

# Radiation Doses Received By Omani Family Members of Thyrotoxic Out-Patients after Radioiodine ( $^{131}\text{I}$ ) Therapy

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## Introduction

Radioiodine ( $^{131}\text{I}$ ) therapy, proven to be safe and relatively inexpensive, has been widely used over the decades for the treatment of hyperthyroidism. The therapeutic administration of  $^{131}\text{I}$  make patients a source of radiation exposure and a potential radiation hazard to individuals in their surrounding<sup>1, 2</sup>. For social and cultural reasons in Oman, thyrotoxic patients treated with  $^{131}\text{I}$  are hospitalized for a few days. The objective of this study was to measure the radiation doses received by Omani family members of thyrotoxic patients treated with radioiodine as out-patients, following existing local radiation safety instructions, and to determine whether these doses complied with the annual dose limit of 1mSv as recommended by the International Commission of Radiation Protection (ICRP)<sup>1</sup>.

## Material and Methods

Eighty-six family members of 22 self-dependent out-patients suffering from thyrotoxicosis and treated with  $^{131}\text{I}$  participated in this study. The ages of the family members ranged from 17 months to 75 years (30 children  $\leq$  18 yrs and 56 adults comprising 11 spouses and 8 parents). All patients and family members were monitored for 10 days using thermoluminescent dosimeters. Patients were treated with a median activity ( $\pm$ SD) of 609.8 ( $\pm$ 79) MBq in the range 520-862 MBq. The mean ( $\pm$ SD) radiation level at one meter from the erect patient on discharge was 23.4 ( $\pm$ 6.3)  $\mu\text{Sv/h}$ . in the range 13 to 42  $\mu\text{Sv/h}$ . Written and verbal local radiation safety guidelines were provided to all patients prior to discharge to keep radiation exposure to their family members as low as reasonably achievable.

## Results

All family members including spouses and parents received less than the annual dose limit of 1 mSv except 4 children (ages 19 months and 12, 13, 15 years) received radiation doses of 2.9, 1.2, 1.2 and 1.2 mSv, respectively.

## Discussion

The-fact-that 95.3% of family members received radiation dose levels lower than the annual limit of 1mSv explains that the radiation safety guidelines given and discussed to all patients and family members were followed seriously. The high radiation exposure received by the other 4 children could not be avoided due to social and financial reasons. In view of the low radiation doses received by the family members, we recommend treating thyrotoxic patients in Oman as out-patients. However, mothers with children  $\leq$  3 years old and patients with tight financial status, sharing the same bedroom with many other family members, should be hospitalized to avoid unnecessary radiation exposure to others.

## References

1. Invited Commentary.  $^{131}\text{I}$  Therapy: Inpatient or Outpatient? The Journal of Nuclear Medicine. 2000; 41:1876-1878
2. Vetter RJ. Regulations for radioiodine therapy in the United States: current status and the process of change. Thyroid. 1997; 7(2):209-211