# Occupational Health Hazards among Wholesalers: A Case Study

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**Abstract:** Wholesalers play an important role in Supply Chain Management but due to less physical activities, mental stress and more comfort level, they may suffer from many occupational health hazards. Literature reveals that with change in the lifestyle of the people there is increase in the number of patients of the coronary heart disease mainly in occupations having less physical activities. The present research work investigates occupational health hazards of wholesalers of cloths & garments market. Qualitative study was done on 64 wholesalers and 64 control group members. Due to financial and time constraints quantitative study was done on 22 members of each group. In qualitative study, data was collected through questionnaire and for quantitative study, physical examinations were performed and analyzed with statistical tests at 95% level of significance. For qualitative study, results of Pearson correlation showed that occupation having a positive correlation with hypertension, sitting having a positive correlation of with BMI, sitting also having a positive correlation of with hypertension, heart problem having a positive correlation with BMI, hypertension having a positive correlation with heart problem. For physical examination, approx. 14% more wholesalers have abnormal ECG, approx. 19% more wholesalers have obesity and overweight, approx. 27% more wholesalers have hypertension as compared to control group members. Qualitative and quantitative analysis revealed that the wholesalers were unaware about their heart problems due to their occupation. So, it is recommended that association of wholesalers must arrange at least one compulsory medical checkup camp for wholesalers within six months.
**Keywords:** Wholesalers; Occupational health; Physical activities; Comfort level**.**

## 1. Introduction

Researchers founded that risk of diseases to people varies with their occupation. The people who work in less physical activity occupations such as wholesale etc. are at more risk of heart disease and stroke. The people working in wholesale have highest percentage of heart disease and stroke [1]. The wholesalers play an important role in Supply Chain Management. Wholesale is the sale of goods to retailers, industrial, institutional or to other wholesalers and related subordinated services. It is the sale of goods to anyone other than a regular consumer. The physical inactivity in this occupation leads to obesity which was associated with hypertension, type II diabetes, sleep disordered breathing, cancers and cardiovascular diseases. The major impact of obesity was on cardiovascular diseases and also was associated with reduced survival [2]. There was association between physical activity and cardiovascular diseases. High and moderate level of physical activities at occupation has beneficial impact in reducing the coronary heart disease risk and stroke [3]. Cardiovascular disease is one of leading cause of deaths in India. There was an increase in prevalence of cardiovascular diseases in India in comparison with other developing countries [4]. According to the World Health Report, 2002, cardio vascular diseases will be the largest cause of death and disability in India by 2020 [5]. United Nations reported that non-communicable disease like cardiovascular, diabetes and cancer can cost the Indian economy around $ 6.2 trillion during the 2012-2030 [6]. Suddenly entering and exiting from air-conditioned cause health problems such as dizziness, eye strain, accelerated respiration and heart rate in people due to thermal discomfort [7]. Increase in age results many structural and functional changes in cardio vascular system. Even if there was no cardio vascular disease, then also age was strongly associated with age related decreased aerobic capacity. Physical activity had positive impact on these health-related changes [8]. Prevalence of hypertension was high among males having age more than 35 years and dietary habits associated with the job showed significant association with hypertension [9]. There was positive association between occupational noise and hypertension [10]. Obesity, blood pressure and ratio of total cholesterol to HDL (High Density Lipoprotein) cholesterol associated with heart disease [11]. Air pollution causes high prevalence of symptoms of angina and cardiovascular diseases [12]. Hypertension was leading risk factor for deaths and disability worldwide. It can be controlled through behavior changes such as weight control, more physical activities, no smoking and reduced salt [13]. The present research work was done to know about the

occupational health hazards among wholesalers and also recommend ways to reduce occupational health hazards among wholesalers.

## 2. Materials and methods.

Fig. 1 represents the block diagram of various steps undertaken to conduct the present research work.

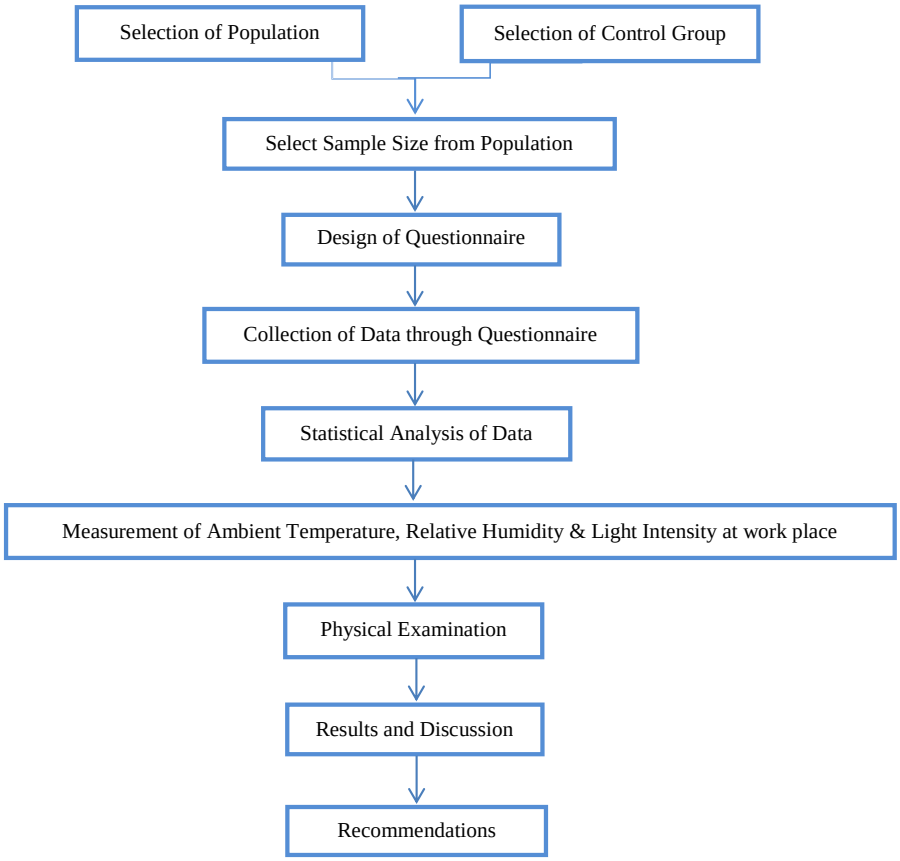


Fig. 1. Block Diagram of Methodology

### 2.1 Selection of Population

Ludhiana is a major industrial center of Northern India and also was referred as India's Manchester due to its industries. There are many wholesale markets which deal with industrial goods, machine parts, auto parts, household appliances, hosiery and garments. For the present research work, the wholesalers of wholesale market of cloths and garments were selected as population due to their more comfort level (air-conditioned environment) and less physical activities at their workplace as compared to wholesalers of similar product and other products in other markets.

Total number of wholesalers in market = 320. Out of 320 wholesalers, sample was selected randomly with confidence level of 95% and confidence interval of 11. Thus, the sample size of wholesalers selected for present research work = 64. This sample size is also in tune with the Pareto Principle.

### 2.2 Selection of Control Group

Control group having almost same age groups as wholesalers was selected from other occupations in which persons do more physical activities and having less comfort level as compared to the wholesalers. Control group was selected from occupations like Agriculture and Dairy Farms etc.

Total number of persons in control group for present research work = 64.

### 2.3 Design of Questionnaire

Design of questionnaire was done with the help of online research, books, research papers and discussion with experts. It was designed for the purpose of identification of occupational health hazards. Questionnaire was divided into four parts:

1) Personal information.
2) Work related information.
3) Health related information.
4) Food intake and exercise related information.

Personal information part has 10 questions to know about the personal information such as age, weight, height, marital status and education etc of the person. Work related information part also has 10 questions to know about the work-related information such as nature of work and time spend on work in a day etc of the person. Health related information part has 5 questions to know about health-related information such as health problems etc to the person. Food intake and exercise related information part has 6 questions to know about food intake and exercise related information of a person. Pilot study was done on 10 wholesalers and 10 control group members to check the reliability of the questionnaire and to carry out further research work.

### 2.4 Statistical Analysis of Data

Statistical analysis of data was done with the help of SPSS Software. For the statistical analysis of data, raw information gathered through questionnaire was converted into Likert scale. Pearson Correlation was used to check the correlation between physical examination results. Pearson correlation is used to measure the strength of a linear association between two variables.

### 2.5 Measurement of Ambient Temperature and Intensity of Light

Ambient temperature measurement was done with the help of room temperature thermometer and Intensity of light was measured with the help of illuminometer. Readings of ambient temperature and intensity of light was taken at different days from 10AM to 8PM after an interval of one hour.

### 2.6 Physical Examination

For the quantitative study due to financial and time constraints 22 members of each group was selected randomly from the questionnaires with confidence level of 95% and confidence interval of 12. Blood pressure measurement, BMI and ECG were done on selected members of each group to check health related problems.

ECG of 22 members from each group was examined to check the heart problem in wholesalers as compared to the control group. It was done with temporary electrodes, TrueST and Computer software. ECG's was done with the help of an expert.

Body Mass Index was found by measuring weight and height of wholesalers and control group. It was done to check the underweight, normal, overweight and obesity in both groups.

$$BMI = \text{Weight in kg} / (\text{Height in m})^2$$

Its unit is $kg/m^2$.

Hypertension was checked by measuring the Systolic and Diastolic Blood Pressure of wholesalers and control group at Morning, Afternoon and Evening for three different days of week to check the burden of the work. It was done with the help of Automatic Blood Pressure Monitor.

## 3. Results

### 3.1. Qualitative Analysis

For marital status, percentage difference in percentage of respondents of both types of respondent's groups for married and unmarried was 7%.

Level of education among wholesalers and control group shows that approx. 8% more control group members were illiterate. Approx. 17% more control group members done metric, approx. 18% more wholesalers done senior secondary and approx. 3% more control group members have done diploma. For graduation this percentage was same and 11% more wholesalers have done other degrees.

The heredity health problems among the wholesalers and control group members were almost negligible as only 3% wholesalers possess some heredity health issues.

Average sitting time of wholesalers in a day during their occupation was 7.39 hours and for control group it was 2.12 hours. Wholesalers deal with their occupation from 11.65 years while control group members deals with their occupation from 11.40 years. For this study it was needed that both the groups were involved in their occupation from same time.

For health-related problems, approx. 8% more wholesalers have health related problems as compared to control group members.

For chest pain, approx. 22% more wholesalers feel chest pain as compared to control group members. For fatigue difference was approx. 25% and more wholesalers feel chest pain. For back pain difference was approx.

11% and wholesalers feels more back pain. For high cholesterol, approx. 18% more wholesalers have high cholesterol as compared to control group members. For high blood pressure, approx. 21% more wholesalers have faces this problem as compared to control group members. For shortness of breath during activities difference was only 7% and control group members feels this problem more as compared to wholesalers. Very less number of respondents of both selected groups have problem of heart problem.

It has been found that approx. 10% more control group members were non-vegetarian as compared to wholesalers. Approx. 16% more control group members were like and eat spicy food as compared to wholesalers. Almost similar number of respondents was drunker in both groups. Approx. 9% more wholesalers were smokers as compared to control group members and in total percentage of respondents there was less number of smokers. For Exercise, only 7% more wholesalers exercise as compared to control group members but percentages of people who exercise in both groups were less.

### 3.2 Quantitative Analysis

Fig. 2 shows that large number of wholesalers faces hypertension as compared to control group members. Blood pressure measurement was checked on 3 different days on different timing (morning, afternoon and evening) of day on both persons those were selected for physical examination. Table 1 shows the blood pressure at different timings of day in wholesalers and control group members. It shows that blood pressure increases with exposure to work.

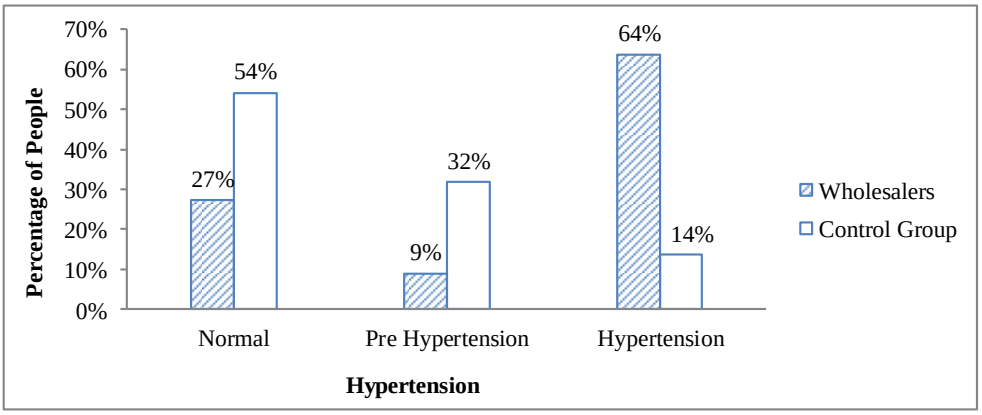


Fig. 2. Hypertension among Wholesaler and Control Group

Table 1 Comparison of Blood Pressure of Wholesalers with Control Group at Different Timings of Day

| | **Average Blood Pressure** | | | | | |
|---|---|---|---|---|---|---|
| | **Morning (9am to 10am)** | | **Afternoon (1pm to 2pm)** | | **Evening (7pm to 8pm)** | |
| | Systolic (mm Hg ) | Diastolic (mm Hg) | Systolic (mm Hg ) | Diastolic (mm Hg ) | Systolic (mm Hg) | Diastolic (mm Hg) |
| **Wholesalers** | 138.9±14.5 | 87.6±10.6 | 142.5±14.2 | 89.6±9.3 | 143.7±13.8 | 90.5±8.5 |
| **Control group** | 128.5±15.2 | 80.3±9.7 | 130.7±15.1 | 82±9.9 | 134.3±13.9 | 82.4±9.3 |

Fig. 3 shows the comparison of BMI in wholesalers and control group members. ECG was used to check the heart problems among wholesalers and control group. Fig. 4 shows the results of ECG.

Correlation was used to correlate between the parameters such as group, age, sitting, experience, BMI, hypertension and heart problem. Table 2 shows that group having a positive correlation of 0.813 with sitting, group also having a positive correlation of 0.308 with hypertension, age having a positive correlation of 0.812 with experience, age also having a positive correlation of 0.351 with BMI, age also having a positive correlation of 0.349 with heart problems, sitting having a positive correlation of 0.500 with BMI, sitting also having a positive correlation of 0.348 with hypertension, BMI having a positive correlation of 0.485 with hypertension, heart problem having a positive correlation of 0.540 with BMI, hypertension having a positive correlation of 0.469 with heart problem.

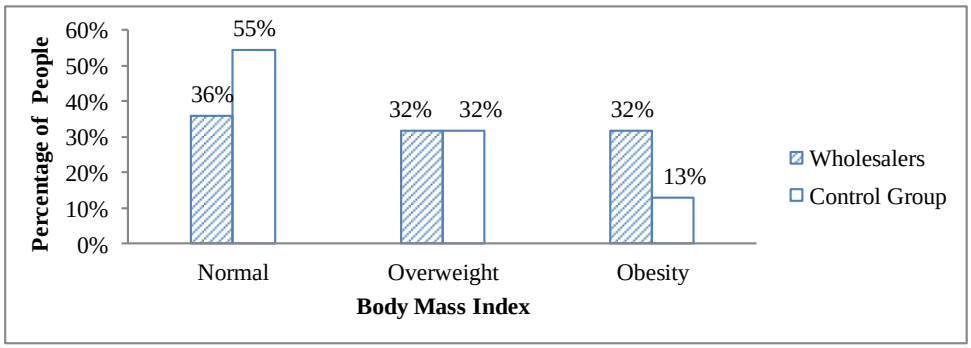


Fig. 3. BMI among Wholesalers and Control Group

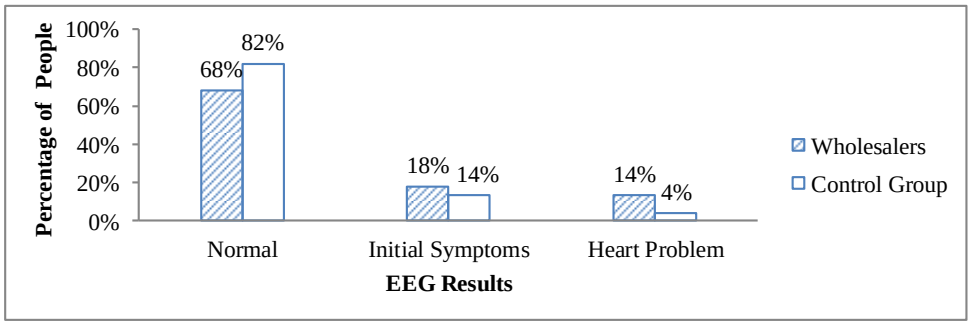


Fig. 4. ECG results of Wholesalers and Control Group

Table 2 Coefficient of Correlation between different Physical Examination Parameters

| | | **COEFFICIENT OF CORRELATION** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Occupation | Age | Sitting | Experience | BMI | Hyper-tension | Heart problem |
| Occupation | Pearson Correlation | 1 | -0.058 | **.813**** | -0.178 | 0.291 | **0.308*** | 0.237 |
| | Sig (2-tailed) | | 0.709 | **0.000** | 0.246 | 0.055 | **0.042** | 0.122 |
| Age | Pearson Correlation | -0.538 | 1 | 0.103 | **0.812**** | **.351*** | 0.290 | **0.349*** |
| | Sig (2-tailed) | 0.709 | | 0.507 | **0.000** | **0.019** | 0.056 | **0.020** |
| Sitting | Pearson Correlation | **.813**** | 0.103 | 1 | -0.029 | **.500**** | **.348*** | 0.127 |
| | Sig (2-tailed) | **0.000** | 0.507 | | 0.851 | **0.001** | **0.021** | 0.411 |
| Experience | Pearson Correlation | -0.178 | **.812**** | -0.029 | 1 | 0.254 | 0.192 | 0.223 |
| | Sig (2-tailed) | 0.246 | **0.000** | 0.851 | | 0.097 | 0.212 | 0.145 |
| BMI | Pearson Correlation | 0.291 | **0.351*** | **.500**** | 0.254 | 1 | **.485**** | **.540**** |
| | Sig (2-tailed) | 0.055 | **0.019** | **0.001** | 0.097 | | **0.001** | **0.000** |
| Hypertension | Pearson Correlation | **.308*** | 0.290 | **.348*** | 0.192 | **.485**** | 1 | **.469**** |
| | Sig (2-tailed) | **0.042** | 0.056 | **0.021** | 0.212 | **0.001** | | **0.001** |
| Heart problem | Pearson Correlation | 0.237 | **0.349*** | 0.127 | 0.223 | **.540**** | **.469**** | 1 |
| | Sig (2-tailed) | 0.122 | **0.020** | 0.411 | 0.145 | **0.000** | **0.001** | |

### 3.3 Comparison between Qualitative and Quantitative Studies

For wholesalers, in quantitative study 73% have high blood pressure and for qualitative study only 59.37% of wholesalers have high blood pressure. For control group, in quantitative study 46% have high blood pressure and for qualitative study only 37.5% of control group members have high blood pressure. Fig. 5 shows that in quantitative study results both wholesalers and control group have more problem of high blood pressure as compared to qualitative study.

For wholesalers, in quantitative study 32% have heart problem and for qualitative study only 6.2% of wholesalers have heart problem. For control group, in quantitative study 18% have heart problem and for qualitative study only 3.1% of control group members have heart problem. Fig. 6 show that in quantitative study results both wholesalers and control group have more problem of heart problem as compared to qualitative study.

Table 3 shows the mean and standard deviation of ambient air temperature at workplaces of both selected groups. Readings of ambient temperature was taken at different days from 10AM to 8PM after an interval of one hour. It clearly shows that large difference in the working environment of wholesalers from control group. It shows high comfort level of wholesalers as compared to control group members.

Mean and standard deviation of intensity of light was shown in table 4. Its readings were also taken at different days from 10AM to 8PM after an interval of one hour on both places. It shows the differences in level of intensity of light at workplace of both groups but it have caused any major effect on body of both group members.

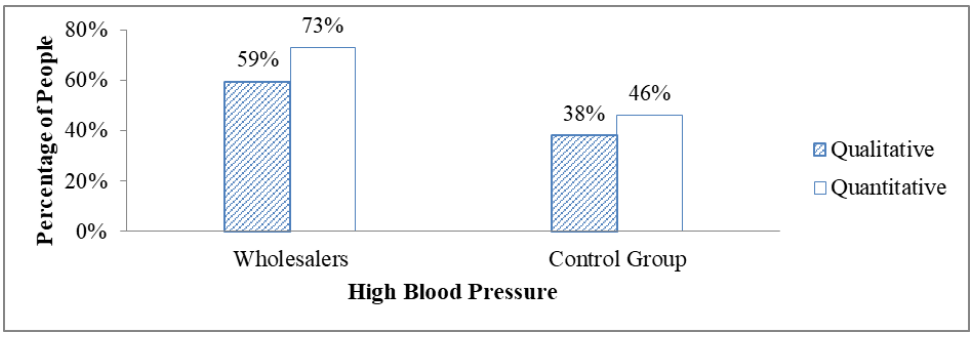


Fig. 5. Comparison between Qualitative and Quantitative Studies for High Blood Pressure

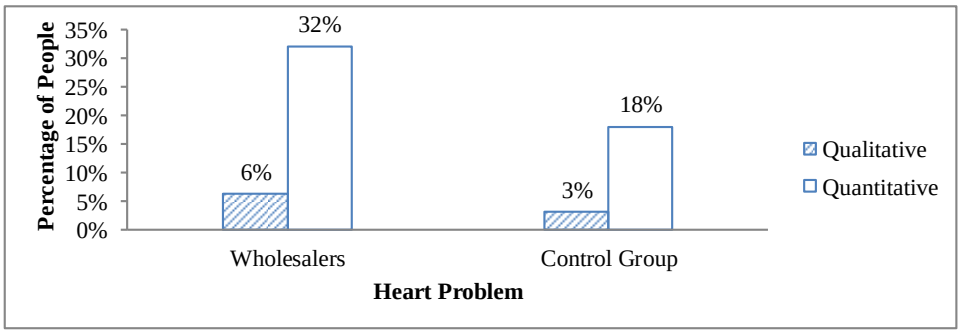


Fig. 6. Comparison between Qualitative and Quantitative Studies for Heart Problem

Table 3 Comparison of Ambient Air Temperature at Workplaces of Wholesalers and Control Group Members

| **Respondents** | **Parameter** |
|---|---|
| | **Ambient Temperature (in ˚C)** |
| **Wholesalers Mean ± SD** | 26 ± 1.2 |
| **Control Group Mean ± SD** | 36.50±1.9 |

Table 4 Comparison of Intensity of Light at Workplace of Wholesalers and Control Group Members

| **Respondents** | **Parameter** |
|---|---|
| | **Intensity of Light (in lux)** |
| **Wholesalers Mean ± SD** | 1050 ± 80 |
| **Control Group Mean ± SD** | 840±50 |

## 4. Discussion

Results of hypertension shows that mental burden of occupational work was more in wholesalers as compared to control group members. Sitting was positive correlated with BMI and hypertension. Both BMI and hypertension was also positive correlated with heart problems. It also shows that wholesalers were also exposed to cardiovascular diseases. The following recommendations have been proposed to reduce health problems among wholesalers:

1) Environment Changes. Entering and existing from air conditioner causes health problems such as accelerated respiration and heart rate (Xiong et al., 2015). Average ambient air temperature in wholesale market was 26˚C and average ambient air temperature of environment outside market was 36.5˚C so there was large difference in temperatures. To solve this problem, it was recommended that 1 hour before closing market, temperature is slowly increased in steps (increase 2˚C after interval of 15min) up to 32˚C to control large step changes in ambient air temperature of wholesalers.

2) Exercise. Physical activities and exercise were beneficial to decrease in the cardiovascular disease occurring with age (Vigorito and Giallauria, 2014). Average sitting period of wholesalers during the working hours was 7.39±0.96 hours and for control group members it was 2.12±0.86 hours. It shows that wholesale occupation has very less amount of physical inactivity as compared to other occupations. So, for health of wholesalers it is important to do exercise but according to information which was gathered through questionnaire only 27% of wholesalers do exercise. Due to this reason wholesalers have more health problems as compared to control group. So, it is recommended that all wholesalers of different ages do moderate exercises (such as 3.2 km walking in 30 mins, running 2.4 km in 15 mins, jumping rope for 15 mins and walking stairs for 15 mins etc are types of moderate exercises) in daily routine.

3) Routine Health Check-ups. Qualitative study results show that only 17% of wholesalers went for monthly health check-ups while other 83% went for monthly check-ups only when they get sick or injured. It shows the lack of interest for health check-ups but due to less physical activities of wholesalers, this occupation has direct exposure to many health problems and without health check-ups wholesalers even not know about their problems in initial stages. Due to busy schedule of wholesalers they also have not went for health check-ups. So, it was recommended that association of wholesalers arrange medical health check-ups camps for wholesalers at least after an interval of six months which are compulsory for each wholesaler of market.

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