38.0	15	14.2	(HS)

P*: Mc Nemar's χ^2 Test
 HS: highly significant

N.B: Drop out of 15 person for the intervention.

Discussion

This cross sectional study was carried out to determine the most prevalent occupational skin problems among the hospital service workers, and to elucidate the personal and occupational risk factors associated with the detected skin problems. This study also aimed to propose, implement and evaluate the effect of a skin care intervention program.

Sociodemographic characteristics of the two studied groups had no significant difference regarding age, gender, residence, education, marital status, smoking habits and family history. There was no significant relation of atopy to occupational dermatoses; in both groups studied that was in contradiction to previous findings reporting that atopic tendency is a major factor favoring the occurrence of occupational dermatoses[16] and people with history of atopy were at a higher risk of

developing contact dermatitis from irritant substances [18,20].

Work conditions:

There was no difference in the job duration between the two groups. The most important factor was the mean of working hours per week which was significantly higher among the hospital service workers than control group. This may be attributed to the longer work shifts among the hospital service workers which range from 10 to 12 hours daily, while control group usually work for 7 to 8 hours daily.

In agreement with other studies [9,13] our study revealed significant increased trend of exposure to wet work among hospital service workers than control group. This observation may be attributed to the fact that more than two thirds of the hospital service workers (67.5%) worked at wet work for more than two hours per day compared with (13.3%) among the control group. Although wet work is a risk factor, it is mostly accompanied by the influence of other irritants substances e.g. cleansing agents and organic solvents.

There was a higher incidence of self reported skin lesions as itching and dryness among group (A) than control group (B). This is against others [18] who found no difference between both. This could be explained by the difference in work facilities and protective measures supplied in different places which affect the rate of skin affection.

Frequency of occupational dermatoses among the study groups:

The highest frequency of occupational dermatoses was among the hospital service workers (50.0%) compared with (19.2%) among the control group. This was confirmed by other studies and explained by frequent exposure to many offending agents in the work places [3,21].

Types of occupational dermatoses:

The most common work related dermatosis is contact dermatitis. The overall reported annual incidence of occupational contact dermatitis is about 1.3 cases per 10 000 workers [1,4]. Irritant and allergic contact dermatitis of the hands frequently occurs, whereas contact urticaria and hospital-acquired infections are less common [9]. Manufacturing industries account for the greatest number of the cases, followed by healthcare employment [22,23].

The frequency of contact dermatitis noticed in this study was (33%) among the hospital service workers compared with (10%) among the control group. These results correlated with some studies [24,25] and were higher than the results of other authors [15,26].

This variation in the prevalence of contact dermatitis in different studies may be also attributed to the variation of work conditions and risk factors, associated skin lesions and/ or difficulty in obtaining ideal samples because of temporary employment of the workers.

Hand dermatitis represents one of the most important occupational health problems among health care workers and contact dermatitis of the hands accounted for 90% in some places [20]. We also found that hands were the commonest site of affection; in 31% among the hospital service workers and 11.6% among the control group. These observations confirm that the exposed areas of the hands and forearms are more prone for contact with irritant materials [27].

Fungus infection predisposed to by wet work or as a complication of eczema should not be left out of consideration. In the present study tinea pedis was diagnosed in 13 workers who represented 10.8% of the hospital service workers, while paronychia and onychomycosis were found among (3.3%) which is approximate to previous reports [18].

Factors affecting the occupational dermatoses:

The understanding of risk factors for occupational dermatoses is crucial for prevention and management of the disease. It also has major implications for medicolegal evaluations [16].

In accordance with other studies [20,28]; older workers were at increased risk of skin diseases than the younger but without significant difference between them. On the other side; occupational dermatoses were reported to be significantly more frequent among the younger age and explained by low seniority, poor job training and disregard for the use of protective measures [3,26,29,30].

As previously reported [31], we found that females are more involved by occupational diseases (58.5%) than males (47.8%) Nevertheless the difference was not significant. However, it was reported that contact dermatitis was significantly more frequent among females as most of the occupational groups exposed extensively to wet work are usually female dominated [20,26].

As regard the level of education, illiterate (who hardly read and write) workers were at a higher risk of occupational dermatoses than those who can read and write, but without significant difference between them. Obviously and as was explained; educated persons are aware of the hazardous materials and they can take care of their skin [6,16].

According to the job place, occupational dermatoses were significantly higher among service workers who work in patient services (i.e. internal medicine- surgery- pediatric- gynecology- emergency- out patient clinic) rather than those who work away of the patient service (i.e. laundry- kitchen- lab- physician residence) which were (60% and 30%) respectively. Similar results of contact dermatitis in workers in inpatient wards and surgical fields were explained by the frequent usage of water, soap and antiseptics [18,26].

In agreement with previous work [28], this study showed that there was no association between duration of exposure per year during work and frequency of occupational dermatoses. Other authors [6,29,30] found that the prevalence of occupational dermatoses increases with longer duration of exposure and explained this finding by the fact that the longer the duration of work the higher level of exposure to offending agents. In the current study it was found that work hours per week had more impact on the incidence of occupational skin diseases.

According to the German Approved Code of Practice (ACOP); endangerment of the skin by work in the wet environment (wet work) is defined as [27]:

- Regular work with the hands (approximately 2 hours daily) in a wet working environment.
- Regular use of occlusive gloves over the same period.
- Frequent and intensive hand washing.

Although this study revealed that skin diseases were higher among hospital service workers who work at wet work for more than 2 hours daily (55.5%) than those who work less than ½

hour/day (37.5%), there was no statistically significant association. In accordance to these results, wet work was not found to be an independent risk factor for occupational dermatoses [16].

However, the opposite point of view has considered wet work as the most important risk factor for occupational dermatoses. Wet work and irritant exposure are frequent due to hand hygiene in hospital service workers which is indispensable for prevention of cross infections [9,10].

Our study showed that there was a statistically significant relation between the number of hand wash during work per day and frequency of occupational dermatoses. Of course removal of chemicals from the skin will diminish their absorption, so washing after work is effective in prevention of occupational dermatoses. Nevertheless, frequent hand washing is risky in increasing dryness and fissuring and decreasing the efficiency of skin barrier [3,32].

This study showed that there was no statistically significant difference between the users and nonusers of protective gloves in the frequency of occupational dermatoses. This is in contrast with the considered important role of protective clothing in prevention of irritants or allergens coming into direct contact with the skin [9,27].

Finally, after logistic regression analysis of factors affecting frequency of occupational dermatoses, the work hours per week were the only significant factor predicting occupational dermatoses among the hospital service workers. Different factors are identified in different studies as the most important e.g. wet work hours per day [20]. Variations of work conditions and ethnic variations may be associated with controversy of the relative effect of different factors.

The frequency of correct knowledge about skin diseases in group (A):

This study revealed that correct knowledge about relevant skin diseases was lacking before the intervention. This finding may be attributed to the low educational level of the workers and absence of health educational programs especially through mass media.

The impact of intervention:

There was a significant improvement of the correct knowledge about healthy skin among the hospital service workers after the intervention program. In addition, there was significant improvement of the attitude that appeared in the increased frequency of use of protective gloves which increased from 61.9% to 85.7%.

Different intervention studies included educational programs, supplying protective gloves and moisturizing creams and decreasing the use of disinfectants for control of occupational skin disease among wet work employees [17,33]. The programs were successful with respect to the information level (knowledge), behavior and clinical symptoms. The addition of high fat petrolatum based moisturizing agents to the protective measures was helpful to reduce work related skin problems [32].

It is valuable to insist that avoidance of unnecessary glove use or use of non powdered or non latex gloves by sensitized subjects can stop progression of contact allergic sensitization. Occlusive gloves have to be used for limited time alternating with protection creams due to their adversary effects on the skin barrier [13,34].

There is a need for increasing intervention studies as they are usually considered to be more

conclusive regarding causality than observational studies and they are important for studying the implementation of worksite changes if possible to improve working conditions [25,35].

A 3-step concept, consisting of skin protection before work, cleaning and skin care after work, is one of the generally recommended measures to prevent occupational contact dermatitis. The effectiveness of skin care program is based on 3 factors: the effectiveness of the products used, the frequency of the application and, finally, the effectiveness of the education (reduction of exposure to skin-damaging substances). For the identification of contact allergens in healthcare workers with hand dermatitis, supplementary work-specific series as well as substances used at work should be patch-tested in addition to the standard series[9].

Further research should include an internationally agreed-upon definition of wet work, better methods to assess the exposure to wet work, the effect of combined exposure to water and water-soluble irritants; the importance of wet work with frequent/short wet-dry cycles versus working longer periods with wet hands, testing skin protection and skin care products, long-term skin effects of alcohol-based disinfectants, and workplace testing of evidence-based prevention program in prospective randomized, controlled intervention studies[11].

Conclusion

An evidence based program can have an impact in preventing occupational dermatoses. Implement health education sessions should be provided through mass media and face to face approach to inform the workers about health hazards of wet work and proper use of gloves for wet rather than for dry tasks, and to supply the protective measures and skin care products through health authorities..

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