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Research on a Few Fetal Defects Resulting from Low-Level Radiation Exposure from Areas with High Background Radiation

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Introduction

Locations with high background radiation (HBRA) provide a rare opportunity to study the biological effects of prolonged exposures. HBRAs with uranium or thorium deposits as well as phosphate rock deposits are regarded as natural laboratories for epidemiological studies because the local population has been continuously exposed to radiation since conception. Populations in areas with high background radiation are exposed to radiation doses that are much greater than the 2.4 mSv per year estimated worldwide average background dose for humans (High Levels of Natural Radiation,1993). Based on the annual radiation dosage rates in each area, a territory can be classified as low (up to 5 mSv y1), medium (5-20 mSv y1), high (20-50 mSv y1), or very high (>50 mSv) [1].

Description

India's most prominent HBRA regions are located in Kollam. Monazite sand that is high in thorium is abundant in the coastal region of Kerala, which stretches from Neendakara (Kollam district) to Purakkadu along the country's western coast for up to 57 kilometers. Black beach sand is common in this area and contains decay byproducts of thorium and uranium at concentrations of 8-10% and 0.3 percent, respectively. The activities of 238U, 232Th, and 40K were reported to range from 17 to 3081 Bq kg1, 54 to 11976 Bq kg1, and 67.4 to 216 Bq kg1, respectively, in the research region. The area has a lot of people who have been there for a long time. The geology and population density of these locations set them apart from other parts of India in terms of socioeconomic status and other factors. As a result, research into the biological effects of long-term exposure to the local population, which has been exposed to these high radiation fields for generations, is of interest to scientists. Based on extensive research of more than 1,40,000 local residents, the Regional Cancer Centre in Trivandrum's technical report on the Natural Background Radiation Cancer Registry (1990–1999) estimates that the average annual dosage to the population is between 15 and 25 mGy. Radiation levels as high as 70 mGy/yr, indoor radon concentrations as high as 215 Bq/m3, and indoor thoron concentrations as high as 92 Bq/m3 are found in some coastal areas [2].

Numerous dosimetric investigations on various facets of radiation exposure and natural radioactivity have been conducted in the area. There have also been reports of minor genetic investigations in rats and cytogenetic research on local flora. According to a local demographic study, there are no appreciable differences between HBRAs and normal radiation zones in terms of reproductive characteristics or newborn mortality. In investigations on cancer occurrences, similar outcomes were attained. However, a higher prevalence of mitochondrial germline point mutations was noted in a study of saliva samples from HBRA residents. The crucial set of investigations includes any research on congenital or hereditary impacts on children and women who are in the reproductive stage. As already stated however, no definitive evidence of carcinogenic hazards has yet been found. Due to the region's high background radiation levels, congenital abnormalities are a worry [3].

The investigation was conducted on people who had one of the two clearly visible congenital abnormalities. Underdeveloped intellectual function and deficiencies in adaptive behaviour are referred to as mental retardation. A cleft palate (palatoschisis) is an opening in the palate that causes an abnormal development of the face, and a cleft lip (cheiloschisis) is the occurrence of one or two vertical fissures in the upper lip. Both deformities are congenital, have a complicated aetiology, and are thought to be influenced by environmental factors. The goal of the current investigation is to determine whether there is a connection between the prevalence of specific congenital abnormalities, cleft lip/palate and mental impairment, using a matched case-control sample of 1:3.

Following stringent exclusion criteria, young adults (35 years old) with the specified abnormalities were chosen as the study's cases from both high background radiation areas (HBRAs) and normal background radiation areas (NBRAs). Age 35 years or under, singleton births without the use of assisted reproductive technology, having a living mother, and never having had a stillbirth or repeated abortions are among the requirements. The radiation dosimetry needed to be done should have been done while the person was still residing in the same place of conception. For each case, three suitable age-matched controls from the area that met additional requirements and had a similar type of housing construction were chosen. In order to obtain a concurrent estimation of radiation doses in all four residences, dosimeters were successively set out after choosing a case and its three controls. Conditional logistic regression analysis of the collected data served as the statistical technique [4].

Kollam, Sakthiklangara, Neendakara, and Chavara were the four panchayaths (hamlets) along Kerala's coastal Kollam district that were chosen for the study. For the studies, 225 control volunteers and 75 subjects (58 mental retardation cases and 17 Cleft lip/palate cases) were chosen. A halogen-quenched Geiger Muller (GM) tube-based survey metre with a microprocessor-based digital display was used to monitor indoor and outdoor gamma exposure rates. The height at which each measurement was taken from the ground was roughly 1 m. Utilizing a dose conversion coefficient of 0.7 Sv/Gy with an indoor occupancy factor of 0.8 and an outdoor effective dose with an occupancy factor of 0.2, measured gamma absorbed doses expressed in Gyh1 were converted to indoor yearly effective doses. The radon and progeny measurements made with the twin cup dosimeters outfitted with LR-115 Type II alpha detectors as stated by Mayya were used to determine the indoor inhalation dose rates. The analysis used the sum of the external and inhalation doses for the interior atmosphere [5].

Conclusion

Finding a potential link between the radiation exposure and the congenital deformity was done using conditional logistic regression (CLR) analysis. The data were interpreted using the evolved Odds Ratio (OR). Both the use of human subjects and the collecting of biological samples from the study participants were not involved in the investigation. To assess the risk of mental retardation/cleft lip/palate at various dose levels and account for the effects of gender and maternal age at delivery of the cases, the CLR analysis of

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mental retardation and cleft lip/palate was conducted. The SPSS programme was used to conduct conditional logistic regression analysis to ascertain the relationship between the analysed parameters.

References

1. Humphrey, Uguru Edwin and Mayeen Uddin Khandaker. "Viability of thorium-based nuclear fuel cycle for the next generation nuclear reactor: Issues and prospects." *Renew Sustain Energy Rev* 97 (2018): 259-275.
2. Monica, S, Panakal John Jojo and Mayeen Uddin Khandaker. "Radionuclide concentrations in medicinal florae and committed effective dose through ayurvedic medicines." *J Mol Biol* 96 (2020): 1028-1037.
3. Christa, E, Jojo P, Vaidyan V and S. Anilkumar, et al. "Radiation dose in the high background radiation area in Kerala, India." *Radiat Prot Dosim* 148 (2012): 482-486.
4. Sohrabi, M. "3.5 High radon levels in nature and in dwellings." (1997): 225.
5. Papadopoulos, N. Arakawa G, Carlsen K and Adnan Custovic, et al. "International consensus on (ICON) pediatric asthma." *Allergy* 67 (2012): 976-997.

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