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**Abstract Topic:-** Cancer

**Abstract Title:-** Genotoxic effects of occupational exposure in women rag pickers at a dump site and its mitigation by Vitamin C.

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**Aims:-** Ahmedabad is the 7th largest city of India and generates about 4000 metric tons of waste daily which is mostly dumped at Pirana dumping site. Rag pickers are exposed to chemical, physical and biological agents which can cause genotoxicity; however, toxicity and oxidative stress can be reduced by using effective antioxidants. Thus, our study investigated the potential genotoxic effects of occupational exposure to solid waste and its hazardous components in women rag pickers working at Pirana landfill in Ahmedabad city of Gujarat and its in vitro amelioration (using Vitamin-C).

**Methods:-** The Institutional Ethics Committee of Gujarat University has approved the study protocol (No: GU/IEC/03/2018). Randomly 250 female rag pickers (18 years or above with 5 years work exposure) were selected from Pirana dumping site and residential areas of Ahmedabad city after taking informed consent. Rag pickers working at dump site were considered as exposed (n=160) and age matched females with similar socio-economic background who were working near residential areas of city were taken as controls (n=90). Lymphocyte cultures were done for scoring mitotic index, sister chromatid exchanges, nuclear anomalies, chromosomal aberrations and telomeric associations. For in vitro amelioration, 20 $\mu$ M of vitamin C (Ascorbic acid) was added at 0 hours.

**Results:-** The results showed a significant decrease ( $p < 0.001$ ) in the mitotic index (MI), frequency of chromosomal aberrations, telomeric associations, sister chromatid exchanges (SCEs), in exposed group as compared to that of the control group. The cytokinesis blocked micronucleus assay (CBMN) assay showed significantly higher ( $p < 0.001$ ) frequencies of cytokinesis-block proliferative index (CBPI), Micronucleus (MN), Nucleoplasmic Bridges (NPB) and Nuclear Buds (NB) in the exposed rag pickers than in the controls. Various genotoxic biomarkers like mitotic index, total SCEs, numerical aberrations, chromosomal breaks, telomeric associations, CBPI and micronuclei showed appreciable amelioration with Vitamin C.

**Conclusions:-** The responsible mutagens include PAHs, pesticidal components, heavy metals etc. which may be carcinogenic too; and were associated with overproduction of reactive oxygen species. This contributed towards genomic instability, leading to deletions, DNA strand breaks, rearrangements, chromosomal alterations, and micronucleus production which can be considered as early signs of health risk including cancer. The in vitro amelioration by vitamin C reveals its potential and will be helpful to reduce the genotoxicity caused due to occupational exposure.

**Keywords:-** Occupational health hazards, Oxidative stress, Genotoxicity, Micronucleus, vitamin C