

● Letter to the Editor

SEMEN ANALYSIS OF PERSONNEL OPERATING MILITARY RADAR EQUIPMENT

Low sperm count has recently been demonstrated among US soldiers with potential microwave exposure (1). We conducted a preliminary survey of semen quality among Danish military personnel operating mobile ground-to-air missile units that use several microwave emitting radar systems.

Thirty-five males were invited and 19 (54%) delivered a semen sample and filled in questionnaires covering demographic, reproductive, medical, and lifestyle issues. The median sperm density of the military personnel was low compared to the references (see Table 1). The unadjusted difference was 21 million/mL, while the difference after adjustment for length of sexual abstinence was 23 million/mL ($P = 0.07$) (SAS PROC GLM; sperm density transformed to the third root). The proportion of males with oligospermia according to the WHO criterion of 20 million/mL did not differ between missile operators and references and no difference in life style or medical history was found.

To evaluate the implications of this finding, field measurements of exposure to microwaves during a manoeuvre were carried out (Narda model 8616, probe model 8623 C). The field levels were of highly fluctuating nature due to radiation from rotating antennas and reflections. The maximal mean exposure was estimated to 0.01 mW/cm². Occasionally short term exposures on the order of 1 mW/cm² might occur. ANSI safety limits based on the heating effect of microwaves are 5 to 10 mW/cm² for the actual radar frequencies measured as averaged values over six min.

Because no substantial exposure could be detected, no further step was taken. The reported difference in semen quality is either due to chance, uncontrolled bias, or nonthermal effects of transitory microwaves.

Acknowledgments — The Danish Airforce, especially Dr. Erik Schroeder, and the participants are acknowledged for very obliging interest for the project.

Table 1. Population and semen characteristics of personnel operating mobile ground-to-air missile system compared to aggregated values of other occupational groups analyzed at the same laboratory

	Missile operators <i>n</i> = 19	Other occupational groups ^a <i>n</i> = 489
Age (years)	29 (27 32)	29 (26 34)
Abstinence (d)	3 (2 4)	3 (2 4.5)
Semen volume (mL)	2.5 (2 6)	3 (2 4.1)
Sperm density (million/mL)	40 (26 63)	62 ^b (29 112)
Proportion <20 million/mL	16%	14%
Immotile spermatozoa (%)	52 ^c (35 62)	33 (26 47)
Normal morphology (strict criteria) (%)	3 (2 5)	6 ^d (3 9)
Normal morphology (WHO) (%)	61 (45 70)	68 ^d (59 74)

Median values, 25th and 75th percentiles.

^aOccupational groups analyzed from 1993 through 1995: farmers, greenhouse workers, metalworkers, office workers, organic farmers, and workers in plastic reinforcement industry.

^bMedian values in the individual reference groups were 54, 54, 56, 58, 86, and 104 million/mL.

^cDue to higher sample age at time of analysis values are not fully comparable.

^dOnly data from two reference groups were available for analysis of motility and morphology (*n* = 145).

NIELS HENRIK I. HJOLLUND AND JENS PETER E. BONDE
Department of Occupational Medicine
Aarhus University Hospital
 JØRGEN SKOTTE
National Institute of Occupational Health
Copenhagen, Denmark

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