

**AXILLARY TEMPERATURE MEASUREMENT A POSSIBLE
DIAGNOSTIC ELEMENT OF ORGANIC DUST TOXIC SYNDROME
(ODTS) FOR WORKERS EXPOSED TO JUTE DUST**

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Abstract. The screening type study emphasizes the part played by axillary temperature measurement as a first step in ODTS diagnosis in workers exposed to organic dust (jute). An exposed group of 110 workers (98 females): age = 39 years, working duration = 12 years, exposed to jute, has been examined. Workplaces of: squashing; carding; laminating; spinning; twisting; starching; rolling were investigated. Noxious agents were: fibers and dust of jute; noise; adverse microclimate. Workers exposed to wood and chemical noxious agents (57 persons each) were also investigated. There were 5 examinations: (1) Monday 6.00 a.m.; (2) Monday 2.00 p.m.; (3) Friday 6.00 a.m.; (4) Friday 2.00 p.m.; (5) consultation. The control group consisted of 68 subjects. The percentages of the temperature measurements of 37° C and over, and respectively the averaged values were: jute = 42% (36.83° C); wood = 32.98% (36.74° C); chemicals = 25.26% (36.64° C); controls = 9.31% (36.53° C). The statistical significance was: jute vs. control group ($\chi^2 = 70.27$; $p = .0000$; OR = 7.05); jute vs. chemicals ($\chi^2 = 22.03$; $p = .0000$; Odds Ratio (OR) = 2.14; Relative Risk (RR) = 1.66). Significant statistical changes of the phenomenon are noticed lasting during the work time, both daily and weekly, at workers exposed to jute: Monday 2.00 p.m. vs. Monday 6.00 a.m.: $\chi^2 = 27.25$; $p = .0000$; OR = 4.73; RR = 2.56; Friday 2.00 p.m. vs. Monday 6.00 a.m.: $\chi^2 = 15.48$; $p = .0000$; OR = 3.28; RR = 2.16; Monday 2.00 p.m. vs. Friday 6.00 a.m.: $\chi^2 = 14.40$; $p = .0001$; OR = 2.98; RR = 1.83; Friday 2.00 p.m. vs. Friday 6.00 a.m.: $\chi^2 = 6.11$; $p = .01$; OR = 2.07; RR = 1.54. The test's sensibility (jute vs. control) = 92.4%. Important steps are to be taken for creating basic, regular attitudes of occupational hygiene in order to prevent ODTS.

Keywords: ODTS; jute; axillary temperature; occupational hygiene.

Rezumat. Studiul de tip screening își propune evidențierea rolului măsurării temperaturii axilare ca un prim pas în diagnosticul Sindromului Toxic la Pulberi Organice (STPO) la muncitori expuși la pulberi organice (iută). A fost examinat un lot de 110 muncitori (98 femei) având vârsta medie = 39 ani și vechime în muncă = 12 ani, expuși la iută. Locurile de muncă investigate: zdrobire, cardare, laminare, tors, răsucire, poliere, ghemuire. Noxe investigate: fibre și pulberi de iută, zgomot, microclimat nefavorabil. Au mai fost examinați câte 57 muncitori expuși la pulberi de lemn și respectiv la noxe chimice. Muncitorii au fost examinați în 5 momente: (1) Luni 6.00 a.m.; (2) luni 2.00 p.m.; (3) Vineri 6.00 a.m.; (4) Vineri 2.00 p.m.; (5) în timpul consultației. Lotul marțor a fost alcătuit din 68 persoane. Procentul de temperaturi $\geq 37^\circ\text{C}$ și valorile medii ale temperaturilor înregistrate au fost: iută = 42% (36,83° C); lemn = 32,98% (36,74° C); noxe chimice = 25,26% (36,64° C); marțor =

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9,31% (36,53° C). Diferențele semnificative statistic sunt: iută vs. martor ($\chi^2 = 70,27$; $p = 0,0000$; OR = 7,05); iută vs. noxe chimice ($\chi^2 = 22,03$; $p = 0,0000$; OR = 2,14; RR = 1,66). La muncitorii expuși la iută se înregistrează modificări semnificative statistic pe parcursul atât a unei zile cât și a săptămânii de lucru: Luni 2.00 p.m. vs. Luni 6.00 a.m.: $\chi^2 = 27,25$; $p = 0,0000$; OR = 4,73; RR = 2,56; Vineri 2.00 p.m. vs. Luni 6.00 a.m.: $\chi^2 = 15,48$; $p = 0,0000$; OR = 3,28; RR = 2,16; Luni 2.00 p.m. vs. Vineri 6.00 a.m.: $\chi^2 = 14,40$; $p = 0,0001$; OR = 2,98; RR = 1,83; Vineri 2.00 p.m. vs. Vineri 6.00 a.m.: $\chi^2 = 6,11$; $p = .01$; OR = 2,07; RR = 1,54. Sensibilitatea testului (iută vs. control) = 92,4%. Pentru prevenirea STPO se impun măsuri importante de igienă ocupațională.

Cuvinte cheie: STPO; iută; temperatura axilară; igienă ocupațională.

INTRODUCTION

Organic dust toxic syndrome (ODTS) is in our attention in the context of assessment of occupational exposure to jute dust. The goal of this screening study was to emphasize the part played by axillary temperature measurement as a first step in ODTS diagnosis in workers exposed to jute dust, in order to implement occupational hygienic measures as a regular attitude for preventing this syndrome.

In the occupational exposure to organic dust there are intricate phenomena that produce various reaction of the organism [12]. Byssinosis occurred only in workers exposed to cotton dust; its prevalence was related to the level and duration of dust exposure, while irritation to nose and throat, eyes and skin prevailed among jute workers [8]. Beside wood itself chemicals for wood protection or wood adhesives may have importance in the pathogenesis of the alveolitis or lung fibrosis [6].

Organic dust effects can potentially occur due to many different constituents of the dust. In the exposure to organic dust, the role of the endotoxins of the bacteria and fungus and the histamine releasing

factors were often mentioned [1,2,11]. Endotoxins, from gram-negative bacteria, have for a long time been considered as important nonimmunogenic, nonallergenic inflammatory constituents responsible for systemic and respiratory effects. Other constituents with a similar mode of action have been identified, such as beta 1-3 glucans from molds and peptidoglycans predominantly from gram-positive bacteria, although their toxicology and epidemiology are still to be established [5, 14].

A fever is technically any body temperature above the normal of 98.6 degrees F. (37°C) [16]. Normally transitory increasing of the body temperature is possible due to the circadian rhythm (approx. 36°C – early remission; higher in the evening - approx. 37° – vesperal exacerbation). Cutaneous temperature is an useful physiological indicator concerning the peripheral vasomotricity [7].

The temperature could be increased in aseptic inflammation on immunology bases [4, 9]. The averaged surface temperature is 35.2°C, being, in general lower the internal one. The averaged axillary temperature is 36.5°C [4, 9].

The type of febrile reaction is now most often known as organic dust toxic syndrome (ODTS). Other authors describe ODTS as a common occupational illness [13]). ODTS probably occurs much more frequently than is currently recognized. Because the incidence, etiologic agent(s), and pathogenesis of ODTS remain unknown, physicians are encouraged to report any influenza-like illness following intense exposure to organic dust. The goal in the diseases prevention and occupational hygiene is the control of the dust level, especially of the inhaling fractions [10, 11]. The basic techniques of dust control are the substitution with a less hazardous material, segregation and enclosure of dusty processes, the application of moisture to materials to

prevent particles becoming airborne, ventilation and filtration. Personal protective equipment should only be provided and used if dust cannot be controlled by any other means [15, 18]. Prevention measures should include the storage of vegetable material in such a manner that limits microbial grows and wearing appropriate respiratory protection when intense exposure to organic dusts cannot be avoided [17].

MATERIAL AND METHOD

There were examined by axillary temperature measurement an exposed group to jute dust, an intermediated group and a control group (Table 1). We have used usual medical maximal thermometers.

Table 1. Characteristics of studied workers groups

Work places	No workers			Age (years)		Total length of work (years)		Length of actual work place (years)	
	No	M	F	Average	Limits	Average	Limits	Average	Limits
Squashing	6	0	6	41.33	32÷51	21.33	14÷28	15.5	6÷25
Carding	18	8	10	34.21	27÷48	14.52	4÷30	9.89	1÷24
Laminating	9	0	9	44	32÷49	24.22	11÷30	12	5÷23
Spinning 1	23	0	23	37.60	29÷50	17.95	11÷31	13.08	4÷27
Spinning 2	16	0	16	38.5	33÷50	18.25	4÷27	14	4÷27
Twisting	16	0	16	39.53	30÷53	18.41	10÷27	10.94	1÷26
Starching	11	4	7	37.08	31÷44	16.75	10÷24	11.5	1÷26
Rolling	11	0	11	37.18	27÷47	18	5÷27	8.45	1÷27
TOTAL JUTE DUST	110	12	98	38.68	27÷53	18.68	4÷31	11.92	1÷27
WOOD DUST	57	24	46	40.63	19÷52	21.10	1÷35	19.83	1÷31
CHEMICALS	57	3	54	40.10	29÷50	21.44	10÷30	21.44	10÷30
CONTROL GROUP	68	34	34	39.69	22÷55	19.32	1÷37	13.82	1÷37

The jute dust exposed group from a textile factory consisting of 110

workers (98 females) is characterized by the following averaged values: age

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of 39 years (26÷53); total work duration of 18 years (4÷30); work duration at the current place of 12 years (1÷27). The investigated workplaces were: squashing; carding; laminating; spinning 1; spinning 2; twisting; starching; rolling. The workers were examined in wintertime, during 7 weeks. Average values of the exterior temperature measured at 6.00 a.m. were of 1°C (0÷2); at 2.00 p.m. = 3°C (2÷5). Average value of the

indoor temperature was of 18°C (17÷19). The principal noxious agent studied, fibres and dust of jute had values above the admissible levels (Table 2). Unfavorable microclimate is registered at starching where relative humidity is 45-87%. The levels of noise exceed the admissible thresholds, and workers performed their activity in a prolonged orthostatic position with a middle physical effort.

Table 2. Exposure levels. Exceeded Thresholds Limits Values (2 mg/m³; 4 mg/m³) dust levels in a textile factory that process jute

Work places	Exceeded TLV dust levels			
	Daytime			
	7.00-10.00 a.m		10.00 am-1.00 pm	
	2 mg/m ³	4 mg/m ³	2 mg/m ³	4 mg/m ³
Squashing	36.21	18.21	15.44	3.87
Carding	3.44	1.72	3.44	1.72
Laminating	6.10	3.05	15.2	7.6
Spinning 1	1.69	0.84	2.69	1.34
Spinning 2	4.58	2.29	7.55	3.78
Twisting	5.13	2.67	2.27	1.14
Starching	1.21	0.61	1.21	0.61
Rolling	3.15	1.58	4.2	2.1

57 workers exposed to wood dust and 57 workers exposed to chemical noxious agents were selected from a furniture factory. For the sake of the present study, these workers, exposed to different noxious agents, are defined as intermediated groups. The control group consisted of 68 subjects was selected from the furniture factory, among the office workers. Each worker of the exposed group was examined in 5 distinct moments of the workweek, namely: at the beginning (6.00 a.m.) (Moment 1) and the end (2.00 p.m.) (Moment 2) of the shift, in

the first day (Monday) of the workweek; at the beginning (6.00 a.m.) (Moment 3) and the end (2.00 p.m.) (Moment 4) of the shift, in the last day (Friday) of the workweek; the Moment 5 referred to clinical examination, which was performed in addition in another week, during clinical examination. The controls were three times examined, any day of the week at the beginning (6.00 a.m.) at the end (2.00 p.m.) of the shift and during clinical examination. The total number of 204

measurements served for all the processing data.

Other investigations were also performed: spirometry, ENT examination, pulmonary auscultation, olfactory sense measurement, clinical and laboratory tests.

In this paper the slightly increased axillary temperature, corresponding to $\geq 37.0^{\circ}\text{C}$ and the number of workers with, is considered.

The data interpretation was based upon the absolute values of the axillary temperature, their averaged values, limits and percentages. Chi test was applied and trendlines of the febrile curve were drawn. The data were statistical processed by means of EPIINFO 6.04b software. We took account of the bias. Multiple comparisons were performed between the 6 possible combinations resulting from the 1÷4 distinct moments of

examination aforementioned, as listed below: (i) Monday 2.00 pm vs. Monday 6.00 a.m.; (ii) Friday 6.00 a.m. vs. Monday 6.00; (iii) Friday 2.00 a.m. vs. Monday 6.00 p.m.; (iv) Monday 2.00 p.m. vs. Friday 6.00 a.m.; (v) Monday 2.00 a.m. vs. Friday 2.00 p.m.; (vi) Friday 2.00 p.m. vs. Friday 6.00 a.m.

Being a screening test we had to determine the sensibility of the test considered (axillary temperature measurement).

RESULTS

The absolute axillary temperature values, their minimal and maximal limits of the averaged values for each studied groups and for the examinations moments (1÷5) and their percentages are presented in Table 3÷5, and Fig. 1, respectively.

Table 3. Averaged values of axillary temperature

Work places of exposure	No workers	Axillary temperature	
		Averaged values ($^{\circ}\text{C}$)	Limits
Squashing	6	36.87	36.2÷37.8
Carding	18	36.83	36.2÷37.8
Laminating	9	36.81	36.5÷37.5
Spinning 1	23	36.79	36.5÷37.6
Spinning 2	16	36.81	36.2÷37.7
Twisting	16	36.75	36.2-37.6
Starching	11	36.91	36.2÷37.7
Rolling	11	36.87	36.2÷37.6
TOTAL JUTE DUST	110	36.83	36.2÷37.8
WOOD DUST	57	36.67	36.0÷37.8
CHEMICALS	57	36.64	36.0÷37.7
CONTROLS	68	36.53	36.0÷37.4

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Table 4. Averaged axillary temperature values (°C) and limits for all the moments (1÷5)

Place of work /Noxious agent	MONDAY				FRIDAY				Examination	
	6.00 a.m Moment 1		2.00 pm Moment 2		6.00 a.m Moment 3		2.00 pm Moment 4		Moment 5	
	Value	Limits	Value	Limits	Value	Limits	Value	Limits	Value	Limits
Squashing	36.78	36.5÷37.2	37.03	36.5÷37.8	36.7	36.2÷37.2	36.93	36.5÷37.6	36.9	36.5÷37.5
Carding	36.69	36.2÷37.2	36.87	36.5÷37.4	36.78	36.5÷37.8	36.88	36.5÷37.4	36.94	36.5÷37.5
Laminating	36.76	36.5÷37.3	36.96	36.5÷37.5	36.67	36.5÷37.3	36.72	36.5÷37.5	36.92	36.5÷37.3
Spinning 1	36.69	36.5÷37.5	36.89	36.5÷37.6	36.74	36.5÷37.6	36.82	36.5÷37.5	36.82	36.5÷37.5
Spinning 2	36.55	36.2÷37.2	37.00	36.5÷37.7	36.72	36.2÷37.5	37.00	36.5÷37.5	36.8	36.5÷37.5
Twisting	36.53	36.2÷36.7	36.88	36.5÷37.2	36.66	36.2÷37.3	36.78	36.2÷37.5	36.9	36.2÷37.6
Starching	36.65	36.2÷37.3	37.25	36.5÷37.7	36.68	36.5÷37.2	37.10	36.5÷37.7	36.9	36.5÷37.6
Rolling	36.81	36.2÷37.6	37.06	36.5÷37.5	36.72	36.2÷37.4	36.92	36.5÷37.5	36.84	36.5÷37.5
TOTAL JUTE DUST	36.68	36.2÷37.7	36.99	36.5÷37.8	36.71	36.2÷37.8	36.89	36.2÷37.7	36.88	36.2÷37.6
WOOD	36.76	36.0÷37.5	36.97	36.1÷37.8	36.57	36.0÷37.5	36.79	36.0÷37.6	36.71	36.0÷37.4
CHEMICALS	36.75	36.0÷37.7	36.72	36.0÷37.8	36.42	36.0÷37.2	36.64	36.0÷37.5	36.70	36.0÷37.3
CONTROLS Moments 1÷3	36.53	36.6÷37.27								

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Table 5. Axillary temperature values of 37°C and over by every moment

Place of work/ Noxious agent	No of Workers (measurements)	Total moments 1÷5		MONDAY				FRIDAY				Examination	
				Moment 1		Moment 2		Moment 3		Moment 1		Moment 2	
		No	%	No	%	No	%	No	%	No	%	No	%
Squashing	6 (30)	13	43.33	3	50.00	3	50.00	2	33.33	2	33.33	3	50.00
Carding	18 (90)	39	43.33	4	22.22	8	44.44	7	38.89	9	50.00	11	61.11
Laminating	9 (45)	20	44.44	4	44.44	6	66.67	2	22.22	3	33.33	5	55.56
Spinning 1	23 (115)	43	37.39	5	21.74	10	43.48	8	34.78	11	47.83	9	39.13
Spinning 2	16 (80)	33	41.25	2	12.50	10	62.50	6	37.50	8	50.00	7	43.75
Twisting	16 (80)	29	36.25	0	0.00	9	56.25	5	31.25	6	37.50	9	56.25
Starching	11 (55)	28	50.91	3	27.27	10	90.91	2	18.18	8	72.73	5	45.45
Rolling	11 (55)	26	47.27	4	36.36	8	72.73	3	27.27	7	63.64	4	36.36
TOTAL JUTE DUST	110 (550)	231	42.00	25	22.73	64	58.18	35	31.82	54	49.09	53	48.18
WOOD	57 (285)	94	32.98	19	33.33	33	57.89	8	14.04	19	33.33	15	26.32
CHEMICALS	57 (285)	72	25.26	23	40.35	22	38.60	3	5.26	11	19.30	13	22.81
CONTROLS Moments 1÷3	68 (204)	19	9.31										

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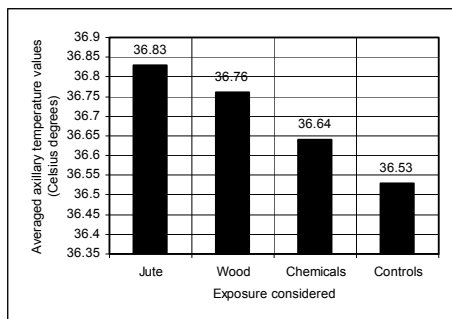


Fig. 1 Averaged axillary temperature values

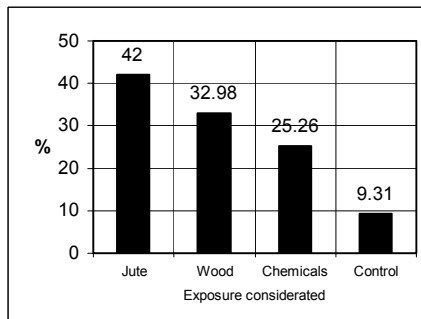


Fig. 2 Percentage evaluation with regard to the total number of measurements of axillary temperature $\geq 37.0^{\circ}\text{C}$

A. The axillary temperature averaged values are:

- The axillary temperature average values for workers exposed to jute dust according to the workplaces are: squashing = 36.87°C ; carding = 36.83°C ; laminating = 36.80°C ; spinning 1 = 36.79°C ; spinning 2 = 36.81°C ; twisting = 36.75°C ; starching = 36.91°C ; rolling = 36.87°C .

- The axillary's temperature average values and limits for workers exposed to other toxicants are: jute dust = 36.83°C ($36.2\div 37.8$); wood dust = 36.76°C ($36.0\div 37.8$); chemicals = 36.64°C ($36.0\div 37.8$); controls = 36.53°C ($36.0\div 37.4$).

B. Percentage evaluation with regard to the number of measurements $\geq 37.00^{\circ}\text{C}$ are:

- Percentage evaluation with regard to the jute workplaces: squashing = 13 (43.33%); carding = 39 (43.33%); laminating = 20 (50%); spinning 1 =

43 (37.39%); spinning 2=33 (41.25%); twisting = 29 (36.25 %); polishing (starching)= 28 (50.9%); rolling = 26 (47.27%).

- Percentage evaluation with regard to the total number of measurements at workers exposed to jute = 42%; at workers exposed to wood: 32.98%; at workers exposed to chemicals = 25.26% at controls = 9.31 (Fig. 2).

C. Trend line for the number of measurements = 37.00°C registered in the 1÷4 examination moments (a polynomial trend line) and febrile line was drawn for each workplaces: Fig. 3 – squashing; Fig. 4 – carding; Fig. 5 – laminating; Fig. 6 – spinning 1; Fig. 7 – spinning 2; Fig. 8 – twisting; Fig. 9 – starching; Fig. 10 – rolling; Fig. 11 – total exposed to jute dust; Fig. 12 – wood dust; Fig. 13 – chemicals.

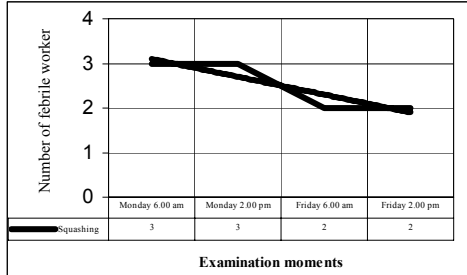


Fig. 3. Febrile curve and polynomial trendline. Number of workers at jute dust (squashing) with axillary temperature $\geq 37.0^{\circ}\text{C}$ for moments 1-4

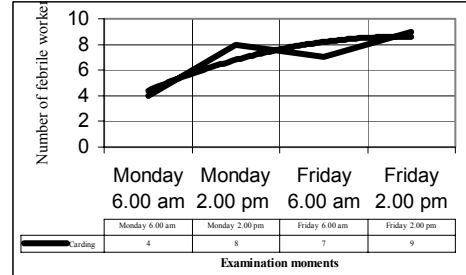


Fig. 4. Febrile curve and polynomial trendline. Number of workers at jute dust (carding) with axillary temperature $\geq 37.0^{\circ}\text{C}$ for moments 1-4

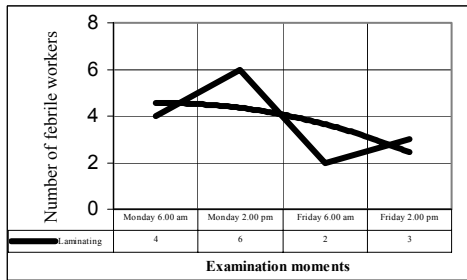


Fig. 5. Febrile curve and polynomial trendline. Number of workers at jute dust (laminating) with axillary temperature $\geq 37.0^{\circ}\text{C}$ for moments 1-4

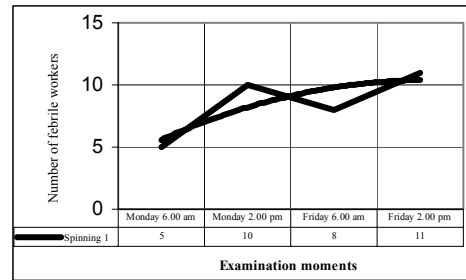


Fig. 6. Febrile curve and polynomial trendline. Number of workers at jute dust (spinning 1) with axillary temperature $\geq 37.0^{\circ}\text{C}$ for moments 1-4

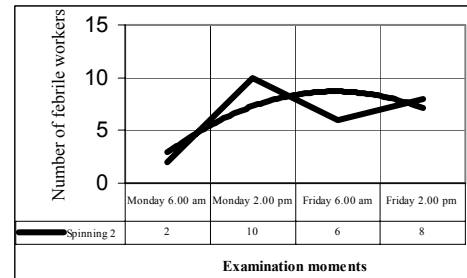


Fig. 7. Febrile curve and polynomial trendline. Number of workers at jute dust (spinning 2) with axillary temperature $\geq 37.0^{\circ}\text{C}$ for moments 1-4

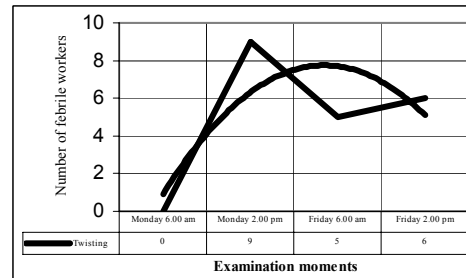


Fig. 8. Febrile curve and polynomial trendline. Number of workers at jute dust (twisting) with axillary temperature $\geq 37.0^{\circ}\text{C}$ for moments 1-4

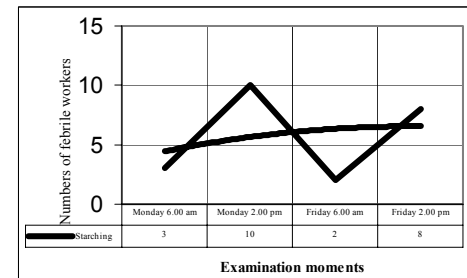


Fig. 9. Febrile curve and polynomial trendline. Number of workers at jute dust (starthing) with axillary temperature $\geq 37.0^{\circ}\text{C}$ for moments 1-4 is

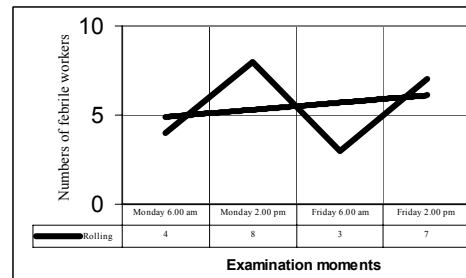


Fig. 10. Febrile curve and polynomial trendline. Number of workers at jute dust (rolling) with axillary temperature $\geq 37.0^{\circ}\text{C}$ for moments 1-4

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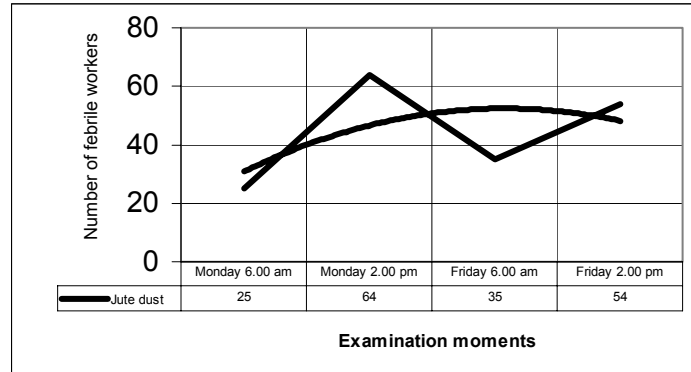


Fig. 11. Febrile curve and polynomial trendline. Number of workers at jute dust with axillary temperature $\geq 37.0^{\circ}\text{C}$ for moments 1÷4

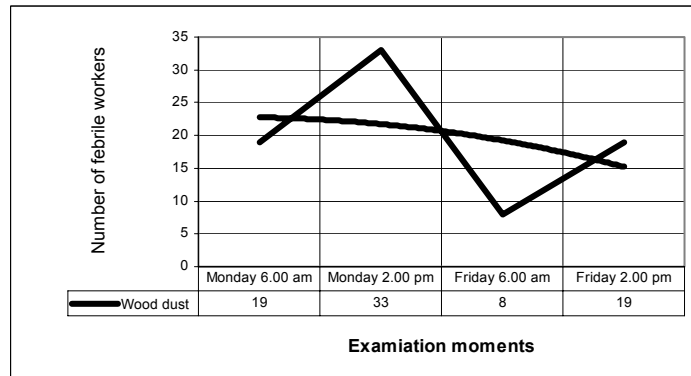


Fig. 12. Febrile curve and polynomial trendline. Number of workers at wood dust with axillary temperature $\geq 37.0^{\circ}\text{C}$ for moments 1÷4

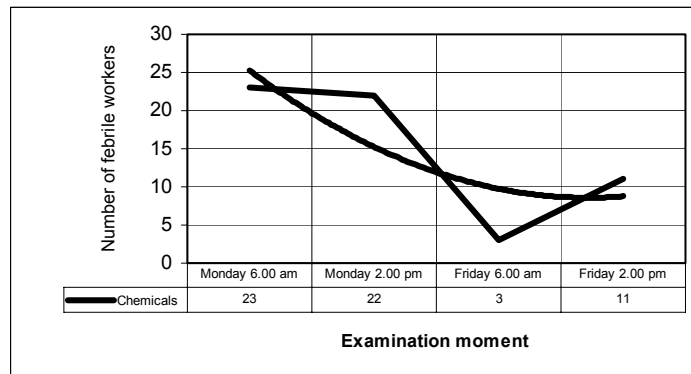


Fig. 13. Febrile curve and polynomial trendline. Number of workers at chemicals with axillary temperature $\geq 37.0^{\circ}\text{C}$ for moments 1÷4

D. OR and RR with 95% confidence intervals were calculated. Analysis by age, sex, and length of work, eliminated the bias. Chi test was performed for: jute dust exposed group, wood exposed group, chemical noxious agents exposed group (Table 6); different work places of jute dust exposure vs. controls (Table 7); jute dust exposed group vs. chemicals exposed group: $\chi^2 = 22.03$; $p = .0000$; OR = 2.14 (95% CI = 1.54-2.98); RR = 1.66 (95% CI = 1.33-2.08); jute dust exposed group vs. wood exposed: $\chi^2 = 6.05$; $p = .0139$; OR=1.47 (95% CI = 1.08-2.01); RR = 1.27 (95% CI= 1.05-1.54); wood exposed group vs. chemical noxious agents exposed group: $\chi^2 = 3.75$; $p = .0528$; OR = 1.46 (95% CI = 1.00-2.13); RR = 1.31 (95% CI=1.01-1.69). Table 8 shows comparisons between all the exposed groups considered and controls for the moment 5 and the averaged values, respectively. Chi test was applied for the 6 possible combinations between the 1÷4 examination moments for: all workers exposed to jute dust (Table 9); workers exposed to wood dust (Table 10); workers exposed to chemicals (Table 11).

Significant statistical modifications of the phenomenon are noticed, lasting during the work time, both daily and weekly, at workers exposed to jute: Monday 2.00 p.m. vs. Monday 6.00 a.m.: $\chi^2 = 27.25$; $p = .0000$; OR = 4.73; RR = 2.56; Friday 2.00 p.m. vs. Monday 6.00 a.m.: $\chi^2 = 15.48$; $p = .0000$; OR = 3.28; RR = 2.16; Monday 2.00 p.m. vs. Friday 6.00 a.m.: $\chi^2 =$

14.40; $p = .0001$; OR = 2.98; RR = 1.83; Friday 2.00 p.m. vs. Friday 6.00 a.m.: $\chi^2 = 6.11$; $p = .01$; OR = 2.07; RR = 1.54. The test' sensibility [3] = 92.4%.

Important steps have to be taken for creating basic, regular attitudes of occupational hygienists in order to prevent ODTs. Although the phenomenon is more evident in people employed for longer periods, all workers could be affected. There are no correlations between the work duration and the studied phenomenon.

DISCUSSION

The meaningful statistical differences for the comparisons built by the help of combinations between the moments of examination, suggest modifications of the phenomenon noticed lasting during the work time, both daily and weekly for exposed group to jute dust as follows: Monday 2.00 p.m. vs. Monday 6.00 a.m.: confirms the existence of the "Monday syndrome", well known from literature devoted to organic dust; Friday 2.00 p.m. vs. Monday 6.00 a.m.: draws attention to the presence of a phenomenon causing the slightly increased temperature during the entire workweek; Monday 2.00 p.m. vs. Friday 6.00 a.m.: suggests the partial reversibility of the discussed phenomenon due to the daily leaving of the working place; Friday 2.00 p.m. vs. Friday 6.00 a.m.: suggests the persistence of the phenomenon during the entire workweek, with a potential risk to become a chronic one.

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Table 6. OR of exposed groups vs. controls

Noxious agent	N° cases with $\geq 37.0^{\circ}\text{C}$	Monday 6.00am Moment 1			Monday 2.00pm Moment 2			Friday 6.00 am Moment 3			Friday 2.00 pm Moment 4		
		χ^2	p	OR 95% CI	χ^2	p	OR 95% CI	χ^2	p	OR 95% CI	χ^2	p	OR 95% CI
JUTE = 110 workers													
Monday	6am	25	9.59	.002	2.86 (1.43-5.76)								
	2pm	64				13.75	.000	85.27 (7.11-26.05)					
Friday	6am	35						23.86	.0000	4.54 (2.35-8.86)			
	2pm	54									61.16	.0000	9.39 (4.95-17.97)
WOOD = 57 workers													
Monday	6am	19	18.78	.000	4.87 (2.22-10.70)								
	2pm	33				62.90	.000	13.39 (6.25-8.29)					
Friday	6am	8						0.62	.4302	1.59 (0.6-4.13)			
	2pm	19									18.78	.0000	4.87 (2.22-10.70)
CHEMICALS = 57 workers													
Monday	6am	23	29.53	.000	6.59 (3.06-14.24)								
	2pm	22				26.68	.000	6.12 (2.8-13.28)					
Friday	6am	3						0.49	.4266	0.54 (0.12-2.03)			
	2pm	11									3.44	.0636	2.33 (0.96-5.60)

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Table 7. OR by different work places of Jute dust factory

		N° cases $\geq 37^{\circ}\text{C}$	Monday 6.00am Moment 1			Monday 2.00pm Moment 2			Friday 6.00 am Moment 3			Friday 2.00 pm Moment 4		
			χ^2	p	OR (95%CI)	χ^2	p	OR (95%CI)	χ^2	p	OR (95%CI)	χ^2	p	OR (95%CI)
Squashing = 6														
Monday	6am	3	5.37	.07	4.87 (0.88 - 24.65)									
	2pm	3				6.41	.0114	9.74 (1.44 - 66.52)						
Friday	6am	2							1.54	.1111	4.7 (0.57 - 34.22)			
	2pm	2										1.54	.1111	4.7 (0.57 - 34.22)
Carding =18														
Monday	6am	4	1.74	.09	2.78 (0.69 - 10.37)									
	2pm	8				15.96	.0000	7.79 (2.44 - 24.82)						
Friday	6am	7							11.28	.0017	6.20 (1.9 - 20.04)			
	2pm	9										21.29	.0000	9.74 (3.08 - 31.05)
Laminating =9														
Monday	6am	4	7.70	.0091	7.79 (1.58 - 37.69)									
	2pm	6				22.11	.0000	19.47 (3.88 - 108.73)						
Friday	6am	2							0.49	.2185	2.78 (0.37 - 16.35)			
	2pm	3										3.09	.0535	4.87 (0.88 - 24.65)
Spinning 1 =23														
Monday	6am	5	2.19	.0770	2.70 (0.78 - 8.94)									
	2pm	10				18.69	.0000	7.49 (2.62 - 21.45)						
Friday	6am	8							10.48	.0020	5.19 (1.75 - 15)			
	2pm	11										20.59	.0000	7.56 (2.78 - 21.17)
Spinning 2 = 16														
Monday	6am	2	0.0	.65	1.39 (0.0 - 7.20)									
	2pm	10				32.17	.0000	16.23 (4.74 - 57.58)						
Friday	6am	6							9.07	.0025	5.84 (1.66 - 20.17)			
	2pm	8										19.19	.0001	9.74 (2.91 - 32.95)
Twisting =16														
Monday	6am	0	0.00	0.3716	0.00									
	2pm	9				2.35	.0000	12.52 (3.73 - 72.98)						
Friday	6am	5							5.26	.0193	4.43 (1.19 - 15.87)			
	2pm	6										9.07	.0043	5.84 (1.66 - 20.17)
Starching =11														
Monday	6am	3	1.97	.009	3.65 (0.7 - 17.11)									
	2pm	10				52.6	.0000	97.37 (11.64 - 145.64)						
Friday	6am	2							0.20	.2924	2.16 (0.0 - 12.04)			
	2pm	8										32.66	.0000	25.96 (5.58 - 136.81)
Rolling = 11														
Monday	6am	4	5.41	.0199	5.56 (1.23 - 24.05)									
	2pm	8				32.66	.0000	25.6 (5.58 - 136.81)						
Friday	6am	3							1.97	.0894	3.65 (0.7 - 17.11)			
	2pm	7										24.09	.0000	17.04 (3.98 - 77.72)

Table 8. OR and 95% confidence intervals for the 5th moment and the averaged temperature values

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	Clinical examination time Moment 5				AVERAGED VALUES			
	No cases with $\geq 37.4^{\circ}\text{C}$				No cases with $\geq 37.4^{\circ}\text{C}$			
		χ^2	p	OR (95%CI)		χ^2	p	OR (95%CI)
Squashing = 6 workers								
Moment 5	3	6.41	.0163	9.74 (4.74 - 66.52)				
Averaged values					2	1.84	.0963	6.30 (0.61 - 60.21)
Carding = 18 workers								
Moment 5	11	33.67	.0000	15.30 (4.77 - 50.54)				
Averaged values					4	1.96	.08767	3.60 (0.69 - 18.47)
Laminating = 9 workers								
Moment 5	5	14.10	.0011	12.17 (2.54 - 6.03)				
Averaged values					2	0.71	.1872	3.60 (0.39 - 28.43)
Spinning 1 = 23 workers								
Moment 5	9	14.35	.0004	6.22 (2.16 - 18.10)				
Averaged values					5	2.31	.1147	3.50 (0.76 - 16.17)
Spinning 2 = 16 workers								
Moment 5	7	13.74	.0007	7.57 (2.23 - 25.6)				
Averaged values					3	0.85	.1723	2.91 (0.47 - 16.79)
Twisting = 16 workers								
Moment 5	9	25.35	.0000	12.52 (3.73 - 42.58)				
Averaged values					3	0.85	.1723	2.91 (0.47 - 16.79)
Starching = 11 workers								
Moment 5	5	10.34	.0033	8.11 (1.92 - 32.12)				
Averaged values					4	5.28	.0186	7.20 (1.24 - 43.06)
Rolling = 11 workers								
Moment 5	4	5.41	.0199	5.56 (1.23 - 24.05)				
Averaged values					3	2.23	.0771	4.72 (0.72 - 30.17)
TOTAL JUTE=110 workers								
Moment 5	53	58.91	.000	9.05 (4.77 - 17.33)				
Averaged values					26	6.66	.0099	3.90 (1.32 - 12.31)
WOOD=57 workers								
Moment 5	15	9.92	.0016	3.48 (1.53 - 7.99)				
Averaged values					12	3.86	.0495	3.36 (1.00 - 11.87)
CHEMICALS=57 workers								
Moment 5	13	6.34	.0118	2.88 (1.23 - 6.69)				
Averaged values					7	0.39	.5308	1.76 (0.46 - 0.89)

Table 9. OR values and 95% confidence intervals for the 6 combinations between 1÷4 moments for workers exposed to jute dust

Jute dust exposed workers (110)	No cases with $\geq 37^{\circ}\text{C}$	Chi test. The 6 combinations between 1÷4 moment for workers at jute dust			
		χ^2	p	OR (95%CI)	RR (95%CI)
Monday 2.00 pm	64	27.25	.0000	4.73 (2.53 - 8.88)	2.56 (1.75 - 3.74)
Monday 6.00 am	25				
Friday 6.00 am	35	1.86	.1731	1.59 (0.84 - 3.02)	1.40 (0.9 - 2.17)
Monday 6.00 am	25				
Friday 2.00 pm	54	15.48	.0000	3.28 (1.76 - 6.13)	2.16 (1.40 - 3.20)
Monday 6.00 am	25				
Monday 2.00 pm	64	14.40	.0001	2.98 (1.66 - 5.38)	1.83 (1.33 - 2.51)
Friday 6.00 am	35				
Monday 2.00 pm	64	1.48	.2236	1.44 (0.82 - 2.52)	1.19 (0.93 - 1.52)
Friday 2.00 pm	54				
Friday 2.00 pm	54	6.11	.0134	2.07 (1.15 - 3.71)	1.54 (1.11 - 2.15)
Friday 6.00 am	35				

Table 10. OR values and 95% confidence intervals for the 6 combinations between 1÷4 moments for workers exposed to wood

Wood dust exposed workers (57)	No cases with $\geq 37^{\circ}\text{C}$	Chi test. The 6 combinations between 1÷4 moment for workers at wood dust			
		χ^2	p	OR (95%CI)	RR (95%CI)
Monday 2.00 pm	33	5.98	.0145	2.755 (1.20 - 6.35)	1.74 (1.13 - 2.67)
Monday 6.00 am	19				
Friday 6.00 am	8	4.85	.0276	0.33 (0.12 - 0.90)	0.42 (0.20 - 0.88)
Monday 6.00 am	19				
Friday 2.00 pm	19	0.04	.8425	1.00 (0.43 - 2.34)	1.00 (0.99 - 1.68)
Monday 6.00 am	19				
Monday 2.00 pm	33	21.94	.0000	8.42 (3.12 - 23.46)	4.13 (2.09 - 8.14)
Friday 6.00 am	8				
Monday 2.00 pm	33	5.98	.0145	2.75 (1.20 - 6.35)	1.74 (1.13 - 2.67)
Friday 2.00 pm	19				
Friday 2.00 pm	19	4.85	.0276	3.06 (1.11 - 8.62)	2.38 (1.13 - 4.58)
Friday 6.00 am	8				

Table 11. OR values and 95% confidence intervals for the 6 combinations between 1÷4 moments for workers exposed to chemicals

Chemicals exposed workers (57)	No cases with $\geq 37^{\circ}\text{C}$	Chi test. The 6 combinations between 1÷4 moment for workers at chemicals			
		χ^2	p	OR (95%CI)	RR (95%CI)
Monday 2.00 pm	22	0.00	1.00	0.93 (0.41 - 2.11)	0.96 (0.61 - 1.51)
Monday 6.00 am	23				
Friday 6.00 am	3	17.99	.0000	0.008 (0.02 - 0.32)	0.13 (0.04 - 0.41)
Monday 6.00 am	23				
Friday 2.00 pm	11	5.07	.0243	0.35 (0.14 - 0.89)	0.48 (0.26 - 0.89)
Monday 6.00 am	23				
Monday 2.00 pm	22	16.60	.0000	11.31 (2.90 - 51.59)	7.3 (2.32 - 23.14)
Friday 6.00 am	3				
Monday 2.00 pm	22	4.26	.0389	2.63 (1.04 - 6.70)	2.00 (1.07 - 3.73)
Friday 2.00 pm	11				
Friday 2.00 pm	11	3.99	.0458	4.30 (1.02 - 20.83)	3.67 (1.08 - 12.45)
Friday 6.00 am	3				

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The meaningful statistical differences mentioned for the wood dust exposed workers confirm the involvement of the organic dust in creating the risk to increase the body temperature, as an element of ODTS.

The aspects of the fever lines and trend lines for the workers exposed to jute dust varies a lot according to the place of work, each place having its own polynomial trendlines. These facts underline the role of the exposure levels of dust (squashing) and of the presence of another noxious agent (unfavorable microclimate – at starching).

The important sensibility of the test studied underlines the role of the measurement of axillary temperature in occupational exposure to various noxious agents in order to establish more characteristics.

The values of the axillary temperature registered to controls are similar to the values mentioned in literature for the general population (36.5°C) [4].

CONCLUSIONS

- In occupational exposure to organic dust (jute), the slight increase of the axillary temperature, during the work time (daily and weekly), could be a first step in ODTS diagnosis.
- A well establish schedule of temperature measurements could be of use for an earlier diagnosis of ODTS.
- The analysis based on types of different exposure underlined the intensifying effect due to the cumulated adversity.
- Important steps have to be taken for creating basic, regular attitudes of

occupational hygienists in order to prevent ODTS.

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