RESEARCH LETTERS

UV Radiation Protection by Handheld Umbrellas

The handheld umbrella (HU) is a commonly employed method of sun protection by women in many countries in Asia (45% in China) and the Middle East. In Turkey, hats and umbrellas were found to be the most common photoprotection accessories. The HU was standard outdoor attire for women of the 18th and 19th centuries in the United States. In the next century, sunscreen, hats, and sun-protective clothing supplanted HUs, but growing public awareness of the harmful effects of UV radiation (UVR) exposure may cause people to increasingly seek the protection of shade.

Several companies market special sun HUs with a UV protection factor of 50 or higher. We wondered how effective average rain HUs are in blocking UVR and whether a commercially available sun HU would be more effective. The specific aim of our study was to determine the amount of UVR that penetrates HUs.

Methods. Attendees of Emory Dermatology Grand Rounds were invited to bring their HUs on April 19, 2012. Exclusion criteria included umbrellas that did not fully open properly, were not handheld, or had an obvious defect such as a tear. We collected 23 umbrellas, and none were excluded.

On April 22, 2012, between 11:05 and 11:58 AM in an open area under a cloudless sky, a meter to measure both UV-A and UV-B radiation (Sper Scientific UVA/B Light Meter, Model 850009) was used to measure UVR in microwatts per square centimeter. We measured UVR without an umbrella at the beginning, middle, and end of the study. We recorded the brand, color, style, and diameter of each HU. We took the following measurements, twice each, with the meter aimed directly toward the sun while holding each umbrella in 2 standard positions: (1) meter held approximately 1 cm beneath the umbrella fabric and (2) the meter approximately 1 cm from the researcher’s nose. We measured UVR inside a nearby building in a windowless room immediately after the study. The UV index was obtained online.

Results. Most of the HUs were compact umbrellas, but there were other types as well: 3 traditional umbrellas, 1 larger golf umbrella, 1 children’s novelty umbrella, and 1 Coolibar travel sun umbrella. The umbrella canopy diameters ranged from 61 to 127 cm, the vast majority ranging between 81 and 99 cm. Of the 22 rain umbrellas, most (n=14) were black, 2 purple, 2 blue, 1 green, 1 white, 1 red, and 1 pink. The UV index on the day of the study was 8 (low is <2; moderate, 3-5; high, 6-7; very high, 8-10; and extreme exposure, ≥11). One UV index unit is equivalent to 25 mW/m².

The 3 UVR measurements without an umbrella were 6563, 6783, and 6913 μW/cm². The UVR reading was 3 in a windowless room. For the first set of measurements, UVR readings taken from 1 cm under the umbrella fabric ranged from 26 to 1714 μW/cm². The UVR measurements taken 1 cm from the researcher’s nose while holding the umbrella overhead in a standard position ranged from 67 to 1256 μW/cm². The correlation between the repeated set of measurements was very high (r=0.995, P < .001). The umbrellas blocked between 77% (white Totes) and 99% (silver Coolibar) of UVR. Thresholds of percentage UVR blocked were determined by examination of scatter plots (Figure 2) to be higher than

Figure 1. Standard positions for UV radiation measurements. A, Measurement taken at 1 cm beneath the fabric of the umbrella. B, Measurement taken at 1 cm from the researcher’s nose.
**Figure 2.** Scatter plot showing distribution of UV radiation (UVR) measurements. Farther measurements were taken approximately 1 cm from researcher’s nose and y-axis measurements taken approximately 1 cm beneath the umbrella fabric. Numbers represent individual umbrellas. Umbrella 6 (Coolibar sun umbrella) blocked the most UVR, and umbrella 13 (white Totes) blocked the least UVR. Umbrellas 1, 3, 8, 9, 10, 11, 12, 14, 15, 16, 18, 19, 22, and 23 were categorized as black. Box plots along the axes correspond to the measurements on the axes. Information in the x-axis box plot represents more Farther data. The outlier (small circle) under the x-axis measurements 13 corresponds to measurements 4, 5, and 13. Box plot lines correspond to 25%, 50%, and 75%, and whiskers stretch from 25% and 75%. When outliers are farther than 1.5 times interquartile range, the outlier is represented with a dot. One outlier appears below the Farther axis, umbrella 13, which means that umbrella 13 stands apart for Farther; 3 outliers are charted along the Closer axis.

99% for the Coolibar umbrella alone, higher than 90% for black, and lower than 90% for the various nonblack colors.

**Comment.** The Coolibar HU clearly outperformed the other HUs. However, the poorest performing umbrella still blocked an average of 77% of UVR. All of the black umbrellas blocked at least 90%, and most blocked more than 95%. Other colors, especially white, did not perform as well. It remains to be determined if the HU can be a socially acceptable form of sun protection in the United States. For those who are willing, our data suggest that the average rain HU is a useful adjunct, and black may be a preferable color. To our knowledge, no prior study has assessed UVR sun protection by HU, only by beach umbrellas and other larger shading devices. A limitation was small sample size. Also it is unclear how much reflective UVR a person may receive that was not picked up by the UV meter. Larger studies with other types of HUs are needed.

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**Oral Minocycline in Treatment of Cutaneous Sarcoidosis**

Currently, therapeutic techniques used to treat cutaneous sarcoidosis rely on limited data from evidenced-based research.1,2 Bachelez et al1 conducted a prospective study in which 10 of 12 patients showed improvement after minocycline therapy, and Antonovich and Callen4 reported the case of 1 woman who was successfully treated with doxycycline. On the basis of these encouraging reports, our clinic began to use minocycline, a commonly used anti-inflammatory acne therapy that does not require laboratory monitoring, as a first-line treatment for cutaneous sarcoidosis. The present retrospective study sought to evaluate our experience with minocycline treatment and to compare its effectiveness across sex and race.

**See Practice Gaps at end of letter**

**Methods.** This retrospective study was approved by our institutional review board. The primary data sources were paper and electronic medical records of patients with cutaneous sarcoidosis treated with minocycline at the University of Pittsburgh Department of Dermatology in the UPMC Falk Dermatology Clinic between 2005 and 2012. The data obtained from medical records included the pa-