

HEALTH HAZARDS AMONG RAG PICKERS - AN INTERVENTIONAL STUDY

SUMMARY OF THESIS

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SUMMARY

Rag pickers, also known as 'waste pickers', 'garbage collectors' are the ones who go through the garbage bins to pick the "rags". These rag pickers are women, children, and men from the lowest position in the society, which is a common sight in most cities and towns around the country. Rag picking entails the sorting, collecting and selling of these various waste materials that can be found at dumpsites, riverbanks, street corners, or in residential areas, and consist primarily of plastics, bottles, cardboard, tin, aluminum, iron, brass, and copper. Rag picking is considered the most important of all activities and it is those people who have no alternatives are driven to it. The work of the rag pickers is not always appreciated or acknowledged, although they make a positive contribution to the society by reducing the cost of collection and transportation and by reducing the burden of the dumping site. Rag pickers positively contribute to solid waste management in the cities.

Most of the rag pickers come from rural areas into big cities and metro areas for better living but are unable to find opportunities for survival, thus end up collecting rags. It is also noteworthy that, many rag pickers live on the street, are homeless and have no access to education or healthcare facilities. Rag pickers mostly work barefoot in the heat, get exposed to chemicals and hazardous substances and often suffer from life threatening diseases as a result. Rag pickers are frequently exposed to poisonous materials, contaminated wastes, and sharp-edged things, which pose a threat of injury and disease. Dermatitis and skin sensitivity can be brought on by chemicals including chlorine, fluorine, plastic additives, equipment cleaning solvents, pesticides, and fertilizers when they come into contact with the skin. Cuts and pricks at work place can cause bacterial and fungal infection. Rag pickers have respiratory problems such as sore throat, high prevalence of chronic obstructive pulmonary disease (COPD), coughing, asthma and loss of breathing. Neutrophils create inflammation that leads to respiratory problems when exposed to organic dust. Previous studies majorly concern on socio- economic aspect, some studies focusing on health aspect individually but none of studies focusing on problems of rag pickers from holistic point of view which includes social, economic, health, education, working and living condition, etc. This study describes the impact of different types of health hazards such as chemical,

physical, biological and ergonomic hazards on rag pickers as gap in the present study. This study also focuses on socio-economic conditions of rag pickers as well as to know the working and living conditions of rag pickers. Hence in the present study the researcher is tried to explore the health problems of rag pickers and find out some solution according to their problems, so far no such study has been conducted on rag pickers in Lucknow city. Hence, the present study has been taken up with following objectives:

OBJECTIVES OF THE STUDY

- 1. To determine the socio-economic status of the rag pickers.**
- 2. To explore the working pattern and living conditions of the rag pickers.**
- 3. To assess the prevalence of various types of occupational health hazards among rag pickers.**
- 4. To assess the musculoskeletal and postural discomfort among the selected rag pickers.**
- 5. To plan and execute intervention to enhance safety, comfort and efficiency among rag pickers.**

Chapter wise Summary -

The present study has been accomplished in five different chapters. Each of the chapter is full of exposure of its importance towards the fulfillment of the objectives pursued by the study. The introduction has been presented in first chapter. Chapter two dealt with review of literature. Methodology has been presented in chapter three. Chapter four dealt with analysis of primary data. This is the last chapter of the thesis, which provides summary of the whole research and brief conclusion of the research. Below, summary has been presented chapter wise.

Chapter I dealt with the introduction part it includes the brief background information of rag pickers, rag pickers statistics, definition of rag pickers, basic categories of rag pickers, causes of rag picking, problems faced by the rag pickers, issues of rag pickers.

Chapter II of the present study dealt with literature review of the relevant works conducted by different researchers, available in form of research articles, reports, theories, concepts and established models, related to the sub headings:

- Theoretical concepts and models
- Socio-economic profile of the rag pickers
- Working pattern and working conditions of the rag pickers
- Different types of occupational health hazards among the rag pickers
- Musculoskeletal and postural discomfort among rag pickers

Chapter III dealt with appropriate methodology adopted for the accomplishment of the objectives of the study. The chapter provides the blue print for conducting the whole research, i.e. short introduction of the research methods, sampling procedure, statistical tools for the analysis and testing the developed hypotheses along with, scales for the measurement of the socio-economic status, health hazards, musculoskeletal disorders and techniques used for the purpose of data collection. It also helps in preparing a frame work for the further study.

In **chapter IV**, as per the objectives and hypotheses, with the help of different statistical tests the results of the various tests and analysis has been interpreted and discussed in detail.

Major findings of the study: The major findings of the study are mentioned below:-

Demographic profile of the rag pickers:

- Total no of respondents included in this study were 400 out of which majority of the respondents (37%) belonged to the age group of 25-35 years and most of them were females (72%) and married (95.5%).
- A major portion of them (91%) belongs to the Muslim community.
- Majority of the rag pickers (72.5%) has joint family consisted of 5-10 members (50.5%).
- Most of the rag pickers (96.5%) were migrants and majority of them (61.5%) migrated from Guwahati (Assam).

Socio-economic profile of the rag pickers:

- Most of the rag pickers (69.55) were illiterate.
- Majority of them (70%) earn between 3,907-11,707 Rs per month and belongs to lower class (69%)
- Majority of the rag pickers (59%) never got any help from Govt/NGO/Community center.

Working pattern and working conditions of the rag pickers:

- Majority of the rag pickers (28.5%) are engaged in rag picking for more than 15 years and most of them (43.5%) spend 5-7 hours per day in rag picking.
- Majority of the rag pickers (71%) collect waste from dumpsites and all types of waste such as papers, cardboard, plastics, metals and glasses etc. are collected.
- Majority of the rag pickers (49.5%) collect 22-40 kg waste per day and most of them (43%) travel 5-10 km in order to collect the waste per day.
- Majority of the rag pickers (68%) did not use any safety gear while collecting the waste.
- Most of the rag pickers (42.5%) sell rags at the end of the month and get paid accordingly (monthly).
- There are multiple reasons for rag pickers to choose rag picking but majority of them (93%) said that poverty and helplessness are the main reasons for their involvement in this work.

Living conditions of the rag pickers:

- Most of the rag pickers (68%) lives in kaccha houses (tent) and did not have toilet facility (42.5%). They go to open places and about 37% have kaccha toilet.
- Majority of the rag pickers (93%) access water from the community tap.
- Most of the rag pickers (88%) have electricity facility by cable hooking and have average electricity facilities (48%).

Prevalence of health hazards among rag pickers:

- Majority of the rag pickers (72%) come in contact with hazardous substances such as biomedical waste (used syringe, gloves, bandages, pills etc.) used sanitary napkins, bleaching agents (bleaching powder and caustic soda), acid, leading to health hazards among rag pickers.
- Majority of the rag pickers suffer from eye related problems such as watering of eyes (40%), eye irritation (36%), itching in eyes (29%) and redness of eyes (26.5%).
- About 39% rag pickers reported problems of itching in hands.
- Majority of the rag pickers (54%) reported stomach ache and 40% complained diarrhea or dysentery.
- Most of the rag pickers (60.5%) suffer injuries with sharp objects.
- Frost bite (32.5%) in winter and rainy season was also reported by the rag pickers.
- Majority of the rag pickers reported fatigue (95%), headache (89%), cough and cold (83.5%) and fever (78%) in past two weeks.
- Majority of the rag pickers (73%) used home remedies while injured.

Prevalence of health hazards among rag pickers across age, gender and work experience

Independent t-test and ANOVA were used to determine whether there exist any statistically significant differences between dependent and independent variables.

Health hazards across gender

Highly significant differences were found in health hazards across gender. It was found that female rag pickers suffer more health problems as compared to male rag pickers. Symptoms like dizziness and nausea ($\mu= 0.39$), redness of eyes ($\mu= 0.38$), eye irritation ($\mu= 0.52$), watering of eyes ($\mu= 0.61$), itching in eyes ($\mu= 0.59$), stomach ache ($\mu= 0.80$), injuries with sharp objects ($\mu= 0.70$), headache ($\mu= 0.96$) and fatigue ($\mu= 0.98$) were found maximum in female rag pickers. The reason behind this may be because of the reason that they do not give priority to their own health and moreover gets involved in strenuous work for longer hours.

Health hazards across age

Highly significant differences were found in health hazards according to age. It was found that older rag pickers (55-65) experience more health problems as compared to other age groups. Skin irritation ($\mu= 0.60$), itching in hands ($\mu= 1.00$), redness of eyes ($\mu= 0.60$), eye irritation ($\mu= 0.80$), watering of eyes ($\mu= 0.80$), itching in eyes ($\mu= 0.60$), diarrhea or dysentery ($\mu= 0.60$), dengue ($\mu= 0.1.00$), frost bite in winter and rainy season ($\mu= 0.60$), road accidents and fall ($\mu= 0.60$) were found maximum among older rag pickers. Further the mean value of injuries with sharp objects, fever, cough and cold and fatigue found similar ($\mu= 0.1.00$), across age groups. Age was found to have significant impact on presence of health issues and this may be due to the reason that as a person ages, the body becomes weak physically and psychologically and hence is prone to many infections and diseases.

Health hazards according to work experience

Highly significant differences were found in health hazards according to work experience. It was found that maximum health hazards were reported by the respondents whose work experience was 10-15 years and more than 15 years. Skin irritation ($\mu=0.28$), itching in hands ($\mu= 0.53$), redness of eye ($\mu= 0.33$), watering of eyes ($\mu= 0.63$), asthma and loss of breathing ($\mu= 0.40$) was found maximum whose work experience was more than 15 years. Equal percentage of sample who works 10-15 years and more than 15 years reported problems like fever, cough and cold, headache and fatigue.

CORRELATION ANALYSIS

TESTING OF HYPOTHESIS

Correlation between age and health hazards

H₀: There exists no significant impact of age on the health hazards faced by the rag pickers.

Pearson correlation coefficient of health hazards and age was found to be moderately positive and statistically significant ($r=0.492$, $p<0.001$), so the null hypothesis was rejected and simultaneously proven.

Correlation between gender and health hazards

H₀: There exists no significant impact of gender on the health hazards faced by the rag pickers.

It was observed that the relationship between health hazards and gender was found to be positive and significant ($r= 0.350$, $p<0.001$), so the null hypothesis was rejected and it was proved.

Correlation between type of waste and health hazards

H₀: There exists no significant impact of type of waste on the health hazards faced by the rag pickers.

The data depicted that the relationship between health hazards and type of waste has low positive relationship ($r=0.112$) but significant at 5% level. Thus the null hypothesis has been rejected and it was accepted.

Musculoskeletal disorders among rag pickers (Ergonomic hazards)

- Majority of the rag pickers (85%) reported that they work in bent, twisted and sometimes adopt awkward postures.
- Most of them complained that they always lift or carry items that are heavier than 20 kg (91%).
- Majority of the rag pickers (90%) said that they do repetitive movement with their hands or wrist while lifting the garbage sack for at least three or more than three hours during a day.
- Maximum body pain was experienced by the rag pickers in neck (59.5%), shoulder (left- 80.5%, right- 87.5%), followed by wrists (left- 58.5%, right- 63.5%) and hands (left- 55%, right- 57.5%) in last one month.
- The anatomical distribution showed that 94.5% suffered maximum pain in lower back, 93.5% in upper back, followed by feet (left- 92%, right- 91.5%) in last one month.

Prevalence of musculoskeletal disorders among rag pickers accross age, gender and work experience

Independent t-test and ANOVA was carried out to determine whether there is any statistically significant differences between musculoskeletal disorders and age, gender and work experience.

Musculoskeletal disorders across gender

Mean score of all body parts of female is higher as comparison to male score and highly significant differences were found in majority of the body parts. The reason behind this may be the body structure of male and female. Man is more physically stronger than women.

Musculoskeletal disorders across age

Highly significant differences across various age groups in the MSDs was found in various body segments reveals that with increase in age the efficiency of workers reduces due to physical and physiological changes in the body. It is also evident from the data that pain increased with age wherein lowest pain was reported by the rag pickers in the age group of 15-25 years and maximum pain in the age group of 55-65 years.

Musculoskeletal disorders according to work experience

Highly significant differences were found in musculoskeletal disorders according to work experience. It was found that maximum body discomfort was reported by the respondents whose work experience was more than 15 years as compared to 0-5 years work experience. With increase of work experience, the workers had more discomfort and this may be due to the reason that, continuous pain without any treatment may have led to chronic pain and discomfort in almost all the areas.

REGRESSION ANALYSIS

TESTING OF HYPOTHESES

Regression between gender and musculoskeletal disorders

H₀: There exists no significant impact of gender on the musculoskeletal and body pain faced by the rag pickers.

For the purpose to check the cause and effect relationship, regression analysis was carried out. The hypothesis tests if gender has significant impact of body pain. The dependent variable body pain was regressed on predicting variable gender to test the hypothesis. $F=92.91$, $p<0.001$, which indicates that the gender can play a significant role in body pain ($b=3.770$, $p<0.001$). These results clearly direct the positive effect of the gender. Moreover, the $R^2=0.189$ depicts that the model explains the 18.9% of the variance in body pain. So the null hypothesis is rejected.

Regression between age and musculoskeletal disorders

H₀: There exists no significant impact of age on the musculoskeletal and body pain faced by the rag pickers.

The dependent variable body pain was regressed on predicting variable age to test the hypothesis. The calculated F test score was 147.69 and p value was 0.000. It indicates that there was significant impact of age on body pain. These results clearly direct the positive affect of the age. Moreover, the $R^2=0.271$ depicts that the model explains the 27.1% of the variance in body pain. So the null hypothesis is rejected.

Regression between working experience and musculoskeletal disorders

H₀: There exists no significant impact of working experience on the musculoskeletal disorders and body pain faced by the rag pickers.

The dependent variable body pain was regressed on predicting variable gender to test the hypothesis. $F=24.91$, $p<0.001$, which indicates that the work experience can play a significant role in body pain ($b=0.841$, $p<0.001$). These results clearly direct the

positive effect of the work experience. Moreover, the $R^2 = 0.059$ depicts that the model explains 5.9% of the variance in body pain. So the null hypothesis is rejected.

Correlation between gender and intensity of pain

H₀: There exists no significant impact of gender on the intensity of pain faced by the rag pickers.

A significant positive correlation ($r=0.338$, $p<0.01$) was found between gender and intensity of pain, which means there exists significant impact of gender on the intensity of pain faced by the rag pickers, thus rejecting above mentioned hypothesis.

Correlation between age and intensity of pain

H₀: There exists no significant impact of age on the intensity of pain faced by the rag pickers.

Moderately positive and highly significant correlation ($r=0.487$, $p<0.01$) was found between the age and intensity of pain, so the null hypothesis was rejected.

Correlation between work experience and intensity pain

H₀: There exists no significant impact of work experience on the intensity of pain faced by the rag pickers.

Highly significant (0.000) value found between work experience and the intensity of pain, hence null hypothesis was rejected which means there was significant impact of work experience on the intensity of pain faced by the rag pickers.

Analysis of Postural strain using REBA [Rapid Entire Body Assessment]

For the postural analysis of rag pickers REBA method was used. Tasks were observed and the postures(adopted by the rag pickers while performing different activities in rag picking) were identified according to the risk involved. It was found that most of the postures involved are bending, twisting, standing, walking and sitting in squatting position and are matched with REBA posture code. All of the predominant postures were found to be very high risky according to the scores of REBA. In almost all the

activities, REBA posture scores ranged from 7-12, indicating a postural change is needed immediately as the postures are vulnerable to risks and require immediate ergonomic intervention.

Development of prototype

- From the analysis of results obtained, observation and based on the review of literature a set of criteria were developed to design the prototype. The survey has been conducted on rag pickers. Prototype was designed on the basis of problems or discomfort identified among rag pickers during survey and observation.
- Developed prototype: PICKEZEE PRO (rag picking stick and garbage bag) kit for rag pickers according to their need. The purpose of developing the prototype was to provide comfort and safety to the rag pickers while collecting the garbage.
- The developed prototype (kit for rag pickers) has been tested on 60 rag pickers in terms of their safety, comfort and improvement of their work efficiency. To test the prototype, it was given to the rag pickers for three months and asked them to use the prototype while picking up the garbage. Data was collected from the rag pickers to record the intensity of pain before and after the use of prototype (six months).
- For the postural analysis, used REBA scale was used and the scores were compared during pre and post intervention. When they use rag picking kit their activities were observed and each posture was identified. After comparison of both postures (with and without kit) adopted by the rag pickers while picking up the garbage, significant differences were found in both postures.

CONCLUSION

Rag pickers in low and middle-income countries work on dumps and landfills, shifting through highly contaminated waste and are exposed to health hazards. Rag pickers despite their poor living and working conditions, generate self-employment and income, save the expenditure of municipal corporation for disposing of waste, helps the owners of the households to make their homes clean through the disposal of

waste, supply the waste to the recycling industry, reducing the pressure on natural resources, such as paper plantation, extraction of iron ore, etc. but they have to bear a cost by working in unhygienic conditions, which is not good for human resource development.

In India, the social stigma of rag pickers remains a problematic issue. Rag pickers are the most highly exposed occupational groups with respect of MSDs because they have to work hard and adopt several awkward postures in order to complete task, due to adoption of the work posture for longer duration, hampering the postural health leading to severe pain. This may be because rag pickers are not protected by occupational health and safety measures. Keeping the health of rag pickers in mind and the health hazards they are exposed to while picking up the garbage with bare hands without any safety gear, ergonomical intervention is very vital.

Ergonomical intervention in the form of a prototype for rag pickers (rag picking kit comprising stick and garbage bag) is designed, developed, tested and patented which was found to be very effective in reducing the health issues and enhancing the safety and comfort of the rag pickers.

If we look at rag pickers through the lenses of social safety and security their rights are not covered under labour legislation and hence, are not entitled to any benefits or job security.

The study found that the lives of the rag pickers are filled with several problems and faced with many difficult circumstances. Failure of the implementation of the various policies have made them even more vulnerable, be it physically, emotionally or mentally. Government and stakeholders should keep in mind all these issues of people who themselves are living in poor and unhealthy environment, are helping us to clean our environment, by picking up the waste and taking it to recycling factories and various upgraded recycling industries, at the cost of their lives and health. Due to the vulnerable conditions the rag pickers are likely to be harassed by public, law authority and any also face many kind of abuses and moreover they are not covered under labour legislation and hence, are not entitled to any benefits of social security or job security

The un-favorable working conditions of rag pickers could be ameliorated through legislative measures as well as a proper workplace health promotion model intervention. In addition, a routine workplace health promotion model needs to be activated for the welfare of these under marginalized population.

RECOMMENDATIONS

The aim of this study is not to glorify the pity of people who are not having any other job opportunity but to find gold in the garbage. After conducting this research, results showed an alarming situation of living and working conditions of rag pickers. Thus it is an eye opening effort made to bring attention of all the stakeholders and policy makers onto the lives of rag pickers who are living at worst conditions. It has become a bread earning source for not only men and women but also for children. There is an urgent need for taking necessary actions on the part of government to recognize the contribution of rag pickers, especially women. In spite of their major contribution, their social and economic life is very poor. Considering the situation, would like to make the following recommendations.

- Rag pickers clean our surroundings save our environment but they live in pathetic conditions, so they must be given better job opportunities.
- Rag pickers live in slums surrounded by garbage they collect, so they should be allocated a better place to live by the government.
- Provide safety equipment such as mask, gloves, raincoat and clothes, to protect them from various dangers.
- Provide better employment opportunities by upgrading this waste management sector into an income generating sector that will not only improve the economic conditions of poor and downtrodden rag pickers but also other people who are working in these kind of jobs.
- Develop training materials on occupation and environmental health and injury issue relating to waste management.
- Government should provide free medical facilities to the rag pickers and their family members living in the slums. According to the research the researcher

found that their daily income is low it is recommended that to increase their daily income, vocational training should be provided in order to develop the skills and knowledge that would allow them to access to the various opportunities that would help them attain a life of dignity.

- Both Government and non-government agencies should take efforts to implement different program and policies especially for rag pickers.
- There is a dire need for targeted interventions for holistic development of rag pickers. Better life style mechanisms towards enhancing livelihood have to be framed by state through urban development departments concerning women rag pickers. The civil society organizations can devise a strategic plan for rehabilitation and promotion of life of rag picker.
- To ensure public recognition of their work, it is important that efforts are made to pursue municipal bodies for issuing occupational identity cards to rag pickers. It will ensure that their profession is legitimate. This will increase their access to social security measures framed for unorganized workers and reduce harassment from police and junkyard or brokers and some rude or uncivilized people.
- In this study it was found that rag pickers face various ergonomic discomforts at work place. So to improve the overall well-being of rag pickers, ergonomics and safe practices must be established to reduce work-related vulnerabilities.

In general Protection of our surroundings and environment should be our prime responsibility as an Indian citizen, so,

- Reduce, reuse and recycle for the planet and people. Keeping environment and sustainability in mind, we should generate as less waste as we can.
- Throwing away the waste without being conscious about their harsh repercussions is filling our green lands with garbage and impacting our health and environment.

IMPLICATIONS

Rag pickers face multifarious health risks and their living and working conditions are vulnerable. Results of this study also found that most of the rag pickers suffer from musculoskeletal and postural discomfort because of their nature of work (frequent bending, twisting and carrying heavy loads). The purpose of this study was to assess the health hazards among rag pickers and intervene them.

- After completing this research investigation it was clearly identified that due to the use of traditional ways and methods of rag picking (without any safety gear), they face a lot of problems like postural, musculoskeletal discomfort and other health related problems as well. Therefore, the major intervention was to upgrade their method of picking up waste material. The first major practical contribution of this research developing a prototype: PICKEZEE PRO (rag picking stick and garbage bag) kit for rag pickers according to their need. The purpose of developing the prototype was to enhance comfort and safety to the rag pickers while collecting the garbage.
- Another major implication of this research is to provide guidelines to the manufacturer to design the product based on the prototype developed for rag pickers.
- Hence, this research may be an eye-opener to the researchers and can be very helpful in providing a roadmap for the government and other bodies to formulate policies for rag pickers.

FUTURE DIRECTIONS OF THE RESEARCH

- The model of the prototype can be extensively developed so that it can reach to the most number of rag pickers all around the world.
- With the new upgraded version of rag picking tool and method of waste collection, this process can be standardized for not only individuals indulged in this activity but also for this whole unorganized sector of labor and employment.

- Future research could be undertaken in the direction of exploring the laws, policies and programs that can be implemented for the betterment of rag pickers and their working and living conditions.
- Furthermore, comparative research studies can be done for the workers working in other unorganized sectors.
- Further research study can be conducted using different samples and sample sizes.
