

Preliminary Evaluation of Exposed Situation of Contact Dermatitis Caused by Petrol, Kerosene and Lubricant

Nguyen Thu Ha and Nguyen Van Son

National Institute of Occupational and Environmental Health, Hanoi, Vietnam

Background. From 1900 years, petroleum always has been the principal energy source for machines. Crude oil provided approximately 45% of the energy source for people. People consume about 58-66 million crude oil casks each day in the world. Vietnam as other developing country, because of much having manual works, workers are exposed to oil and petrol. This worker's high risk factor leads to contact dermatitis.

Methods. A cross-sectional study was conducted on workers at Thai Nguyen Iron- Steel Corporation and the 1st Zone Petrol Company (238 exposed petrol, kerosene and lubricant workers and 200 non-exposed workers) to evaluate working condition and contact dermatitis. Some methods were used in this study: Measurement of a microclimate (the temperature, the humidity, and the air-velocity), hydrocarbon concentration at the workplace; clinical examination and para-clinical examination (patch test) for workers to find their skin diseases and contact dermatitis

Results. Assessment: The working environment showed that the temperature and humidity at the workplace was under threshold limit value (TLV) and the air-velocity was lower than TLV.

During the work, workers were usually exposed to petrol, kerosene and lubricant; especially contact with worker's forearm and hand.

Table 1. Petroleum gas calculated by Hydrocarbon

TT	Measured locations		Results (mg/m ³)	TLV (mg/m ³)
1	Trai Cau iron mine	Motobike shop	328	300
		Mechanical prefabrication plant	17	
		Petroleum store	412	
2	Transport enterprise	Repairing shop	310	
3	Honda enterprise	Repairing shop	293	
4	Construction company of area I	Inspected Petroleum-lorry workplace	103.8	

Hydrocarbon levels at some workplaces exceeded the TLV (300mg/m³): Petroleum store 328mg/m³, Petroleum store of the Trai Cau iron mine 412mg/m³ and Repairing shop of the Transport enterprise 310mg/m³

Clinical examination results showed that:

Table 2. The prevalence of skin diseases among exposed group and non-exposed group

Skin diseases				PrR	χ ²	P
Exposed group		Non-exposed group				
Number	%	Number	%			
114	47.9	31	15.5	3.09	51.51	<0.001

The prevalence of skin diseases among exposed group was 47.9%, 3.09 times greater than that among non-exposed group (15.5%) statistics significantly (P<0.001).

Table 3. Kinds of Contact dermatitis

Diseases	Prurigo, nettle rash		Dermatitis		Eczema		Total	
	N	%	N	%	N	%	N	%
Examined total (n=238)	40	16.8	9	3.8	8	3.4	57	24
Contact dermatitis total (n= 57)	40	70.2	9	15.8	8	14.0	57	100

Fifty seven workers suffered from contact dermatitis in the 238 examined total (exposed petrol, kerosene and lubricant workers), appropriate 24%; 40 workers suffered from a prurigo, nettle rash (16% in the examined total, 70.2% in the contact dermatitis total); 9 workers suffered from a dermatitis (3.8% in the examined total, 15.8% in the contact dermatitis total); 8 workers suffered from a Eczema (3.4% in the examined total, 14.0% in the contact dermatitis total).

Our results are suitable with some other research about injury places in the body. In our research: occurred injury in the under forearm is 45 cases (78.9%) (28 cases (49%) in the forearm; 17 cases (29.8%) in the back of hands; 8 cases (14%) in the hand palm; 11 cases (19.3%) in the leg and foot; occurred rare injuries in the thigh, face, chest (1.8-3.5%). In James R. Nethercott and Linda Holness's research: in 51 contact dermatitis patients related to exposed petroleum, injury occurred in the under forearm is 85% (47% in the forearm; 36.5% in the hand palm; 28.5% in the fingers); occurred rare injuries in the face, lower extremity, arm (under 10%).

Conclusions. Workers' skin has to be exposed to petrol, kerosene and lubricant when working; especially in the forearm and hand. The temperature, humidity at the workplace was under threshold limit value (TLV); the air-velocity was lower than TLV. Hydrocarbon levels at some workplaces exceeded the TLV. The prevalence of skin diseases among exposed group was 47.9%, 3.09 times greater than that among non-exposed group (15.5%) statistics significantly ($P < 0.001$). The prevalence of contact dermatitis among exposed group was 24%, 5.6 times greater than that among non-exposed group statistics significantly ($P < 0.001$). Diseases were mostly located at contacted skin areas, usually below the forearms (78.9%).

It is necessary to apply some methods to prevent dermatitis for workers, including technical means and protective equipment supply as well as the means of management and improvement of work environment and working condition. The author also suggested more studies on contact dermatitis so that the diseases would be added to the list of compensated occupational diseases in Vietnam.

Acknowledgements. We acknowledge support from the NIOEH

References

- [1] James R. Nethercott and Linda Holness, Contact Dermatitis Associated with exposures to oils and coolants, Occupational Skin Diseases, page 365 -372
- [2] Judd.L., A Descriptive Study of Occupational Skin Disease, N-Z.Med.J., page 142-149 (1994).
- [3] Kiec Swierczynska.M., Cause of Allergic Occupational Dermatitis Diagnosed at the Institute of Occupational Medicine in Lors during the last five years (Polish), Med-Pr., page 539-544 (1993).
- [4] Lammintausta.K; Maibach. H.I., Contact Dermatitis Due to Irritation, General Principle, Etiology and Histology, Occupational Skin Disease, page 1-10.