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Original Research Article

A study of morbidities among electronic equipment manufacturing workers in Goa

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ABSTRACT

Background: Electronic equipment manufacturing units are among the most common industries all over the world. It involves a large amount of employees required for processing, manufacturing, building and setting up electronic equipments. Workers are usually sedentary and involve very less physical movement. Chronic illnesses are common among these sedentary workers of which most important are cardiovascular diseases, hypertension, obesity and diabetes. Considering the importance of the subject and the lack of published evidence on health status of electronic manufacturing workers, our study was done with an aim of assessing selected morbidities among electronic equipment manufacturing units in Goa.
Methods: Our retrospective record based cross-sectional study was conducted over a period of one month in March 2019. The study was done in electronic equipment manufacturing workers. Data included sociodemographic details of the workers and details of periodic medical check-up. The data analysis was done using and analyzed using SPSS version 22. Chi square test was used to assess association between qualitative variables.
Results: Among the 109 electronic manufacturing workers, it was observed that 10.1% (11) had obesity with a BMI >30, 24.8% (27) had hypertension (>140/90) and 31.2% (34) had diabetes mellitus with HbA1c >6.5. In addition, 24.8% (27) had far vision defect and 39.4% (43) had near vision defect. 42.2% (46) had abnormal lung function tests, 0.9% (1) had hearing disability and 4.6% (5) had abnormal ECG findings. Among male workers 0.9% (1) had elevated PSA levels, whereas all PAPs smear reports were normal among female workers.
Conclusions: This study highlights the need of periodic medical check-up of the electronic manufacturing workers for timely detection and early management of their health problems.

Keywords: Goa, Morbidities, Medical check-up, Electronic manufacturing workers

INTRODUCTION

Electronic equipment manufacturing units are among the most common industries all over the world involving a large amount of employees required for processing, manufacturing, building and setting up electronic equipments.[1] Workers are usually sedentary and their work involve minimal physical movement.

Chronic illnesses are common among these sedentary workers of which most important are cardiovascular diseases, hypertension, obesity and diabetes. Cardiovascular diseases commonly involve

atherosclerotic diseases.[2] There is a plethora of health problems among these workers.

Considering the importance of the subject and the lack of published evidence on health status of electronic manufacturing workers in Goa, our study was conducted to assess selected morbidities among electronic equipment manufacturing units in Goa and to suggest suitable recommendations to reduce morbidities and enhance productivity, based on findings of our study.[3]

The objective of the study was to assess selected morbidities among electronic equipment manufacturing units in Goa and to suggest suitable recommendations to reduce morbidities and enhance productivity, based on findings of our study.

METHODS

A retrospective record based cross sectional study was conducted over a period of one month during March 2019.

The study was commenced after obtaining approval from the institutional ethics committee of Goa medical college.

Periodic medical checkup of the electronic manufacturing workers was done.

Data included sociodemographic details of the workers and details of periodic medical checkup including anthropometry (height, weight, BMI), blood investigations like fasting and post prandial blood glucose levels, HbA1c, cholesterol, lipid profile, blood pressure, prostate specific antigen levels, vision (near, far and color), spirometry (lung function tests), audiometry, ECG, chest X-ray, sonomammography, Pap smear.

The data was analyzed using SPSS version 22. The results were presented using tables and figures along with charts and figures.

Chi square test was used to assess association between qualitative variables.

Simple random sampling was done.

The study variables were classified as follows:

Hypertension

History of hypertension or systolic BP ≥140 mmHg and/or diastolic BP ≥90 mmHg.

Diabetes

History of diabetes or fasting blood glucose ≥126 mg/dl and/or post prandial blood glucose ≥200 mg/dl. General treatment goals and guidelines and tools to evaluate quality of care. Members of the ADA professional practice committee, a multidisciplinary expert committee are responsible for updating the standards of care anually or more frequently as warranted.[4]

BMI

<18.5 kg/m^2 as underweight, 18.5-24.9 kg/m^2 as normal, 25-29.9 kg/m^2 as overweight, ≥30 kg/m^2 as obese.

Dyslipidemia

Dyslipidemia as triglycerides >150 mg/dl and/or total cholesterol >200 mg/dl and/or LDL >130 mg/dl and/or HDL <40 mg/dl.

Audiometry

Audiometry results were interpreted as follows based on WHO grades of hearing impairment. Hearing levels of 26-40 dB as mild, 41-60 dB as moderate, 61-80 dB as severe and >80 dB as profound hearing impairment

Visual status

Far vision (Snellen chart): Normal ≥6/6 in both eyes; satisfactory 6/9-6/12 in worse eye; poor <6/12 in worse eye.

Near vision (Roman text type): Normal ≥N6; satisfactory N8-N12; poor <N125.

Color vision

Ishihara chart was used and interpreted as defective if the study participant could not correctly identify at least 12 of the 14 red/green plate.

Inclusion criteria

All workers in the electronic manufacturing industry ≥20 years were included in the study.

Exclusion criteria

All workers in the electronic manufacturing industry <20 years were excluded from the study.

RESULTS

Among the 109 electronic manufacturing workers, it was observed that 10.1% (11) had obesity with a BMI >30, 24.8% (27) had hypertension (>140/90) and 31.2% (34) had diabetes mellitus with HbA1C >6.5.

In addition, 24.8% (27) had far vision defect and 39.4% (43) had near vision defect. 42.2% (46) had abnormal lung function tests, 0.9% (1) had hearing disability and 4.6% (5) had abnormal ECG findings.

Table 1: Sociodemographic details of the study participants.

Sample characteristics	Number (frequency)	Percentage (%)
Age (in years)		
20-35	43	39.44
36-59	64	58.68
60 and above	2	1.83
Sex		
Male	100	91.71
Female	9	8.29
Education		
Middle school	12	11.01
Higher secondary	60	55.02
Diploma	31	28.42
Graduate	6	5.50
Marital status		
Married	72	66.02
Unmarried	33	30.26
Widow	3	2.71
Separated	1	0.91

Table 2: Working conditions of the manufacturing workers.

Sample characteristics	Number (frequency)	Percentage (%)
Work experience (in years)		
1-4	42	38.51
5-9	36	33.01
10 and above	31	28.42
Working days in the week (in days)		
1-2	2	1.83
3-5	22	20.17
6-7	85	77.94
Working hours per day (in hours)		
Less than 5	4	3.66
5-8	35	32.09
9 and above	70	64.19
Stressful working conditions		
Yes	90	82.53
No	19	17.42

Table 3: Percentage and frequency of morbidities among the workers.

Morbidities among workers	Percentage (%)	Number (frequency)
Obesity	10.1	11
Hypertension	24.8	27
Diabetes mellitus	31.2	34
Far vision defect	24.8	27
Near vision defect	31.2	43
Abnormal pulmonary function tests	42.2	46
Hearing disability	0.9	1
Abnormal ECG findings	4.6	5
Elevated PSA levels	0.9	1

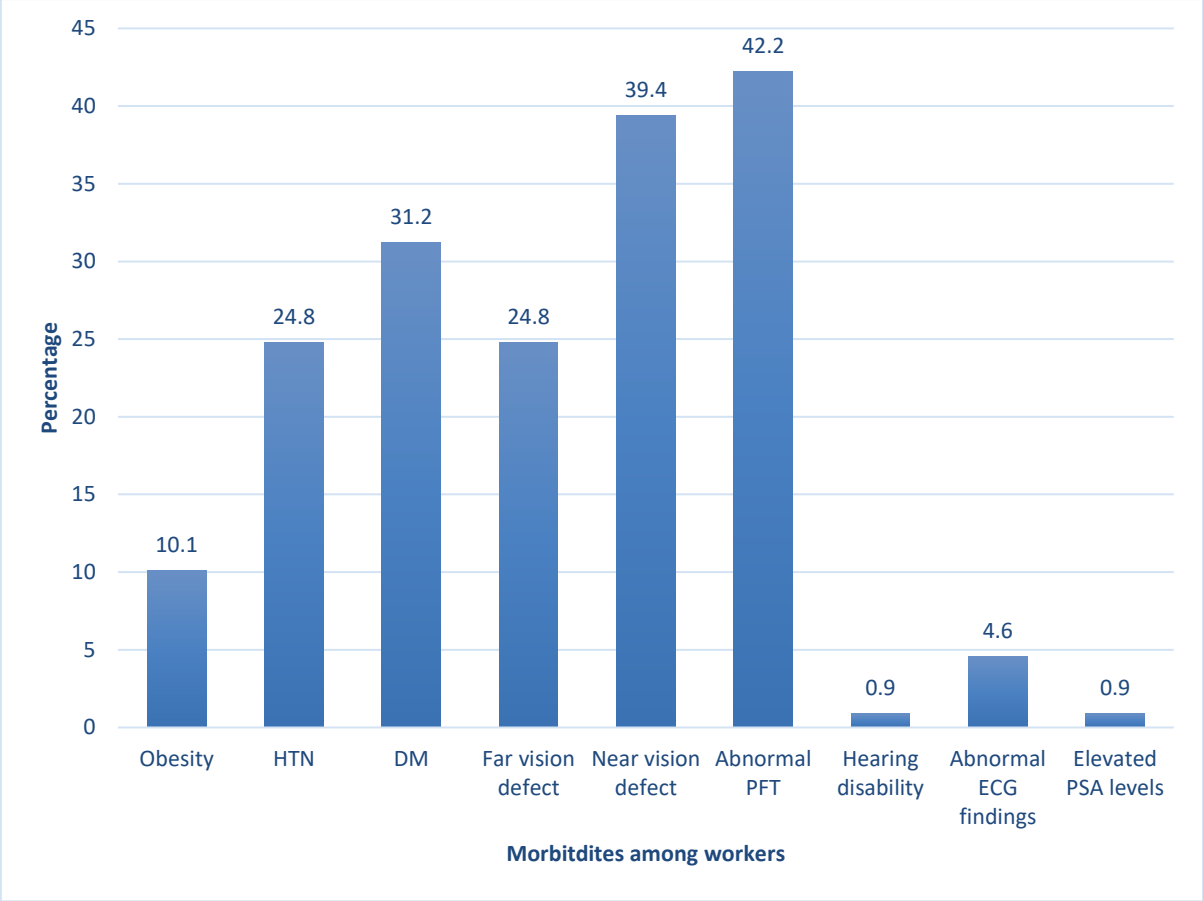

Figure 1: Morbidities among the electronic manufacturing workers.

Among male workers 0.9% (1) had elevated prostate specific antigen (PSA) levels, whereas all Pap smear reports were normal among female workers.

DISCUSSION

Our study showed a significant prevalence of lifestyle diseases among study participants. Lifestyle dieases like hypertension, diabetes mellitus and obesity are the major risk factors for the development of cardiovascular diseases.

A high percentage (24%) workers had hypertension, (31.2%) had diabetes similar to the other studies. (10%) of workers had obesity which was slightly lower than Lim et al study.[6] This can lead to cardiovascular diseases in due course of time.

In contrast to the study of Kim et al our study had significantly high level of abnormal lung functions and vision defects. Near vision defects (39.4%) were significantly higher than other studies.[7]

Abnormal ECG findings were comparable with other studies. PSA levels were studied for the first time in these workers but negligible percentage (0.9%) had high PSA levels.

Study by Yun et al showed abnormal Pap smear reports whereas our study showed no abnormality in Pap smear report.

Hence there was need to educate workers about the lifestyle modifications such as healthy dietary habits and increased physical activity as these morbidities are rising at an alarming pace. Also there was a need to conduct yearly pulmonary function tests and ECG.

Most studies done in India on electronic manufacturing workers focused on common visual symptoms such as blurring of vision, headaches, eye strain. Our study focused on checking visual acuity, near and color vision of the workers and the proportion of near vision defects were significantly high. Workers should be advised referral for necessary correction of possible refractive error and further evaluation.

Pre placement medical records of the employees were not available. Other specific morbidities like job stress and other musculoskeletal disorders could not be studied.

Limitations

This study was conducted in only one electronic manufacturing industry in Goa among limited number of participants, hence the findings cannot be generalised. Since this study was record based, all socio demographic details and behavioural aspects of the workers could not be obtained.

CONCLUSION

We conclude that there is a need for implementation of a system that caters to monitoring the health and wellbeing of employees working in chemical industry and its related sectors. The industries should have mandatory periodic health check-ups of the employees, preferably at their regular health centre for better insight into the general health status of workers. Pre placement examination of the employees is a must to know the working capacity of the employees to ensure ergonomics as well as to procure first-hand knowledge on health problems the workers may be suffering before employment. The employees should also be encouraged to report any health issues which need investigations and appropriate treatment, referral to a higher centre may be considered.

Effective communication with the manager and higher authorities and moral support from colleagues and supervisors is necessary. Health education regarding diet, physical activity and relaxation techniques like yoga and meditation should be given to the employees. Also employees should be advised referral for necessary correction of possible refractive errors and also periodic Pulmonary function tests for further evaluation. Organising committee should be appointed by the managers to conduct periodic recreational activities for the workers.

These measure will finally improve their performance in respective fields and will in turn lead to decreased incidence of morbidities, reduce sickness absentism and job stress leading to an optimum work output and contribute indirectly to a better Indian workforce.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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