USE OF MOBILE PHONES AND LIGHT METRE APPLICATIONS IN THE ASSESSMENT OF THE OCCUPATIONAL LIGHTING ENVIRONMENT

Introduction With a variety of built-in sensors, smartphone users can do many things with only one portable device. Light metre applications measure illuminance and are offered free or at low cost. Like noise metre apps, it is tempting to use such devices for preliminary lighting surveys. However, there are few reports of studies evaluating such use, and none which have explored their potential use for blue light hazards. This paper presents preliminary data on side by side measurements of illuminance and blue light hazard (BLHF) function-weighted illuminance with a range of smartphones, apps and light sources.

Methods Phones with Android and Apple iOS operating systems and two phone apps were compared alongside a professional lux metre on a workstation desk in a mock office, set up in a dark room. A blue light filter (Hoya B440) was used directly over the sensors for the approximate BLHF weighted value.

Results The values of the illuminance and blue-weighted illuminance differed depending on distances and the types of light sources. The illuminance values for Android and Apple devices using the same software were variable suggesting differences in sensor hardware or circuitry. There were major differences between forward and rear facing sensors. The use of the blue light filter significantly reduced illuminance readings, limiting practical application for some devices.

Discussion The rationale for the use of BLHF filters on photometric instrumentation for blue light hazard assessment has been described in the literature. Calibration factors for both naked and filtered sensors need to be established for specific phones and software. The limitations and variances of particular combinations also need to be understood. However, in principle, the use of a smartphone in preliminary lighting surveys may be feasible, and if so, guidance for their use may be developed.

ASSOCIATION BETWEEN ENDOCRINE FUNCTION AND RADIATION EXPOSURE

Introduction There has been a growing focus on endocrine dysfunction especially thyroid dysfunction after radiation exposure recent years. Thyroid dysfunction caused by radiation exposure or other reasons may be associated with change in BMI, weight and even induced obesity and metabolic consequences including diabetes. On the basis of above theories, we decided to observe the likely relationship of endocrine function changes within radiation exposure.

Methods A total of 1784 subjects from physical examination organization for occupational health were investigated. Subject information was collected with a questionnaire that was carried out through interviews in the forms of face-to-face. We entered all data into a computerised database using the statistical analysis Epidata3.1, all analyses were performed by SAS 9.1.3 software. p<0.05 was generally accepted as statistically significant.

Results The abnormal proportion of T3 and T4 in female were higher than them in male (p<0.05). Abnormal rate of FT4 increased, accompanying with the growth of age (p<0.05). In addition, T3 and FT3 levels may be associated with exposure time of X-ray. On the basis of this survey, abnormal rate of T3(1.4%) and FT3 (1.0%) were higher in group <3 years than that in group ≥3 years (0.3% and 0.1%, respectively, p<0.05). We compared serum T3, T4, TSH, FT3 and FT4 levels between different degrees referred to exposure time of radiation. Subjects whose duration time longer than 3 years were likely to have higher T4 contents than those who contact less than 3 years (p<0.05). Furthermore, normal T4 subjects and abnormal ones were researched separately. In this study, serum T4 was significantly and positively related with BMI in the T4 normal group. Within normal T4 level, T4 was a little weak positive-correlated with BMI.

Conclusion Changes in thyroid function and glucose metabolism may appear after long time exposure to radiation.