RESULTS

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Table (1): Distribution of the studied groups according to sex.

Group / Sex	Exposed		Non Exposed		Total	
	No.	%	No.	%	No.	%
Males	69	69.0	31	62.0	100	100
Females	31	31.0	19	38.0	50	100
Total	100	100.0	50	100.0	150	100.0

$X^2 = 0.74$ $P > 0.05$

This table shows that there is no statistically significant difference between both studied groups as regards sex.

Fig. (1): **Distribution of the studied groups according to sex.**

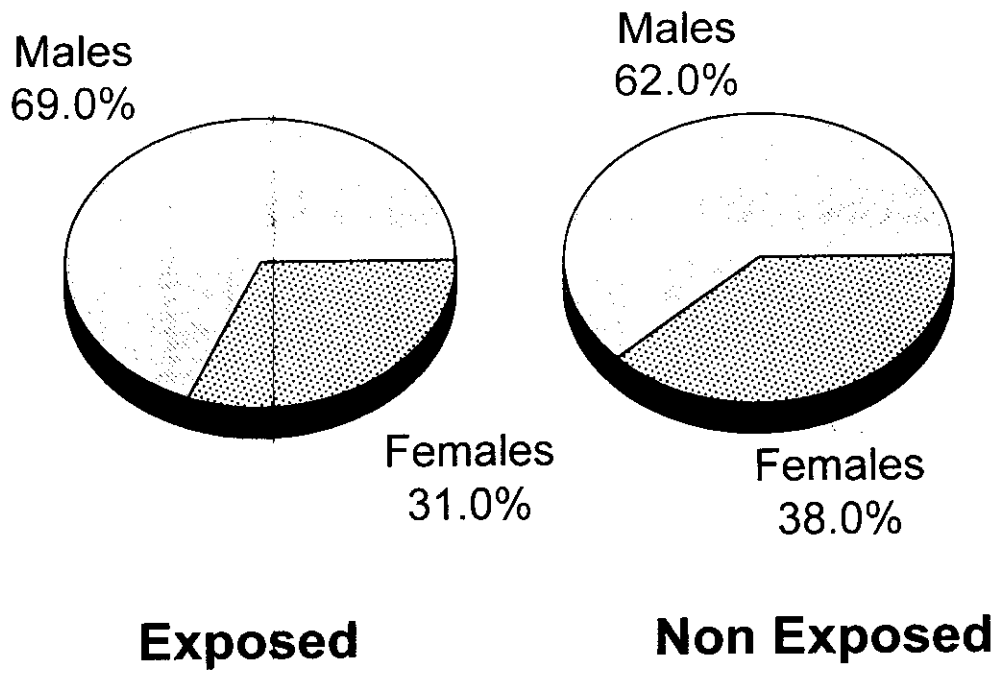

Table (2a): Age distribution among the studied groups.

Group / Age	Exposed		Non Exposed		Total	
	No.	%	No.	%	No.	%
10-	7	7.0	5	10.0	12	100
20-	37	37.0	16	32.0	53	100
30-	15	15.0	5	10.0	20	100
40-	23	23.0	10	20.0	33	100
50+	18	18.0	14	28.0	32	100
Total	100	100.0	50	100.0	150	100.0

$X^2 = 0.57$ $P > 0.05$

Table (2b): Mean age among the studied groups.

	Exposed		Non Exposed		t value	P-value
	$\bar{X}$	SD(±)	$\bar{X}$	SD (±)		
Age	34.9	13.02	36.5	14.5	0.69	> 0.05

Table (2a) illustrates that there is no statistically significant difference between exposed and non exposed groups as regards age. Also there is no statistically significant difference in table (2b) regarding mean age.

Table (3): Smoking habit among the studied groups.

Group	Exposed		Non Exposed		X^2	P-value
	No.	%	No.	%		
Smoker	69	69.0	31	62.0	0.74	>0.05
Non smoker	31	31.0	19	38.0		
Total	100	100.0	50	100.0		
No/day						
< 20/d	34	49.3	17	55.2	0.6	>0.05
> 20/d	35	50.7	14	45.8		
Total	69	100.0	31	100.0		
Duration						
<20/y	34	49.3	17	55.2	0.6	>0.05
>20/y	35	50.7	14	45.8		
Total	69	100.0	31	100.0		

This table clearly illustrates that the two groups studied are matched with no statistically significant difference regarding smoking habit, number of cigarettes/day and duration of smoking.

Table (4): Chest manifestations among the studied groups.

Group / Symptoms	Exposed		Non Exposed		z-test	P-value
	No.	%	No.	%		
Cough	78	78.0	7	14.0	6.10	<0.01
Expectoration	71	71.0	6	12.0	4.02	<0.01
Tightness	71	71.0	0	0.0	--	--
Chest pain	8	8.0	1	2.0	1.29	>0.05
Wheeze	42	42.0	0	0.0	--	--
**Hypersensitivity manifestation	18	18.0	0	0.0	--	--

** **Hypersensitivity manifestations:** Urticaria, nasal and eye symptoms *(Stites et al., 1997).*

This table shows that the chest symptoms (cough and expectoration) are statistically significantly higher among the exposed than non exposed workers.

Table (5): Incidence of chest manifestations among the exposed groups in relation to duration of exposure.

Duration / Symptoms	< 10 y		≥ 10 y		X^2	P-value
	No.	%	No.	%		
Cough						
+ve	35	44.9	43	55.1	2.17	> 0.05
-ve	12	54.5	10	45.5		
Expectoration						
+ve	31	43.7	40	56.3	1.1	> 0.05
-ve	16	55.2	13	44.8		
Chest tightness						
+ve	31	43.7	40	56.3	1.1	> 0.05
-ve	16	55.2	13	44.8		
Chest pain						
+ve	4	50.0	4	50.0	0.03	> 0.05
-ve	43	46.7	49	53.3		
Wheeze						
+ve	10	23.8	32	76.2	15.6	< 0.05
-ve	37	63.8	21	36.2		
Hypersentstivity						
+ve	9	50.0	9	50.0	0.08	> 0.05
-ve	38	46.3	44	53.7		

This table shows that the workers who are exposed for 10 years or more have higher prevalence of chest wheeze.

Table (6): Number and percent of exposed and non exposed groups according to the presence of chest signs.

Group / Signs	Exposed		Non Exposed		Z-test	P-value
	No.	%	No.	%		
Crepitations	24	24.0	11	22.0	0.13	>0.05
Rhonchi	35	35.0	9	18.0	1.13	>0.05
Wheeze	44	44.0	7	14.0	1.99	<0.05

This table illustrates that, there is statistical difference between exposed and non exposed group, according to chest wheeze.

Table (7): Distribution of chest signs among exposed group in relation to duration of exposure.

Duration / Signs	< 10 y		> 10 y		X^2	P-value
	No.	%	No.	%		
Crepitation						
+ve	10	41.7	14	58.3	0.36	> 0.05
-ve	37	48.7	39	51.3		
Rhonchi						
+ve	12	34.3	23	65.7	3.49	> 0.05
-ve	35	53.8	30	46.2		
Wheeze						
+ve	12	27.3	32	72.7	12.3	< 0.05
-ve	35	62.5	21	37.5		

This table shows that the workers who are exposed 10 years or more have statistically higher prevalence of chest wheeze than those who are exposed less than 10 years. As regards crepitation and rhonchi there is no statistically significant difference between both groups.

Table (8): Mean and standard deviation of the pulmonary ventilatory functions among the studied groups.

Group / Pul. function	Exposed		Non Exposed		t-value	P-value
	$\bar{X}$	SD	$\bar{X}$	SD		
VC (L)	2.7	1.04	3.6	0.65	5.01	<0.01
FEV_1 (L)	1.94	1.02	2.9	0.53	6.7	<0.01
FVC (L)	2.26	1.14	3.5	0.64	7.65	<0.01
FEV_1/FVC (%)	86.94	16.9	84.8	3.3	0.87	>0.05
$FEF_{0.2-1.2}$ (L/S)	2.89	2.2	3.4	0.65	1.62	>0.05
FEF_{25-75} (L/S)	2.9	1.41	3.3	0.54	2.18	<0.05
MVV (L/M)	74.74	37.42	116.5	15.7	7.56	<0.01

This table clearly illustrates that VC, FEV_1, FVC, FEF_{25-75} and MVV are statistically significantly lower among exposed than among non exposed workers. Both groups don't statistically differ as regards FEV_1/FVC and $FEF_{0.2-1.2}$.

Fig. (2): **Distribution of cases according to pulmonary ventilatory functions pattern.**

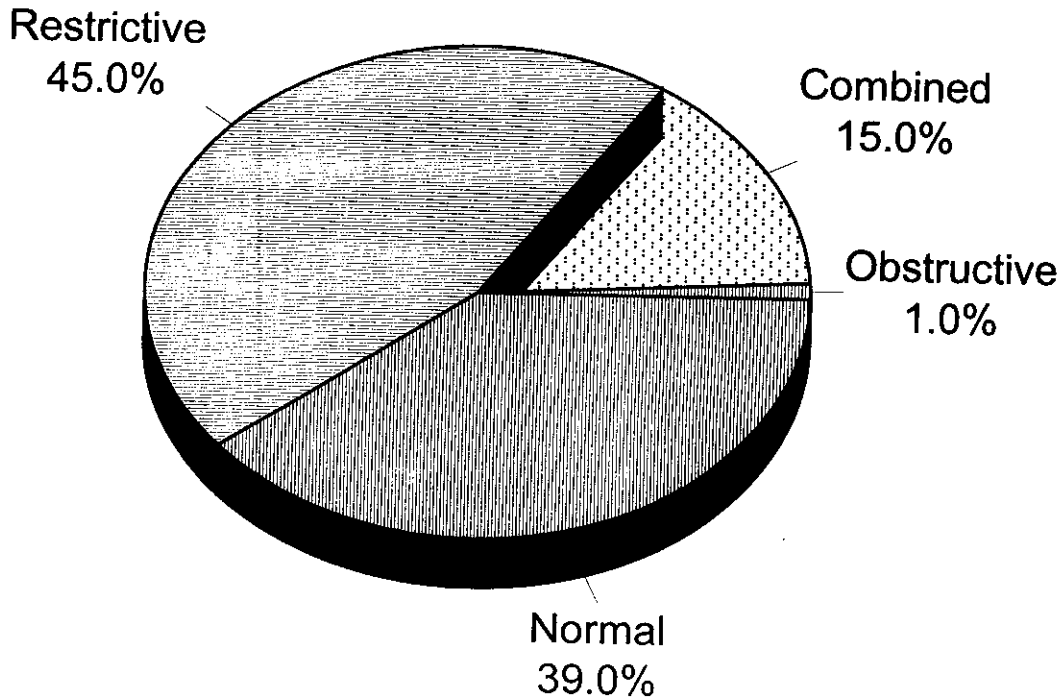

Table (9): Pulmonary ventilatory functions in relation to duration of exposure among the exposed group.

Group / P. function	< 10 y		≥ 10 y		t-test	P-value
	$\bar{X}$	SD	$\bar{X}$	SD		
VC (L)	3.38	0.94	2.11	0.75	8.7	<0.01*
FEV_1 (L)	2.76	0.78	1.22	0.59	11.87	<0.01*
FVC (L)	3.22	0.98	1.55	0.66	10.5	<0.01*
FEV_1/FVC (%)	87.7	6.9	82.9	22.8	1.9	>0.05
$FEF_{0.2-1.2}$ (L/S)	3.6	1.53	1.83	1.97	5.9	<0.01*
$FEF_{0.25-0.75}$ (L/S)	3.34	0.78	2.41	1.7	4.62	<0.01*
MVV (L/M)	102.7	30.53	56.9	32.02	8.34	<0.01*

This table illustrates that VC, FEV_1, FVC, $FEF_{0.2-1.2}$, $FEF_{0.25-0.75}$ and MVV are statistically significant lower among workers who are exposed for 10 years or more. As regards FEV_1/FVC there is no statistically significant difference.

Fig. (3): **Pulmonary ventilatory functions in relation to duration among exposed group.**

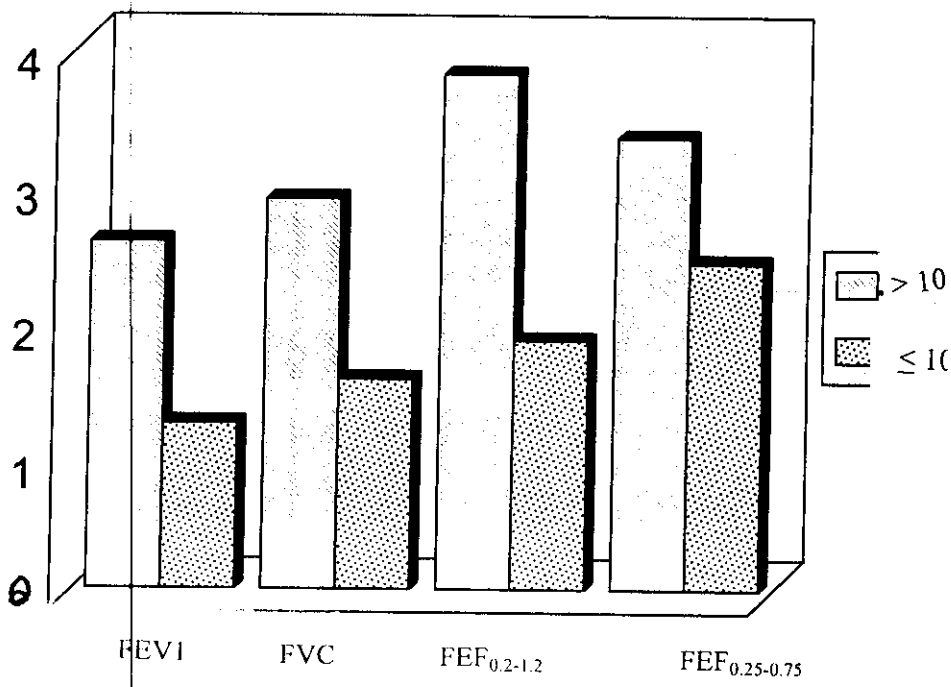

Table (10): Relationship between pulmonary ventilatory functions pattern and immunoglobulins among the exposed group.

Group / Immunoglobulins	Normal (n = 39)		Restrictive (n = 45)		Obstructive (n = 1)		Combined (n = 15)		X^2	P
	No.	%	No.	%	No.	%	No.	%		
IgG										
Normal	1	33.3	1	33.3	0	0.0	1	33.33	0.84	> 0.05
Elevated	38	39.18	44	45.36	1	1.03	14	14.43		
IgM										
Normal	33	43.4	1	33.3	0	1.31	3	15.8	66.05	< 0.01
Elevated	6	25.0	44	45.36	1	0.0	12	12.5		
IgA										
Normal	17	85.0	3	15.0	0	0.0	0	0.0	22.56	< 0.01
Elevated	22	27.5	42	52.5	1	1.25	15	18.75		

This table shows workers with abnormal pattern (restrictive, obstructive or combined) had an elevated levels of IgM and IgA the difference was statistically significant. .

Table (11): Relationship between pulmonary ventilatory function and skin test results among the exposed group.

Skin test / P. function	-ve skin test		+ve skin test		t-value	P-value
	$\bar{X}$	SD	$\bar{X}$	SD		
VC (L)	3.41	0.91	2.5	1.01	3.4	<0.01*
FEV_1 (L)	2.85	0.82	1.7	0.94	4.9	<0.01*
FVC (L)	3.23	1.02	2.02	1.04	4.6	<0.01*
FEV_1/FVC (%)	90.1	6.91	86.1	18.5	0.94	>0.05
$FEF_{0.2-1.2}$ (L/S)	4.2	2.31	2.5	2.07	3.2	<0.01*
$FEF_{0.25-0.75}$ (L/S)	3.4	0.87	2.7	1.49	2.12	<0.05*
MVV (L/M)	95.3	36.9	69.5	35.9	2.8	<0.01*

This table shows workers with +ve skin test results had lower values of FEV_1, FVC, $FEF_{0.2-1.2}$, $FEF_{0.25-0.75}$ and MVV the difference was statistically significant.

Fig. (4): **Skin test results in relation to pulmonary ventilatory functions pattern.**

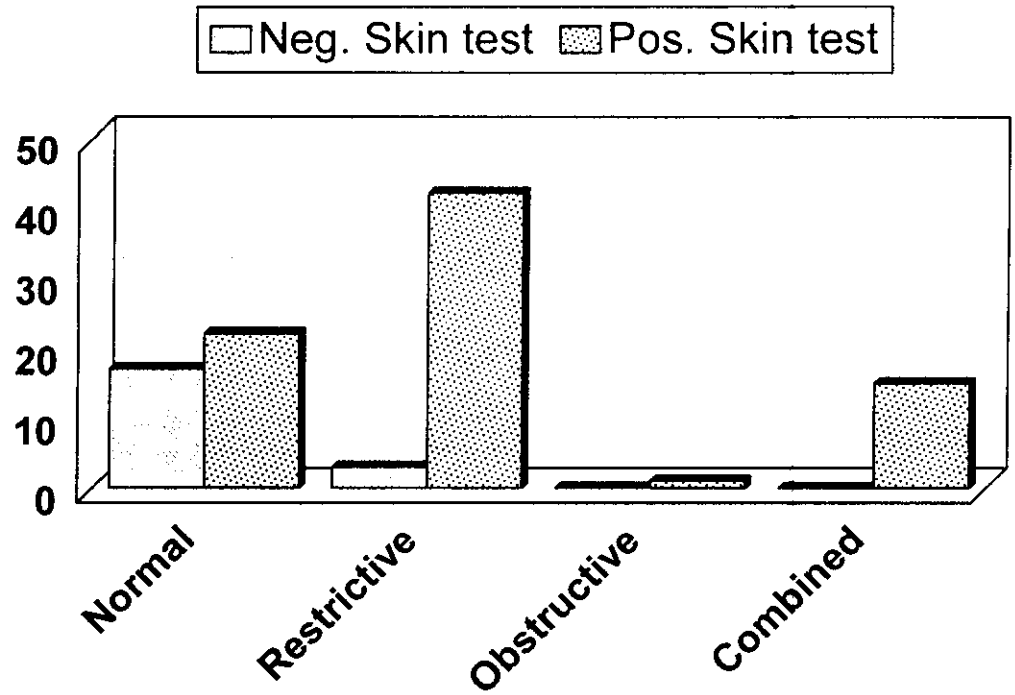

Table (12): Relationship between pulmonary ventilatory functions and type of occupation.

Group	Normal		Restrictive		Obstructive		Combined		Total
	No.	%	No.	%	No.	%	No.	%	
Breaders	4	10.3	19	42.2	1	100	7	46.67	31
Cleaners	5	12.8	17	37.8	0	0.0	7	46.67	29
Gaurds	13	33.3	8	17.8	0	0.0	1	6.66	22
Salesmen	17	43.6	1	2.22	0	0.0	0	0.0	18
Total	39	100.0	45	100	1	100.0	15	100.0	100

$X^2 = 44.34$ $P < 0.001$

This table shows higher prevalence of abnormal pattern (restriction, obstructive or combined) among breaders and cleaners the difference was statistically significant.

Table (13): Mean and standard deviation of the values of IgG, IgM & IgA among the studied groups.

Group / Immunoglobulins	Exposed		Non Exposed		t-value	P-value
	$\bar{X}$	SD(±)	$\bar{X}$	SD (±)		
IgG (g/L)	28.19	7.0	14.65	4.05	12.6	<0.01*
IgM (g/L)	3.71	0.87	1.78	0.79	13.04	<0.01*
IgA (g/L)	2.25	0.81	2.90	0.69	4.89	<0.01*

This table shows that mean and standard deviation of IgG, IgM and IgA values are statistically significantly higher among exposed group than those among non exposed group.

Table (14): Immunoglobulins in relations to duration among the exposed group.

Group / Immuno-globulins	< 10		≥ 10		Total		X^2	P-value
	No.	%	No.	%	No.	%		
IgG (g/L)								
Normal	2	3.7	1	2.2	3	3.0	0.19	>0.05
Elevated	52	96.3	45	97.8	97	97.0		
IgM (g/L)								
Normal	42	77.78	34	62.9	76	76.0	0.2	>0.05
Elevated	12	22.22	12	37.1	24	24.0		
IgA (g/L)								
Normal	43	79.6	33	71.7	76	76.0	0.35	>0.05
Elevated	11	20.4	13	28.3	24	24.0		
Total	54	54.0	46	46.0	100	100		

This table shows that the values of IgG, IgM and IgA have statistically non significant difference in relation to duration of exposure among exposed group.

Table (15): Relationship between immunoglobulins and skin test results among exposed groups.

Skin test / Immuno-globulins	Skin test –ve		Skin test +ve		X^2	P-value
	No.	%	No.	%		
IgG (g/L)						
Normal	1	5.0	2	2.5	0.344	>0.05
Elevated	19	95.0	78	97.5		
IgM (g/L)						
Normal	19	95.0	23	28.7	4.96	<0.05*
Elevated	1	5.0	57	71.2		
IgA (g/L)						
Normal	16	80.0	20	25.0	0.219	>0.05
Elevated	4	20.0	60	75.0		

This table shows workers with +ve skin test had an elevated IgM titre the difference was statistically significant. As regards IgG and IgA the difference was statistically insignificant.

Table (16): Relationship between IgG and type of occupation.

IgG / Type of Occup.	Normal		Elevated		Total
	No.	%	No.	%	
Breader	1	3.57	27	96.4	28
Cleaner	0	0.00	32	100	32
Guard	2	9.09	20	90.9	22
Salesmen	0	00.0	18	100	18
Total	3	3.00	97	97.00	100

$X^2 = 4.38$ $P > 0.05$

Table (17): Relationship between IgM and type of occupation.

IgM / Type of Occup.	Normal		Elevated		Total
	No.	%	No.	%	
Breader	22	78.6	6	21.4	28
Cleaner	24	75.0	8	25.0	32
Guard	15	68.2	7	31.8	22
Salesmen	15	83.3	3	16.7	18
Total	76	76.00	24	24.00	100

$X^2 = 1.39$ $P > 0.05$

Table (18): Relationship between IgA and type of occupation.

IgA / Type of Occup.	Normal		Elevated		Total
	No.	%	No.	%	
Breader	20	71.4	8	28.6	28
Cleaner	26	81.2	6	18.7	32
Guard	16	72.7	6	27.3	22
Salesmen	14	77.8	4	22.2	18
Total	76	76.00	24	24.00	100

$X^2 = 0.96$ $P > 0.05$

This tables shows statistically non significant difference between values of IgG, IgM and IgA and type of occupation.

Table (19): Number and percent of exposed and non exposed groups according to skin test results.

Group / Skin test	Exposed		Non Exposed		Total	
	No.	%	No.	%	No.	%
+ve	80	80.0	6	12.0	86.0	86.0
-ve	20	20.0	44	88.0	64.0	64.0
Total	100	100.0	50	100.0	150	100.0

$X^2 = 63.0$ $P < 0.01$*

This table shows that number and percent of skin test +ve results are statistically higher among exposed than those among non exposed.

Fig. (5): **Percent of positive skin tests among the exposed group.**

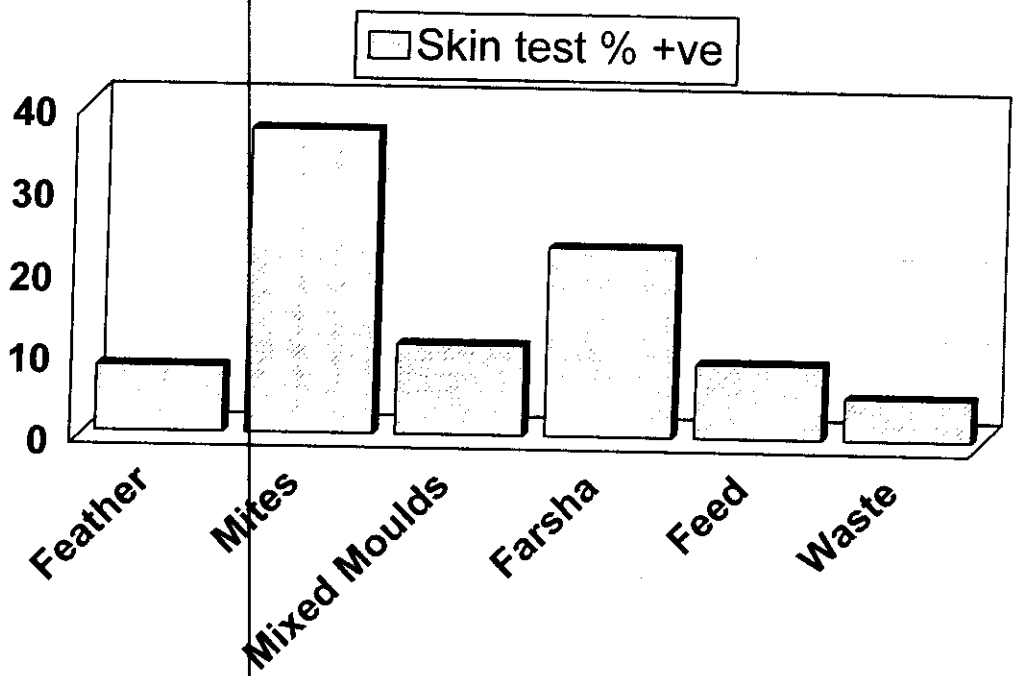

Table (20): Skin test results in relation to duration of exposure among exposed groups.

Group / Skin test	Duration < 10		Duration ≥ 10		Total	
	No.	%	No.	%	No.	%
Negative	19	95.0	1	5.00	20	100
Positive	35	43.7	45	56.2	80	100
Total	54	54.0	46	46.0	100	100

$X^2 = 16.9$ $P < 0.01$*

This table shows that the workers who are exposed for 10 years or more have statistically significantly higher skin test positive results than those exposed for less than 10 years.

Table (21): Relationship between skin test results and type of occupation.

IgG	Negative		Positive		Total
	No.	%	No.	%	
Breader	3	10.7	25	89.3	28
Cleaner	4	12.5	28	87.5	32
Guard	7	31.8	15	68.2	22
Salesmen	6	33.3	12	66.7	18
Total	20	20.00	80	80.00	100

$X^2 = 6.55$ $P > 0.05$

This table shows statistically non significant difference between skin test results and type of occupation.