CONCLUSION:

- The sperm functional characteristics like, total motility, viability, morphology were significantly altered in the subjects exposed to radiation at workplace when compared to age matched non-exposed individuals.

- An inverse relationship was established between the extent of radiation exposure level and sperm characteristics such as motility and viability.

- Exposed subjects had significantly increased level of sperm DNA fragmentation. A good correlation was observed between the extent of damage and radiation exposure dose. Change in the global methylation status of spermatozoa of exposed subjects is suggestive of perturbance in epigenetic integrity. However, methylation levels in specific imprinted genes are required to validate this observation. Though, exposed subjects have increased sperm DNA fragmentation, the incidence of sperm aneuploidy was not statistically different between exposed and non-exposed subjects. However, the incidence of aneuploidy and acentric fragments in the peripheral blood lymphocyte was increased by two-folds in exposed subjects compared to non-exposed subjects.

- Approximately four-fold increase in the level of micronuclei in the peripheral lymphocytes of exposed subjects demonstrated a strong positive correlation with radiation exposure level of exposed subjects. However, aneuploidy incidence and acentric fragments failed to demonstrate any association with radiation exposure level in the exposed subjects.
• The increased plasma antioxidants (GSH, TAC, SOD) level in the exposed subjects could be an adaptive measure to tackle the oxidative stress to protect genetic and functional sperm deformities in radiation health workers.

• There was no alteration in the FSH, LH and testosterone level in radiation health workers which suggested that occupational radiation exposure may not act as an endocrine disrupter.

• In conclusion, present data clearly suggests that occupational radiation exposure may have substantial detrimental effect on sperm functional, genetic and epigenetic integrity in health workers. Due to limited sample size, significant differences in terms of infertility and abnormal reproductive outcomes in the spouses of exposed subjects were not demonstrated; hence, future studies are certainly needed in large population to address the reproductive fitness of the exposed individuals and also the health status of the children born to radiation exposed health workers.