# RESULTS

**Table (1):** Physical characters and work duration of exposed and control groups of workers.

| Groups<br><br>Physical character | Exposed group No = 150 | | Control group No = 50 | | t | p |
|---|---|---|---|---|---|---|
| | X | ± SD | X | ± SD | | |
| Age /y | 38.5 | 8.87 | 41.18 | 9.13 | 1.83 | > 0.05 |
| Height/cm | 169.82 | 4.12 | 168.95 | 6.05 | 0.18 | > 0.05 |
| Weight/kg | 79.05 | 16.3 | 78.9 | 15.05 | 0.5 | > 0.05 |
| Work D/y | 17.9 | 11.19 | 17.89 | 10.24 | 0.005 | > 0.05 |

This table shows that there is no statistically significant difference between exposed and control groups as regards physical characters and work duration.

**Table (2):** Physical characters and work duration in different exposed groups.

| Groups<br><br>Physical character | Body repair No = 49 | | Engine maint- No = 72 | | Painters No = 29 | | F | P |
|---|---|---|---|---|---|---|---|---|
| | X | ± SD | X | ± SD | X | ± SD | | |
| Age/y | 37.67 | 9.24 | 39.13 | 9.30 | 40.35 | 8.36 | 1.313 | > 0.05 |
| Ht/cm | 168.97 | 6 .45 | 168.95 | 6.06 | 172.45 | 4.12 | 0.829 | > 0.05 |
| Wt/kg | 76.91 | 6.40 | 77.01 | 6.40 | 78.99 | 6.4 | 2.235 | > 0.05 |
| Work D/y | 17.69 | 9.48 | 18.35 | 9.62 | 17.20 | 9.52 | 0.573 | > 0.05 |

This table illustrates that there is statistically insignificant difference between different exposed groups regarding physical characters and work duration.

**Table (3):** Distrbution exposed and control workers according to smoking habit.

| Groups<br><br>Smoking habit | Exposed group<br>No = 150 | | Control group<br>No = 50 | |
|---|---|---|---|---|
| | No | % | No | % |
| Smokers. | 100 | 66.67 | 35 | 70 |
| Non smokers. | 48 | 32.00 | 13 | 26 |
| Ex Smokers. | 2 | 1.33 | 2 | 4 |
| Total | 150 | 100 | 50 | 100 |

$X^2 = 1.84$ $P = > 0.05$

This table clearly illustrates that there is statistically insignificant difference between both groups regarding smoking habit.

**Table (4):** Distribution of smoking habit in different exposed groups.

| Groups | Body repair No = 49 | | Engine maintenane No = 72 | | Painters No = 29 | |
|---|---|---|---|---|---|---|
| S.Habit | No | % | No | % | No | % |
| Smokers | 31 | 63.27 | 48 | 66.66 | 21 | 72.41 |
| Non smok. | 18 | 36.73 | 22 | 30.55 | 8 | 27.59 |
| Ex smok. | 0 | 0 | 2 | 2.77 | 0 | 0 |
| Total | 49 | 100 | 72 | 100 | 29 | 100 |

$X^2 = 0.67$ $P = > 0.05$

This table shows that there is statistically insignificant difference between the three exposed groups regarding smoking habit.

**Table (5):** Type of smoking in exposed and control smokers.

| Different groups | Exposed smokers No = 100 | | Control smokers No = 35 | |
|---|---|---|---|---|
| Type of smoke. | No | % | No | % |
| Cigarette | 67 | 67% | 27 | 77.14 |
| Goza | 16 | 16% | 6 | 17.14 |
| Combined | 17 | 17% | 2 | 5.72 |
| Total | 100 | 100% | 35 | 100% |

$X^2 = 3.86$ $P = > 0.05$

In this table it is clear that there is statistically insignificant difference between both groups regarding smoking type.

**Table (6):** Distribution of exposed workers according to type of smoke.

| Groups | Body repair No = 33 | | Engine maint- No = 53 | | Painters No = 14 | |
|---|---|---|---|---|---|---|
| Smoke type | No | % | No | % | No | % |
| Cigarette | 21 | 63.63 | 34 | 64.15 | 7 | 50 |
| Goza | 7 | 21.21 | 9 | 16.98 | 4 | 28.57 |
| Combined | 5 | 1.5.15 | 10 | 18.87 | 3 | 21.43 |
| Total | 33 | 100% | 53 | 100% | 14 | 100% |

$X^2 = 6.83$ $P = > 0.05$

This table clears that there is no statistically significant difference in different exposed groups as regards the type of smoke.

**Table (7):** Distribution of exposed and control workers according to number of smoked cigarette per day.

| Group | Exposed smokers No = 84 | | Control smokers No = 29 | |
|---|---|---|---|---|
| n.of cig/day | No | % | No | % |
| 0-9 | 21 | 25 | 6 | 20.69 |
| 10-19 | 23 | 27.38 | 8 | 27.59 |
| 20 + | 40 | 47.62 | 15 | 51.72 |
| Total | 84 | 100% | 29 | 100% |

$X^2 = 0.921$ $P - > 0.05$

This table shows that there is statistically insignificant difference between exposed and control groups according to number of smoked cigarettes per day.

**Table (8):** Distribution of exposed workers according to number of smoked cigarettes per day.

| Groups | Body repair smokers No = 26 | | Engine maint-smokers No = 44 | | smokers Painters No = 14 | |
|---|---|---|---|---|---|---|
| No. of cig/day | No | % | No | % | No | % |
| 0-9 | 3 | 11.54 | 10 | 22.72 | 8 | 57.15 |
| 10-19 | 11 | 42.3 | 10 | 22.72 | 2 | 14.28 |
| 20 + | 12 | 46.16 | 24 | 45.56 | 4 | 28.57 |
| Total | 26 | 100% | 44 | 100% | 14 | 100% |

$X^2 = 0.67$ $P = > 0.05$

This table illustrates that there is no statistically significant difference between different groups of exposed workers regarding the number of smoked cigarette per day.

**Table (9):** Distribution of exposed and control workers according to results of skin examination.

| Groups | Exposed group N = 150 | | Control group No = 50 | |
|---|---|---|---|---|
| Skin examination | No | % | No | % |
| Free | 85 | 56.67 | 43 | 86 |
| Irritation. | 30 | 20 | 2 | 4 |
| Tinea. | 18 | 12 | 5 | 10 |
| More than one | 11 | 7.33 | 0 | 0 |
| Others | 6 | 4 | 0 | 0 |
| Tolal disorders | 65 | 43.33 | 7 | 14 |

$X^2 = 16.86$ $P = < 0.05$

* Others include vitiligo and hair loss.

This table clearly illustrate that the skin disorders are more prevalent in exposed than the control group of workers. The difference is statistically significant.

**Table (10):** Distribution of different exposed groups according to results of skin examination.

| Groups | Body repair No = 49 | | Engine maint- No = 72 | | Painters No = 29 | |
|---|---|---|---|---|---|---|
| Skin examination | No | % | No | % | No | % |
| Free | 31 | 63.2 | 40 | 55.55 | 14 | 48.3 |
| Irritation | 9 | 18.43 | 16 | 22.23 | 5 | 17.25 |
| Tinea | 6 | 12.22 | 10 | 13.92 | 2 | 6.9 |
| More than one | 1 | 2.05 | 5 | 6.9 | 5 | 17.25 |
| Others | 2 | 4.10 | 1 | 1.4 | 3 | 10.3 |
| Total disorders | 18 | 36.8 | 32 | 44.45 | 15 | 51.7 |

$X^2 = 17.6$ $P = > 0.05$

This table shows that painters have insignificantly higher percentage of skin disorders than other exposed groups

**Table (11):** Distribution of the exposed and control groups according to results of eye examination.

| Groups | Exposed group No = 150 | | Control group No = 50 | |
|---|---|---|---|---|
| Eye examination | No | % | No | % |
| Free | 111 | 74 | 47 | 94 |
| Irritation | 25 | 16.67 | 1 | 2 |
| Lenses opacity | 5 | 3.33 | 2 | 4 |
| More then one | 7 | 4.67 | 0 | |
| Forg-bodies | 2 | 1.33 | 0 | |
| Total disorders | 39 | 26 | 3 | 6 |

$X^2 = 11.12$ $P = < 0.05$

This table illustrates that the exposed workers have significantly heigher eye disorders than the control group workers.

**Table (12):** Distribution of different exposed groups according to the results of eye examination.

| Groups | Body repair No = 49 | | Engine maint. No = 72 | | Painters No = 29 | |
|---|---|---|---|---|---|---|
| Eye examination | No | % | No | % | No | % |
| Free | 30 | 61.22 | 58 | 80.55 | 23 | 79.31 |
| Irritation | 12 | 24.43 | 10 | 13.88 | 3 | 10.34 |
| Lenses opacity | 2 | 4.10 | 1 | 1.4 | 2 | 6.9 |
| More than one | 4 | 8.20 | 2 | 2.78 | 1 | 3.45 |
| Forg.bodies | 1 | 2.05 | 1 | 1.4 | 0 | 0 |
| Total disorders | 19 | 38.78 | 14 | 19.45 | 6 | 20.69 |

$X^2 = 6.77$ $P = >0.05$.

This table clearly illustrate that body repair workers have insignificantly higher eye disorders than other two exposed groups.

**Table (13):** Distribution of the exposed and control groups according to result of chest symptoms..

| Groups | Exposed group No = 150 | | Control group No = 50 | |
|---|---|---|---|---|
| Chest symptoms | No | % | No | % |
| Free | 56 | 37.34 | 28 | 56 |
| More than one disorder | 25 | 16.66 | 8 | 16 |
| Cough | 33 | 22.0 | 6 | 12 |
| Expect. | 27 | 18 | 5 | 10 |
| Dyspnea | 6 | 4 | 2 | 4 |
| Wheeze | 3 | 2 | 1 | 2 |
| Total | 94 | 62.66 | 22 | 44 |

$X^2 = 3.86$ $P = > 0.05$

This table shows that the exposed workers have insignificantly higher percentage of chest symptoms than the control workers.

**Table(14):**Distribution of different exposed groups according to chest symptoms .

| Group | Body repair No = 49 | | Engine maint- No = 72 | | Painters No = 29 | |
|---|---|---|---|---|---|---|
| Chest symptoms | No | % | No | % | No | % |
| Free | 22 | 44.89 | 25 | 34.72 | 9 | 31.03 |
| More than one | 10 | 20.41 | 10 | 13.88 | 5 | 17.24 |
| Cough | 8 | 16.33 | 16 | 22.22 | 9 | 31.03 |
| Expect. | 7 | 14.28 | 17 | 23.61 | 3 | 10.34 |
| Dyspnea | 1 | 2.04 | 3 | 4.16 | 2 | 6.89 |
| Wheeze | 1 | 2.04 | 1 | 1.39 | 1 | 3.45 |
| Total symptoms | 27 | 55.11 | 47 | 65.28 | 20 | 68.97 |

$X^2 = 10.85$ $P = > 0.05$

This table illustrates that painters have insignificantly higher percentage of chest symptoms than the other two exposed groups.

**Table (15):** Distribution of the exposed and control groups according to heart symptoms and signs.

| Group | Exposed group No = 150 | | Control group No = 50 | |
|---|---|---|---|---|
| Heart S & S | No | % | No | % |
| Free | 89 | 59.34 | 27 | 54 |
| Chest pain | 9 | 6 | 3 | 6 |
| Palpatation | 31 | 20.66 | 12 | 24 |
| Low c.o.p. S & S | 22 | 14.66 | 9 | 18 |
| Congestion | 20 | 13.34 | 11 | 22 |
| Total S & S | 61 | 40.66 | 23 | 46 |

$X^2 = 3.785$ $P = > 0.05$.

This table illustrates that the controls have insignificantly higher heart S & S than the exposed workers.

**Table (16):** Distribution of different exposed groups regarding to heart symptoms and signs.

| Groups | Body repair No = 49 | | Engine maint- No = 72 | | Painters No = 29 | |
|---|---|---|---|---|---|---|
| Heart S&S | No | % | No | % | No | % |
| Free | 30 | 61.23 | 42 | 58.33 | 17 | 58.64 |
| Chest pain | 2 | 4.08 | 3 | 4.16 | 1 | 3.45 |
| Palpatation | 10 | 20.4 | 19 | 26.38 | 2 | 6.9 |
| Low cop S &S | 5 | 10.2 | 11 | 15.28 | 6 | 20.69 |
| Congestion | 6 | 12.24 | 11 | 15.28 | 3 | 10.34 |
| Total S & S | 19 | 38.77 | 30 | 41.67 | 12 | 41.38 |

$X^2 = 2.66$ $P = > 0.05$

This table illustrates that there is statistically insignificant difference between the exposed groups regarding heart symptoms and signs.

**Table (17):** Distribution of exposed and control groups according to results of abdominal examination.

| Groups | Exposed workers No = 150 | | Control group No = 50 | |
|---|---|---|---|---|
| Abdominal examination | No | % | No | % |
| Free | 143 | 95.33 | 46 | 92 |
| Enlarged liver & spleen | 5 | 3.33 | 2 | 4 |
| Gastritis | 2 | 1.33 | 2 | 4 |

$X^2 = 2.526$ $P = > 0.05$

This table clearly illustrate that there is statisitically insignificant difference between both groups regarding result of abdominal examination.

**Table (18):** Distribution of exposed and control groups according to results of locomotor examination.

| Groups | Exposed workers No = 150 | | Control group No = 50 | |
|---|---|---|---|---|
| Locomotor. examination. | No | % | No | % |
| Free | 132 | 88 | 48 | 96 |
| Ms Pain | 15 | 10.00 | 1 | 2 |
| Joint pain | 2 | 1.33 | 0 | 0 |
| Bone pain | 1 | 0.66 | 1 | 2 |
| Total disorders | 8 | 12 | 2 | 4 |

$X^2 = 7.26$ $P > 0.05$

This table illustrates that there is insignificantly higher locomotor disorders, in the exposed group than the controls.

**Table (19):** Distribution of different exposed groups according to locomotor examination.

| Groups | Body repair No = 49 | | Engine maint- No = 72 | | Painters No = 29 | |
|---|---|---|---|---|---|---|
| Locomotor. examination. | No | % | No | % | No | % |
| Free | 41 | 83.68 | 64 | 88.90 | 27 | 93.1% |
| MS pain | 6 | 12.24 | 7 | 9.72 | 2 | 6.9% |
| Joint pain | 1 | 2.04 | 1 | 1.38 | 0 | 0% |
| Bone pain | 1 | 2.04 | 0 | 0 | 0 | 0% |
| Total disorders | 8 | 16.32 | 8 | 11.1 | 2 | 6.9 |

$X^2 = 3.362$ $P = > 0.05.$

This table illustrates that body repair workers have the highest precentage of locomotor disorders followed by engine maintenance then the painters and the difference between the three groups is statistically insignificant.

**Table (21):** Distribution of different exposed groups according to results of stool analysis.

| Groups | Body repair No = 49 | | Engine main- No = 72 | | Painters No = 29 | |
|---|---|---|---|---|---|---|
| S. analysis | No | % | No | % | No | % |
| Bilharziasis | 5 | 10.20 | 7 | 9.72 | 3 | 10.34 |
| Amoebiasis | 2 | 4.08 | 3 | 4.17 | 1 | 3.45 |
| Others | 5 | 10.20 | 15 | 20.83 | 2 | 6.90 |
| Total | 10 | 20.4 | 21 | 29.16 | 6 | 20.67 |

$X^2 = 0.08$ $P = > 0.05$

This table illustrates that the engine maintenance workers have the highest prcentage of parasitic infestation while body repair and painters have the same percentage. The difference between the three groups is statistically insignificant.

**Table (22):** Distribution of the exposed and control groups regarding the results of blood investigations.

| Groups | Exposed workers No = 50 | | Control workers No = 50 | | | |
|---|---|---|---|---|---|---|
| investigations. | X | ± SD | X | ±SD | t | P |
| Blood lead µg/100ml | 32.1 | 16 | 17.8 | 0.5 | 4.37 | < 0.05 |
| HB concentration/gm | 10.81 | 1.33 | 11.57 | 0.9 | 3.78 | < 0.05 |
| RBCs count | 3.643 | 0.478 | 3.984 | 0.696 | 3.86 | < 0.05 |
| WBCs count | 7.681 | 2.122 | 7.75 | 2.145 | 0.199 | > 0.05 |
| Monocyte | 2.85 | 1.783 | 3.08 | 1.915 | 1.011 | > 0.05 |
| Lymphocyte | 35.3 | 13.45 | 36.66 | 8.792 | 0.269 | > 0.05 |
| Eosin. | 6.53 | 4.23 | 6.76 | 3.52 | 0.452 | > 0.05 |
| Seg. | 51.52 | 9.58 | 49.4 | 9.05 | 1.68 | > 0.05 |
| Staph. | 3.87 | 2.89 | 4.1 | 2.909 | 0.95 | > 0.05 |

This table illustrates that blood lead is significantly higher in exposed than control group while RBCs count and Hb concentration are significantly lower in exposed than control group. The total and differential leucocytic count are not significantly different between exposed and control groups.

**Table (23):** Distribution of different exposed workers according to results of blood investigations.

| groups | Body repair No = 49 | | Engine maint- No = 72 | | Painters No = 29 | | | |
|---|---|---|---|---|---|---|---|---|
| investigations | X | ±SD | X | ±SD | X | ±SD | F | p |
| Blood lead µg/100ml | 30.1 | 15.9 | 32.3 | 20.8 | 35 | 20.4 | 0.755 | > 0.05 |
| HB concentr/gm. | 10.92 | 1.45 | 10.92 | 1.31 | 10.36 | 1.11 | 2.12 | > 0.05 |
| RBCs count | 3.69 | 0.5 | 3.72 | 0.49 | 3.52 | 0.38 | 2.17 | > 0.05 |
| WBCs count | 7.21 | 1.83 | 7.78 | 2.22 | 8.08 | 2.32 | 1.35 | > 0.05 |
| Mono. | 3.18 | 1.69 | 2.42 | 1.75 | 2.96 | 1.89 | 2.865 | > 0.05 |
| Lymph. | 37.0 | 9.15 | 37.0 | 16.57 | 35.0 | 9.03 | 1.282 | > 0.05 |
| Eosin. | 6.56 | 3.93 | 6.08 | 3.7 | 7.345 | 5.7 | 0.973 | > 0.05 |
| Seg. | 49.14 | 8.33 | 52.0 | 9.97 | 54.0 | 9.9 | 2.813 | > 0.05 |
| Staph. | 3.886 | 1.74 | 3.86 | 1.94 | 3.87 | 1.88 | 2.246 | > 0.05 |

This table shows that painters have the highest insignificant blood lead and the lowest insignificant Hb concentration and RBCs counts. Regarding total and differential leucocytic count there is statistically insignificant difference between the three groups.

**Table (24):** Distribution of the exposed and control groups according to Pulmonary function paramaters.

| Groups | Exposed group No = 150 | | Control group No = 50 | | | |
|---|---|---|---|---|---|---|
| P.F parameter | X | ±SD | X | ± SD | t | P |
| FEV1 | 2.98 | 0.782 | 3.04 | 0.71 | 0.93 | > 0.05 |
| FVC | 3.79 | 0.902 | 3.822 | 0.66 | 1.64 | > 0.05 |
| FVC pred. | 4.821 | 0.676 | 4.75 | 0.911 | 0.59 | > 0.05 |
| FEV1/FVC % | 78.61 | 10.1 | 80.62 | 7.4 | 1.22 | > 0.05 |
| FVC/FVC pred. % | 78.39 | 15.95 | 80.53 | 10.57 | 0.881 | > 0.05 |

This table illustrates that there is insignifcantly lower pulmonary function parameters in exposed than control groups.

**Table (25):** Distribution of different exposed groups regarding pulmonary function parameters.

| Groups | Body repair No = 49 | | Engine maint- No = 72 | | Painters No = 29 | | F | P |
|---|---|---|---|---|---|---|---|---|
| P.F parameter | X | ± SD | X | ± SD | X | ± SD | | |
| FEV1 | 2.956 | 0.241 | 2.954 | 0.292 | 3.016 | 0.299 | 0.327 | > 0.05 |
| FVC | 3.75 | 0.353 | 3.77 | 0.321 | 3.817 | 0.301 | 0.425 | > 0.05 |
| FVC pred. | 4.84 | 0.463 | 4.777 | 0.404 | 4.85 | 0.304 | 0.524 | > 0.05 |
| FEV1/FVC % | 78.81 | 9.946 | 78.33 | 11.30 | 78.99 | 10.58 | 0.051 | > 0.05 |
| FVC/FVC pred. % | 77.96 | 19.91 | 78.89 | 14.176 | 78.73 | 12.721 | 0.125 | > 0.05 |

This table illustrates that there is insignificantly lower FVC/FVC pred. % in body repair than other two exposed groups while there is insignificant lower FEV1/FVC % in engine maintenance than other two exposed groups .The paramaters although showing insignificant different between the three exposed groups but still lower than that of the control group.

**Table (26):** Distribution of the exposed and control groups according to pulmonary function interpretation.

| Groups | Exposed group No = 150 | | Control group No = 50 | |
|---|---|---|---|---|
| P.F. interpretation | No | % | No | % |
| Normal | 133 | 88.67 | 47 | 94 |
| Obst. | 5 | 3.34 | 1 | 2 |
| Rest. | 8 | 5.33 | 1 | 2 |
| Combined Obst. Rest. | 4 | 2.66 | 1 | 2 |
| Total | 17 | 11.33 | 3 | 6 |

$X^2 = 0.67$ $P = > 0.05$.

This table illustrates that 11.33% of the exposed workers have pulmonary function impairment while only 6% of the control workers have impairment, the difference is statistically insignificant.

**Table (27):** Distribution of different exposed groups regarding pulmonary function interpretation.

| Groups | Body repair No = 49 | | Engine maint- No = 72 | | Painters No = 29 | |
|---|---|---|---|---|---|---|
| P. F. inter. | No | % | No | % | No | % |
| Normal | 45 | 91.83 | 63 | 87.5 | 25 | 86.2 |
| Obst. | 0 | 0% | 3 | 4.16 | 2 | 6.89 |
| Rest. | 2 | 4.085 | 4 | 5.56 | 2 | 6.89 |
| Combined | 2 | 4.085 | 2 | 2.78 | 0 | 0% |

$X^2 = 4.402$ $P = > 0.05$

This table shows that the painters have the highest precentage of impairment in the interpretation (13.8%), while engine maintenance (12.5%), and the body repair (8.17). The differene is statistically insignificant.

**Table (28):** Distribution of the exposed and control groups regarding ECG interpretation.

| Group | Exposed group No= 150 | | Control group No= 50 | |
|---|---|---|---|---|
| ECG | No | % | No | % |
| Free | 96 | 64 | 28 | 56 |
| Arrhythmia | 31 | 20.66 | 17 | 34 |
| Cardiac | 43 | 28.66 | 26 | 52 |
| Strain | | | | |
| Total disorders | 54 | 36 | 22 | 44 |

$X^2 = 1.33$ $P = > 0.05$.

This table illustrates that there was insignificantly lower ECG abnormalities in the exposed workers than the control group.

**Table (29):** Distribution of different exposed groups according to ECG interpretation.

| Group | Body repair No = 49 | | Engine maint No = 72 | | Painters No = 29 | |
|---|---|---|---|---|---|---|
| ECG interpre. | No | % | No | % | No | % |
| Free | 31 | 63.26 | 44 | 61.11 | 21 | 72.41 |
| Arrhyth. | 10 | 20.4 | 19 | 26.38 | 2 | 6.9 |
| Car.strain | 16 | 32.68 | 20 | 27.78 | 7 | 24.1 |
| Total disorders | 18 | 36.74 | 28 | 38.89 | 8 | 27.59 |

$X^2 = 2.462$ $P = > 0.05$

This table illustrates that the engine maintenance workers had insignificantly higher ECG abnormalitis than other two exposed groups.

**Table (30):** Distribution of the exposed and control groups regarding hearing threshold levels (dB).

| groups | Exposed group No = 150 | | Control group No = 50 | | t | P |
|---|---|---|---|---|---|---|
| Hearing thresh. | X | ± SD | X | ± SD | | |
| Rt ear air cond. thr. | 35.277 | 13.166 | 29.925 | 7.988 | 2.71 | < 0.05 |
| Bone cond. thr. | 28.661 | 13.317 | 24.825 | 7.258 | 1.937 | > 0.05 |
| Lt ear air cond. thr. | 34.702 | 12.581 | 30.05 | 7.214 | 2.479 | < 0.05 |
| Bone cond. thr. | 29.9052 | 12.67 | 25.525 | 6.051 | 1.892 | > 0.05 |

This table illustrates that the air conduction thresholds of right & left ears in exposed workers are significantly higher than that of the control workers while bone conduction thresholds, in exposed workers right and left ears are insignificantly higher than that of the control workers.

**Table (31):** Distribution of different exposed groups regarding hearing threshold levels (dB) right ear.

| Groups | Body repair No = 49 | | Engine maint- No = 72 | | Painters No = 29 | | F | P |
|---|---|---|---|---|---|---|---|---|
| Frequ. | X | ± SD | X | ± SD | X | ± SD | | |
| air 500 | 38.87 | 12.72 | 39.45 | 12.82 | 35.69 | 10.67 | 0.981 | > 0.05 |
| 1000 | 35.71 | 13.23 | 36.59 | 13.75 | 32.58 | 9.41 | 1.012 | > 0.05 |
| 2000 | 36.02 | 15.64 | 34.72 | 14.91 | 27.41 | 11.07 | 3.523 | < 0.05 |
| 4000 | 35.41 | 16.26 | 33.89 | 17.78 | 28.27 | 13.64 | 1.775 | > 0.05 |
| Bone 500 | 28.11 | 14,69 | 28.06 | 14.17 | 26.48 | 11.75 | 0.151 | > 0.05 |
| 1000 | 27.11 | 15.54 | 27.61 | 15.10 | 26.03 | 12.20 | 0.153 | > 0.05 |
| 2000 | 28.62 | 13.45 | 28.90 | 13.4 | 28.21 | 12.76 | 0.289 | > 0.05 |
| 4000 | 32.34 | 13.99 | 32.5 | 13.96 | 28.45 | 12.68 | 1.11 | > 0.05 |

**Table (32):** Distribution of different exposed groups regarding hearing threshold levels (dB) left ear.

| Groups | Body repair No = 49 | | Engine maint- No = 72 | | Painter No = 29 | | F | P |
|---|---|---|---|---|---|---|---|---|
| Frequ. | X | ±SD | X | ± SD | X | ± SD | | |
| air 500 | 38.67 | 12.28 | 37.56 | 13.19 | 36.72 | 10.63 | 0.241 | > 0.05 |
| 1000 | 35.40 | 11.89 | 34.51 | 12.70 | 32.24 | 11.15 | 0.628 | > 0.05 |
| 2000 | 33.76 | 14.09 | 33.19 | 14.92 | 29.31 | 10.58 | 0.905 | > 0.05 |
| 4000 | 35.20 | 15.87 | 34.45 | 15.86 | 32.069 | 12.06 | 0.401 | > 0.05 |
| bone 500 | 27.71 | 13.15 | 29.93 | 13.43 | 26.43 | 9.41 | 0.912 | > 0.05 |
| 1000 | 28.06 | 14.53 | 29.58 | 14.74 | 25.69 | 11.47 | 0.801 | > 0.05 |
| 2000 | 30.30 | 13.59 | 30.41 | 15.0 | 27.76 | 9.87 | 0.427 | > 0.05 |
| 4000 | 31.02 | 15.03 | 31.816 | 14.80 | 29.31 | 9.70 | 0.326 | > 0.05 |

Table 31 & 32 clearly illustrate that body repair and engine maintenance have insignificantly higher hearing threshold levels than that of the painters & this is clear at all frequencies.

**Table (33):** Distribution of the exposed and control groups regarding results of Audiometry.

| Groups / Hearing | | Exposed group No = 150 | | Control group No = 50 | | $X^2$ | P |
|---|---|---|---|---|---|---|---|
| Rt air | Normal | 110 | 73.33 | 44 | 88 | | |
| | impaired | 40 | 26.67 | 6 | 12 | 4.555 | < 0.05 |
| Rt bone | Normal | 118 | 78.67 | 50 | 100 | | |
| | impaired | 32 | 21.33 | 0 | 0 | 12.698 | < 0.05 |
| Lt air | Normal | 113 | 75.33 | 45 | 90 | | |
| | impaired | 37 | 24.67 | 5 | 10 | 4.86 | < 0.05 |
| Lt bone | Normal | 119 | 79.33 | 50 | 100 | | |
| | impaired | 31 | 20.67 | 0 | 0 | 12.229 | < 0.05 |

This table illustrates that the number of workers having hearing impairment were significantly higher in exposed than the control group workers.

**Table (34):** Distribution of different exposed groups regarding results of Audiometry.

| Groups | Body repair No = 49 | | Engine Maint. No = 72 | | Painters No = 29 | | $X^2$ | P |
|---|---|---|---|---|---|---|---|---|
| Hearing | N | % | N | % | N | % | | |
| Rt air Nor. | 31 | 63.27 | 55 | 76.39 | 24 | 82.76 | | |
| impaired | 18 | 36.73 | 17 | 23.61 | 5 | 17.24 | 4.201 | > 0.05 |
| Rt bone Nor. | 39 | 79.59 | 55 | 76.39 | 24 | 82.76 | | |
| impaired | 10 | 20.41 | 17 | 23.61 | 5 | 17.24 | 0.537 | > 0.05 |
| Lt. air Nor. | 33 | 67.35 | 56 | 77.78 | 24 | 82.76 | | |
| impaired | 16 | 32.65 | 16 | 22.22 | 5 | 17.24 | 2.774 | > 0.05 |
| Lt. bone Nor. | 37 | 75.51 | 57 | 79.17 | 25 | 86.21 | | |
| impaired | 12 | 24.49 | 15 | 20.83 | 4 | 13.79 | 1.274 | > 0.05 |

This table clearly illustrates that the number of workers having hearing impairment were insignificantly higher in the body repair and engine maintenance workers than the painters.

**Table (35):** Distribution of the exposed and control groups regarding results of Audiogram.

| Deafness | Conductive deafness | | Mixed deafness (Cond & Precep) | |
|---|---|---|---|---|
| groups | N | % | N | % |
| Exp. Rt ear | 40 | 26.68 | 32 | 21.33 |
| Lt . ear | 37 | 24.66 | 31 | 20.66 |
| Control Rt ear | 5 | 10 | 0 | 0 |
| Lt.ear | 4 | 8 | 0 | 0 |

This table shows that, (26.68%) & (24.66%) of exposed workers have conductive deafness in contrast to (10%) & (8%) in the control group in Rt and Left ears respectively. Mixed (conductive and perceptive) deafness in exposed workers was (21.33%) and (20.66) for Rt and Lt ears respectively, and control group workers have not.

**Table (36):** Distribution of different exposed groups regarding results of Audiogram.

| Deafness | Conduct. deafness | | Mixed deafness . | |
|---|---|---|---|---|
| Groups | N | % | N | % |
| Body repair Rt ear | 18 | 36.73 | 10 | 24.40 |
| Lt ear | 16 | 32.65 | 12 | 24.48 |
| Engine ment. Rt ear | 17 | 23.61 | 17 | 23.61 |
| Lt ear | 16 | 22.22 | 15 | 20.38 |
| Painters Rt ear | 6 | 20.69 | 5 | 17.24 |
| Lt ear. | 5 | 17.24 | 4 | 13.79 |

$X2 = 2.89$ $P = > 0.05$

This table illustrates that body repair workers have insigificantly higher conductive and mixed deafness than other two exposed groups, followed by engine maintenance and lastly the painters.

**Table (37):** Results of environmental measurements

| Pollution | Level of pollution | | | Noise level | $Pb_20$ µm/m3 |
|---|---|---|---|---|---|
| Site | dust mg/m3 | $SO_2$ ppm | CO ppm | in dB | |
| Body repair | 19.8 | 0.18 | 59 | 96 | 15.9 |
| Engine maint. | 24.2 | 0.095 | 51 | 88 | 24.6 |
| Painting | 29 | 0.1 | 26 | 76 | 31.8 |
| General Environ. | 16.7 | 0.05 | 18.7 | 69 | 11.2 |
| TLVs | 20 mg/m3 | 2ppm | 50ppm | | 50 µm/m3 |

This table illustrates that the body repair, engine maintenace and painting department had higher levels of pollution (dust, lead, gases ($SO_2$ & CO), and Noise) than the general environment.