

The Environmental Determinants of Lupus Flares study (EDOLF)

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The Environmental Determinants of Lupus Flares study (EDOLF) investigated the relationships between common environmental agents found indoors and self-reported symptom flare days (SRF) in 101 Australian female lupus patients as compared to 41 age matched healthy controls. The study was retrospective and employed mixed methods examining differences in lifestyle behaviours and agent exposure with personal product use.

The study showed that the Australian population was similar to other Caucasian populations, with the average number of flares reported to be 29.9 SRF days, with 6.8 discrete flares for the study year. Flare symptoms were consistent with other population profiles published, however the EDOLF Australian population also reported gastrointestinal issues (13.9%) and shortness of breath (9.9%) as common symptoms.

Commonly published flare triggers of UV radiation, infection and stress were confirmed, with the addition of new potential triggers: temperature & weather changes, work, and cleaning chemicals. Use of personal care products for home cleaning, personal hygiene and lifestyle activities, resulted in significant increased risk associations for bath oil (IRR 1.008, CI 1.00-1.02) and significant reduced SRF risk for cleansing beauty products (IRR 0.999, CI 0.998-0.999) and a combined makeup group (foundation and sunscreen) (OR 0.998; CI 0.997–1.0). A flare day reduction of 0.15% was calculated for each day of combined makeup group product use.

In comparison to control participants, the SLE group showed significant difference in 25(OH)D deficiency ($p=0.02$), and 25(OH)D levels (means-control 74nmol/L (29.5ng/ml); SLE 58nmol/L (23.1ng/ml), $p=0.04$). Reduced levels of 25(OH)D were associated with expression of serological autoimmunity (ANA titres of 1:80) with odds ratios (OR) for ANA-positivity declining by 36% of the baseline OR for every two-fold rise in 25(OH)D level. A significant association could not be found between levels of 25(OH)D and SRF.

Significant associations were found for Finnish Job Exposure Matrix (FINJEM) occupational exposure classes; manual handling burden ($p=0.02$, IRR 1.01); iron ($p=0.00$, IRR

1.37); wood dust (p=0.00, IRR 3.34); and asbestos (p=0.03, IRR 2.48), indicating that participating in occupations such as nursing, teaching and specialist labouring could pose an increased risk to SLE patients.

Analysis of lifestyle factors indicates that the EDOLF SLE participants, as compared to the control participants, had reduced levels of QOL on VAS scales, lower levels of physical activity but similar dietary variables. SLE participants also used significantly more whole medical system CAM (p=0.0301). SLE patients commonly used therapies such as acupuncture, hydrotherapy, massage and dietary supplements including vitamin D and anti-inflammatory homeopathic medications such as fish oils.

The retrospective design of the EDOLF study may have resulted in a number of study limitations including misclassification and recall bias; however a number of data validation steps were incorporated to limit bias influences on reported results. One considerable limitation of the retrospective EDOLF study design was that establishment of firm causal relationships was not possible. Therefore, reported results can only infer potential significant relationships and health effects.

In conclusion, the EDOLF study provides insight into the patient SLE experience particularly perceived flare symptoms, triggers and management strategies. Each year, the average SLE patient experiences 30 days of symptom flares which are commonly self-managed with no extra physician assistance. The study also identified that everyday behaviours and exposures in day-to-day life activities, including both home and work environments, could potentially trigger exacerbation of SLE symptoms. In addition, the use of UV protective products, whilst potentially reducing symptom exacerbation and flare days, may paradoxically influence serum 25(OH)D in a group of patients with a higher incidence of deficiency and insufficiency as compared to the general population.

Importantly, the EDOLF study provides insight into future research directions that will better inform appropriate protective measures that people living with SLE can adopt to reduce adverse health impacts and improve life potential and quality.

List of publications to date

1. **The lived experience of lupus flares: features, triggers and management in an Australian female cohort.**

Journal: International Journal of Chronic Diseases

Authors: Marline Squance, Glenn EM Reeves, Howard Bridgman.

www.hindawi.com/journals/ijcd/2014/816729/

2. Exploring lifetime occupational exposure and SLE flare: a patient focussed pilot study.

Journal: Lupus, Science & Medicine

Authors: Marline Squance, Maya Guest, Glenn Reeves, John Attia, Howard Bridgman

www.lupus.bmj.com/content/1/1/e000023

3. Vitamin D levels are associated with expression of SLE, but not flare.

Journal: International Journal of Rheumatology

Authors: Marline Squance, Glenn Reeves, Huy Tran

www.hindawi.com/journals/ijr/2014/362834/

4. Self-reported Lupus flare: associations with everyday home and personal product exposure.

Journal: Toxicology Reports

Authors: Marline Squance, Glenn Reeves, John Attia, Howard Bridgman, Maya Guest

www.sciencedirect.com/science/article/pii/S2214750015300044

5. Patient reported lupus flare: exploring associations with foundation makeup and sunscreen use.

Journal: Journal of Cosmetics, Dermatological Sciences and Applications

Authors: Marline Squance, Glenn Reeves, and John Attia

www.scirp.org/journal/PaperDownload.aspx?paperID=52242

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