

# The Analysis Of Gastrointestinal Symptoms Impacted By Whole Body Vibrations On Workers Of Deliveryman And Helper With Age 40 Years PT. Coca Cola Amatil Indonesia

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## **Abstract**

*The study of whole body vibration has been widely applied in various industries by demonstrating the various impacts and complaints. The objective of this research is to analyze the study of gastrointestinal symptoms, dyspeptic derived from whole body vibration deliveryman workers and helpers within distribution vehicles due to engine vibration transmitted through the vehicle seat. The design of the study was using cross-sectional design. The sampling technique used purposive sampling; as many as 60 workers were aged less than 40 years from a total of 75 workers in the field of distribution for North Medan operational areas, and focused on the 30 distribution trucks. To analyze the gastrointestinal symptoms of dyspeptic due to the effects of whole body vibration that was affecting to the workers, electrically analysis with IBM SPSS software version 20. The results that vibration which exposes to helper seat to reach average of  $7.15 \text{ m/s}^2$  and deliveryman seat reach average to  $6.68 \text{ m/s}^2$ . According to the standard comfortable reaction, the result that obtained can cause a reaction that is very uncomfortable for the workers. The amount of exposure received helper due to engine vibration propagation directly received through a seat before it spread to the seat of deliveryman. A total of 12 people from the deliveryman and 9 helper suffered of dyspeptic symptoms and dyspeptic symptoms based on the statistics that come from whole body vibration of workers due to machine vibration of distribution trucks. This condition is seen from the results of chi-square calculation on each group of workers, which shows the chi-square test> tables and chi-square probability  $<0.05$  in each group of workers. This means that there is a correlation between the impacts of vibration that exposes to the workers during the activity distributes bottled beverage with the advent of dyspeptic symptoms in workers.*

*Keywords : Gastrointestinal, dyspeptic, Whole Body Vibration*

## **1. INTRODUCTION**

The study of whole body vibration in various industries has been widely performed and the results of the study show that the most common body-sustained complaints of the workers are lower back pain, blurred vision, pain, shakiness of internal organ damage to the neck and shoulders is an ergonomic problem often encountered in the workplace, especially in relation to the strength and resilience of humans in doing their work. The problem is commonly experienced by workers who do the same movement and repeated continuously. (Manuaba, 2005)

In 2008 A.D. Adli, et al., Has conducted a study of the relationship between whole-body vibration and dyspepsia symptoms located in the same company but showed no significant correlation, this may be influenced by various variables.

During the duties as a Company Doctor at the Clinic PT. Coca- Cola Amatil Indonesia Northern Sumatra in Medan from 1998 to 2004 the authors found that many patient visits, especially from the delivery department and its supporters (helper), complained of disturbances

in the digestive system. The authors suspect the correlation of the delivery work and its supporters (helper) in the use of transportation every day for more than eight hours.

PT. Coca - Cola Amatil Indonesia Northern Sumatra is one of the companies engaged in soft drink bottles in the city of Medan, North Sumatra. Workers who operate in the distribution of beverages to outlets consist of two parts, called the deliveryman and the helper. These workers in addition to distributing bottles of drink, also have to pass the days of work on medium-sized land transportation. Medium-sized means of land transportation is the type of vehicle that puts the engine on the bottom of the seat in the cabin of the vehicle. Allegedly, the workers will get a potential hazard due to engine vibration and vibration arising from the route of distribution of bottled beverages. Transportation disruption is not separated from the effects of vibration caused by environmental conditions are crossed and the condition of the vehicle. Vibrations in the vehicle are transferred to the human body through the feet, standing or sitting, buttocks on the seat or buffers on the chair (Identification of Whole Body Vibration, [www.safetyline.wa.gov.au](http://www.safetyline.wa.gov.au)). The entire vibration media above, can cause a whole body vibration (Whole Body Vibration) that brings health effects to humans. Effects that can be caused in the form of fatigue, complaints of spinal column disease, affect the cardiovascular system and diseases of the digestive system Identification of WholeBodyVibration ([www.safetyline.wa.gov.au](http://www.safetyline.wa.gov.au))

Ergonomics is a science that cares about the harmony of human beings and their work. This science puts man as the first element, especially his ability, skill and limitations. Ergonomics goal is making work, tools, information and environment to be harmonious with each other.

PT.Coca - Cola Amatil Indonesia has workers from the delivery department (deliveryman) and supporters (Helper) consisting of 75 peoples consisting of 30 persons of goods delivery and 45 supporters, divided into two operational areas, namely North Medan and South Medan (secondary data of PT.Coca Cola Amatil Indonesia 2014)

Based on data of patient visits at company clinic in 2004, there were 89 cases of group Gastrointestinal, dyspepsia symptoms in 35 cases. The symptoms of dyspepsia cannot be ascertained simply caused by the vibration of the whole body, this symptom is latent / hidden. Experiments and investigations, providing some answers to the vibration transfer to the body and having an impact on comfort and innateness (Griffin, 1990).

This study objectives to analyze the effects of the whole body vibration that can cause symptoms of gastrointestinal symptoms of dyspepsia originating from the vibrations of the deliveryman's entire body and helper due to the vibration of the distribution vehicle engine transmitted through the vehicle seat and get a large vibration that received by deliveryman and helper which is capable of causing dyspepsia symptoms also aims to get the number of workers (percentage of workers) who show symptoms of dyspeptic.

## **2. RESEARCH METODOLGY**

### **II.1. Methods Approach**

The study methods used a cross-sectional design. The cross-sectional design was chosen because this study was conducted only once, each study subject was observed only once and the measurement was done on the subject variable at the time of the examination, given the limited time and cost. But the disadvantage cannot determine which cause and effect because of the examination in a certain time. This study does not use cohort design because it will take a lot of time and cost. The purpose of this study is to know whether the vibrations in the deliveryman and the helper under 40 years in the vehicle distribution cabin are related to the symptoms of gastrointestinal (dyspeptic) in deliveryman and helper. Vibration measurements are made using a vibrometer tool, measurable vibration results are fed into a special table that includes time domain and frequency domain measurements.

Symptoms of gastrointestinal (dyspeptic) in workers, can be known from a questionnaire filled by deliveryman and supporters (helper). Several variables in the questionnaire were adopted from the gastrointestinal disorder questionnaire life or disability

insurance to the RBC life insurance company and guidance counseling experts in the field of occupational health and safety. Method of measuring the questionnaire using Guttman scale. The use of this scale is suitable to find out the symptoms of dyspepsia that arise in workers. Guttman scale, will see the complaints that often arise from symptoms of dyspepsia in workers. Thus, based on the classification made The American Gastroenterology Association 1987 can be determined whether workers are exposed to symptoms of dyspeptic or not.

## II.2. Objects and Variables of the Study

The study object used as sampling is: 60 employments of PT. Coca-Cola Amatil Indonesia who served as a deliveryman 30 people and who served as a helper 30 people under the age of 40 years (*purposive sampling*) of a total of 75 workers who served in the operational area of North Medan and the entire number of vehicles of distribution belongs to PT. Coca - Cola Amatil Indonesia in charge of North Medan operational area of 30 units was researched and measured. Categorized of the vibration data and dyspeptic symptoms data which also has been categorized be processed electrically using IBM SPSS version 20 software and the data were analyzed with univariate and bivariate as well as statistical test used chi square test with the formula:

$$\chi^2 = \frac{\sum (O - E)^2}{E}$$

Information :

- $\chi^2$  = Chi Square
- O = Observation Value
- E = Expected Value

## II.3. Determining the Hypothesis

H0: There is no significant relationship between the 2 categorical variables

If the value of  $P > 0.05$  then H0 is accepted which means There is no significant relationship between the 2 categories variables. (Singgih,2004). In addition, cross-tabulation (Crosstabs) was used to calculate Prevalence Ratio (PR) and Confidence Internal (CI) 95% The variables of this study are: Independent variables: Vibration on deliveryman and helper seats in the distribution vehicle cabin and dependent variable: Gastrointestinal (dyspeptic) symptoms on deliveryman and helper.

## 3. RESULT AND DISCUSSION

### III.1. Result

The largest mean value of vibration that exposed to the workers is from the helper group amount 7.15 m / s<sup>2</sup>; It means having a very uncomfortable reaction based on the comfort reaction standard and it is within a potential health risk zone based on the health guidance zone for 8 working hours refer to the ISO 2631-1: 1997.

The average vibration value exceeds the comfort reaction and the health guideline zone standard for 8 hours of work based on ISO 2631-1:1997 in the deliveryman and helper groups shows the average level of vibration in the working group derived from the road conditions and the condition of the vehicles that used. The amount of exposure received by the helper is caused by the propagation of the engine vibration directly received by the helper through the seat before creeping into the deliveryman seat. The vehicle's distribution machine is just under the helper seat. The propagation of the engine vibration to the deliveryman's seat was slightly muffled by the distance between the helper's seat and the deliveryman. Vibration is said to be

normal, if the engine vibration generated does not exceed the value of  $0.315 \text{ m / s}^2$  set by the International Standard. Conversely, it is said to be above normal, when the engine vibration generated exceeds the value of  $0.315 \text{ m / s}^2$

The distance between the seats inter the workers, does not cause the vibration value to fall below the ISO 2631-1: 1997 standard. When viewed from the health sector through the health guide zone for 8 hours of work based on ISO 2631-1: 1997, the vibrations that accrue the delivery man and helper are in the potential health risk zone. The definition of this zone indicates the possibility of workers to be exposed to various health impacts, such as; spinal injuries, difficulty urinating, prostate disorders, increased balance problems, vision problems, headaches, sleeplessness, and similar symptoms, in addition to stomach and digestive problems.

### *III.2. Discussion*

1. Comparison of time workers in the vehicle with the results of the exposure of vibrations received by workers.

Within 45 minutes, the greatest vibration occurred in the helper group of  $0.623 \text{ m / s}^2$ . According to the standard reaction reaction of ISO 2631-1: 1997, the comfort reaction to vibration gives a slight discomfort, although the vibration level is in an acceptable area of the helper body.

Average vibration exposure to workers in comparison time length of worker in distribution vehicle, vibration exposure rouses a little discomfort on 30 minutes and 45 minutes on the deliveryman, as well as 25 minutes to 45 minutes on the helper. This condition occurs when the worker goes to the outlet location and returns to the factory after carrying out the task. The average worker is in the vehicle for 5 minutes to 20 minutes. The vibrations that exposed workers within this timeframe do not present health symptoms according to the comfort reaction standard and the ISO 2631-1: 1997 health guidance zone. Keep in mind, although within a short span of time there is no effect on the health impact for workers, but for a long time with the level of vibration accumulation, will cause health impact to the worker's body.

2. Data on the incidence of dyspepsia symptoms in workers

In the worker group of deliveryman had 12 workers who suffered dyspepsia while the helper had the number of workers who experienced dyspepsia symptoms as many as 9 people.

3. The chi-square test results in the delivery man and helper groups

In the deliveryman group, if seen from its probability value, the asymptotic significance value is 0,018; It means probability  $<0.05$ , which means that  $H_0$  is rejected. From the above analysis, it can be concluded that  $H_0$  is rejected or there is a relationship between the symptoms of dyspepsia that arise in workers with the vibration of the vehicle engine.

In the helper group, when viewed from its probability value, the asymptotic value significance is 0,026; Means probability  $<0.05$ , which means that  $H_0$  is rejected. From the above analysis, it can be concluded that  $H_0$  is rejected or there is a relationship between the symptoms of dyspepsia that arise in workers with the vibration of the vehicle engine.

It should be highlighted in this study that in the deliveryman and helper workers groups experiencing symptoms of dyspepsia due to vibration and the average vibration that exposes the worker is considered very unpleasant and is in the likely health risk zone, and based on statistical analysis, between the vibrations that the workers Activity to distribute soft drink bottle products, there is a significant impact with the onset of dyspepsia symptoms on the workers. Means, symptoms of dyspepsia that arise in the deliveryman and helper is mainly caused from the vibration of the vehicle distribution Vibration arising from the vibration of the engine is also

affected by the condition of the road conditions traversed. Most of the workers crossed the route that has relatively good road conditions and no holes, although there are some conditions that the condition of the road is very bad. But the condition of the road is not traversed every day, there is a time interval through the route. The likelihood of occurrence of dyspepsia symptoms in some workers is due to a good seat cushioning system. Good seated cushion can absorb vibrations arising from a variety of factors, because in a sitting condition the whole human body can be regarded as a single mass on the vibration. It is thought to be the greatest impact of vibrations on workers other than the onset of dyspepsia symptoms, as well as the disruption of the tasks that occur together with the rapid onset of fatigue.

Fatigue is increased due to the worker itself, especially the helper must do the activity of lifting and sorting bottle of drink at every outlet visited. Fatigue causes increased heart rate and blood pressure, muscle tension, hormone levels, metabolism, and brain activity. Muscle fatigue also occurs when the muscles try to react to the vibrating force to maintain balance, protect and support the spinal column, but this is always slow at the time of the muscular and the nervous system can not react fast enough in the impact of vibration and contain the execution of the body.

Company policy for vehicle maintenance of distribution vehicles in continuous periodic time, possibly minimizing extreme machine vibration and keeping workers from dyspepsia symptoms. Well-maintained machines will facilitate the process of running any motor drive as a vibration mechanism of a machine. Before starting the distribution activities the helper must check the fuel, oil, water radiator, brake fluid, wheel air pressure, and the completeness of the vehicle letter. All of the above factors greatly affect the size of the vibrations that arise in the distribution process. If all the above factors are well maintained, the vibrations that arise will not affect the workers in the vehicle distribution. In addition the company also provides clinics equipped with doctors and nurses who are trained in treating general complaints of workers. This can reduce the incidence of symptoms interfere with the comfort of workers, workers directly consult with doctors who served in the clinic and if should get a drug can be obtained with free of charge.

Previous research by A.D. Adli, et al. In the year 2008 showed no significant correlation between the vibrations that exposes workers during activity with dyspepsia complaints there should be a significant correlation with not to be included the crucial demographic factors that is the age of workers. Ages of less than 20 and more than 40 years (usually this age have many who experience degenerative diseases) are more susceptible to the effects of vibration throughout the body.

At the time of the A.D. Adli, et al. In 2008, the Management of PT. Coca- Cola Amatil Indonesia in connection with advice and input from the company's doctors are still very concerned about vehicle maintenance, especially the replacement of the engine bench to reduce the vibration generated.

At the time this research was conducted, the maintenance and procurement operation of the delivery vehicles was handed over to third parties so the maintenance, especially those related to the engine vibration, was less of a concern so that the average vibration became more varied.

#### **4. CONCLUSION**

From the results in the field and the discussion, the following conclusions can be determined:

1. According to statistical analysis, there is a significant correlation between the vibrations occurring in the vehicle distribution with the onset of dyspepsia symptoms in the worker so that the research question about the effect of vibration of vehicles related to dyspepsia complaints has been answered plus the statistical test result  $p < 0,05$ .
2. A description of the characteristics of workers complaining of dyspepsia disorder is a worker in a distribution department who is under 40 years old, serving as a deliveryman of 12 people and a helper of 9 people obtained from questionnaire.
3. The amount of vibration that is capable of causing the disturbance is the average value of vibration that reaches the deliveryman of  $6.68 \text{ m} / \text{s}^2$  and the helper of  $7.15 \text{ m} / \text{s}^2$ , this

condition means that the vibration occurs in a very uncomfortable reaction and is likely Health risk zone.

4. Limitations of the study: that in this study the respondents did not included their common characteristics such as Age, Body Weight, smoking habits, drinking alcohol, gastric disease, diabetes and hypertension

## 5. SUGGESTION

From the conclusions obtained, there are some suggestions that can be used as input as follows;

1. Vibration in the seat of the vehicle distribution, can be reduced by carrying out seating maintenance to reduce the vibration sourced from the engine of the vehicle and periodic maintenance of the engine, especially the replacement of the bench holder of the vehicle operational engine and the addition of vibration dampers on other seats.
2. Treatment of dyspepsia symptoms in workers can be done with a healthy lifestyle and always consulted with a doctor, especially with a company doctor so that it can be given input directly to the responsible management of the Occupational Health and Safety issues.
3. Employees recruitment by the company for deliveryman and helper is preferred for those under 40 and free of degenerative diseases.
4. It is necessary to rejuvenate operational vehicles and their maintenance is controlled directly under the management of PT. Coca-Cola Amatil Indonesia and shall not handed over to third parties in order to increase work productivity and reduce lost working hours from employees.
5. If there any further research on the impact of vibrations that induce gastrointestinal symptoms and other symptoms should use advanced research methodologies such as cohort or case study methodology.

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