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IOT and Cloud Based Technique to Track and Monitor the Work and Well Being of the Street Sweepers

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ABSTRACT

Street cleaning is an important part of the waste management system. There are different ways to get clean roads depending on the availability of equipment, the type and size of the contaminants, the above conditions encountered or the traffic conditions. Generally, hand cleaning is individual Employee or team, pipe hitting, or machine sweeping or beating is used. For information on the feasibility and suitability of Occupational health hazards for street cleaners, current international literature, and related German laws, were also reviewed. Road cleaning covers a wide range of health hazards for workers. These can be categorized into activity outcomes and outcomes of operating conditions such as weather or road congestion. Accidents are caused by physical, chemical and biological exposure, but they can also be caused physical and mental burden or inadequate safety features. The most commonly reported work-related complaints are musculoskeletal as well respiratory disturbances, cuts, slipping, and road accidents. In developing countries, street cleaners seem to be exposed to the dust again and again, to many cases; no appropriate protective measures are available. Especially in industrialized countries there are a number of standards and recommendations for waste workers who aim to reduce their health impact on the workplace.

I. INTRODUCTION

Human health is adversely afected by exposure to occupational and environmental exposure and extreme weather conditions. Outdoor workers, particularly those in the informal sector, such as autorickshaw drivers, street sweepers, construction workers, and street vendors, are more susceptible to occupational exposure as little or no attention is paid to their health by the authorities. They are exposed to multiple occupational risks due to road dust, construction dust, vehicular emissions, industrial fumes, and more extreme weather events

tend to decrease the efciency and productivity of these groups of workers and expose them to unhealthy working conditions

In developed countries, occupational health and safety are given due importance. However, in the case of developing countries, these issues are usually neglected, and workers are left without proper protection and safety equipment. In India, millions of workers are engaged in physically demanding jobs like agriculture, stone grinding, construction work, sweeping, and vending work without protection and are thus exposed to extreme conditions and other occupational hazards

II. LITERATURE REVIEW

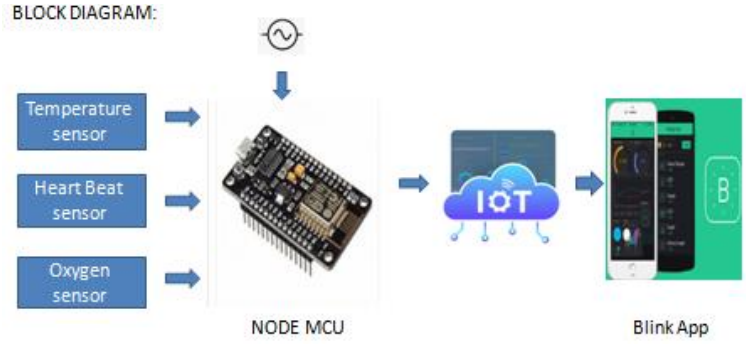
Dust includes the most commonly found harmful particles in the atmosphere, and street sweepers are exposed to a combination of soil, sand and gravel dust particles, vehicle dust, bioaerosols and plant particles. In some studies, sneezing, coughing, eye irritation, lung tissue swelling, asthma and throat infections were found to be more prevalent among individuals exposed to occupational dust. Moreover, the symptoms associated with impaired lung function may lead to occupational lung diseases. The long and continuous inhalation of non-industrial dust by street sweepers has been reported to be one of the critical factors in the development of Chronic Obstructive Pulmonary disease, resulting in obstructive ventilator patterns. When compared with other health hazards, respiratory problems are more prevalent among street sweepers. Moreover, the effects of occupational dust exposure on the reduction of pulmonary function have been confirmed. The lung diseases seen in street sweepers are often due to the deposition of harmful dust particles that are inhaled while sweeping [6]. Most of the time, workers reported passenger fatigue, and gradually the symptoms become more intense and present during the workday, tend to build conditions that may cause the onset of Musculoskeletal Disorders (MSDs) due to imposition of physical exertion such as walking, running, carry heavy loads, lowering and rising sharply associated with poor posture and other. The interest in this topic stems from concerns about the occupational risks to which cleaning agents are subject in the performance of their functions, among which are the musculoskeletal disorders that can trigger long-term disabilities that may keep them from work indefinitely [2].

Personal protective equipment, commonly referred to as “PPE” it is the equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses it includes gloves, uniform, respirators, hard hats, safety glasses, high visibility clothing, and safety footwear. In a study on sweeping practice and knowledge about occupational safety and health hazards among street sweepers of Shyamoli area in Dhaka city concluded that among the most of respondent faced Problem during work, most of them don’t have any idea about hygiene and most respondents do not use protective equipment [10]. In another study in Calabar, Nigeria, Street sweepers in Calabar do not observe internationally recommended precautionary measures against inhalation of dust, e.g. wearing of facemasks and watering of streets to minimize inhalation of dust. It is likely therefore, that chronic inhalation of dust will affect their health and lung function in particular [11]

Apart from the social marginalization that these workers face, there is insufficient health care, and this makes them more prone to specific health problems due to their occupation which include respiratory system problems, cardiovascular diseases, musculoskeletal disorders, infections, skin problems and gastrointestinal problems. Various socioeconomic factors such as poverty, lack of education, poor housing conditions and poor diet affect medical problems of those workers [7].

III. METHODOLOGY

The research design for this study was survey method. This was achieved through field observation, use of structured questionnaire and interview analysis. The data used was collected through the administration of questionnaires to randomly selected street sweepers in Ilorin Metropolis. 100 questionnaires were distributed and all were retrieved. Data Analysis The study uses percentage, pie charts, Graphs, Bar chart, table, frequency counts and mean in tables for presentation analysis and interpretation of data. The analysis of the data collected will be based on descriptive statistics SPSS 23.0 software.



IV. RESULTS AND DISCUSSION

Of the 100 street sweepers who were studied and were also the respondents, 3% of them were between the age of 10 to 20 years, 25% between 21 and 30 years, 49% between the age of 31 and 40 years and 23% accounted for the age of 41yeras and above . Also, 88% of the studied street sweepers were female while 12% were male. The educational backgrounds of the respondents were also looked into, 65% of the respondents are non-literate, 18% had education up to primary school, 14%has secondary school level education and 36% has tertiary education. The respondents also has varying durations in years they have spent on the job of street sweeping, 3% has been on the job for a duration of less than a year, 53% has been a street sweeper between 1 to5 years, 22% has been on the job for about 6to10 years.amd 22% has been on the job for over 15years. The daily period of exposures also vary among the street sweepers, 8.2% of the street sweepers studies work for about 1 to 3hours daily, 87.6% works for 4 to 6hours daily and 401% works for 7 to 9hours daily.

Table 1: showing responses on the knowledge and awareness of street sweepers of Occupational Health hazards

Questions	Response	Frequency (%)
Any training on waste handling?	Yes	27
	No	73
Any knowledge on work hazard or occupational health hazards?	Yes	77
	No	23
Knowledge of occupational health hazards	Good	10.4
	Fair	57.1
	Poor	32.5
Any Training on cleaning	Yes	41
	No	59
Training on?	How to clean the environment	61
	How to stay safe	39
Duration of training	1 week	72.5
	2weeks	7.5
	1months	20

The knowledge and awareness of street sweepers were tested, 27% of the street sweepers responded affirmatively to have undergone training on waste handling while 73% said they have no training on waste handling. 77% claimed to have knowledge of occupational health hazards while 23% has no knowledge of occupational health hazards, where 10.4% has a good knowledge of occupational health hazards, 57.1% has a fair knowledge and 32.5% has a poor knowledge of occupational health hazards. Respondents were also asked if they had any training on cleaning, 41% answered Yes to the question, while 59% said they do not undergo any training on cleaning, out of the 41% that answered affirmatively to the questions on cleaning training, 61% said they were trained on how to clean the environment, and 39% was trained on how to stay safe in their workplace. 72.5% said their training lasted for 1 week, 7.5% said they were trained for 2 weeks and 20% were trained for 1month.

The level of awareness of street sweepers to occupational health and occupational health hazards. The result above is in contrast and agreement with the study of assessing the knowledge and preventive practices about occupational health hazard among street sweepers in Delhli, India, among the respondents of about 164 which were studied, 36.6% claimed to have been trained while 63.4% did not receive any form of training on occupational health and safety, it was said that the knowledge about occupational hazards among trained respondents are more compared to untrained respondent.

The study revealed the demographic information of the street sweepers, use of PPE, training and knowledge of occupational Health Hazards by the street sweeping, and the health status or health challenges of street sweepers in Ilorin Metropolis, Kwara State Nigeria. There is poor knowledge and awareness of health hazards related to the occupation of street sweepings, also, training is low, for those that claimed to have undergo training, they were only on how to stay safe from road accidents and how to clean the environment, no proper training on the importance of the use of PPE and dangers associated with their occupations, compared to their contemporaries from other countries who sure has basic need knowledge of the occupation and hazards associated with it. The lack of adequate equipments and PPEs, has also contributed to the exposure of the street sweepers to different ailments attributed to their occupations. All the identified health issues related to their occupations can be prevented through the use of PPE. It is therefore, concluded that the people that falls within the work class as street sweepers as been neglected, the society see them as a group with no values despite the value their work contributes to the society, this neglect has made them vulnerable and exposed to different health problems. In Ilorin Metropolis, Kwara State, Nigeria, the street sweepers here are not spared

from the neglects and vulnerabilities to different health challenges like dermatological disorders, cough, cold, dyspnea etc.

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