

People lacking vital antioxidants and exposed to sunlight more likely to develop AMD

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People who lack essential antioxidants, and who have high levels of sunlight exposure, have a higher risk of developing advanced macular degeneration (AMD), according to a study published today in the journal *Archives of Ophthalmology*. AMD is the leading cause of poor vision in the UK.

The EUREYE study, led by Astrid Fletcher, Professor of Epidemiology of Ageing at the London School of Hygiene & Tropical Medicine, is the first to report in human populations an adverse association between sunlight exposure and AMD in people with low levels of antioxidants. It is also unprecedented in the level of detail the researchers used, taking into account not only lifestyle and medical factors but even going so far as to estimate levels of cloud cover in each of the countries from which participants were recruited.

The eye is particularly vulnerable to the damaging effects of sunlight. Ultraviolet radiation is absorbed by the lens, but visible or "blue" light penetrates to the retina so allowing us to see. Protection against the harmful effects of blue light is provided by the antioxidant vitamins C and E, the carotenoids (lutein and zeaxanthin) which filter blue light, and zinc.

Animal and laboratory studies have previously shown that blue light may be a factor in the pathogenesis of AMD, but results have been inconsistent in the few studies that have investigated associations between sunlight exposure and AMD in human populations. Little

attention has been paid to the possible interactions between antioxidant levels and light exposure, although it is thought that the adverse effects of sunlight may be mitigated by the protective effects of antioxidants.

4,753 participants aged 65 years were selected randomly in seven centres, Bergen in Norway, Tallinn in Estonia, Belfast in the UK, Paris-Createil in France, Verona in Italy, Thessaloniki in Greece and Alicante in Spain. The average age of participants was 73.2 and 55% were women.

Blue light exposures tended to be higher in participants from centres in southern Europe while participants in an exclusively urban centre (Paris) had the lowest exposures.

Participants underwent fundus photography, and gave a blood sample for antioxidant analysis. They completed a residence and job history in advance, and attended a face-to-face interview. They were asked about their education, smoking and alcohol use, medical history, lifetime residence and level of sunlight exposure, including how much time they had spent outdoors between the hours of 9am and 5pm, and 11am and 3pm each day since they left school and throughout their working life.

Information was collected separately for summer and winter, and for different occupational time periods (including time spent looking after the home) and in retirement up to their current age. For each period, they were asked about their use of eyewear (glasses, contact lenses and sunglasses). The information on sunlight exposure and area of residence was sent to the University of East Anglia and combined with metrological information to estimate lifetime blue light exposure for each participant.

The results indicated that those with the lowest levels of antioxidants were most at risk of AMD due to blue light. In particular, the

combination of blue light exposure and low levels of zeaxanthin, alpha tocopherol and Vitamin C was associated with a nearly four-fold likelihood of developing AMD. The researchers found that the associations of blue light in those with low antioxidant status appeared stronger at older ages, reaching a peak at 50-59 years.

The combination of blue light exposure and low concentrations of antioxidants in the blood was also found to be associated with the early stages of AMD, which are common in the population, and that exposures in middle age might be more damaging than at younger ages.

Professor Fletcher comments:

'In the absence of cost-effective screening methods to identify people in the population with early AMD, we suggest that recommendations on protecting the eyes, ensuring that diets contain the right nutrients and antioxidants, are targeted at the general population, and especially middle-aged people'.

'We are not telling people to stay out of the sun altogether. The benefits of sunlight are well documented, in particular its role in vitamin D synthesis. But if people want to avoid macular degeneration as they get older, they should avoid exposing their eyes to too much sunlight when they are outside, and take simple precautions, such as wearing a wide-brimmed hat and sunglasses,.

'Nor are we recommending that people should take vitamin supplements. It is perfectly possible to achieve the recommended dietary reference intakes for these essential antioxidants by following a balanced diet'.

Source: London School of Hygiene & Tropical Medicine

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