

ELECTIVE (SSC5b) REPORT (1200 words)

A report that addresses the above four objectives should be written below. Your Elective supervisor will assess this.

Prevalence and disease associations of eczema:

Eczema is an inflammatory skin disease, traditionally considered a disease of childhood. However, eczema may affect around 10% of adults(1, 2) and the global prevalence of eczema is increasing(3). There is good evidence that eczema is associated with asthma and hayfever(4), and increasing evidence that we should consider it as a systemic disease rather than one localised to the skin(5). Dermatoepidemiology (which describes the study of causes, prevention, health services research, and evaluation of interventions of skin diseases) studies has reported increasing evidence of the associations between chronic inflammatory skin conditions such as eczema, and non-allergic diseases such as cardiovascular disease, autoimmune diseases, and malignancy.

Chronic inflammatory conditions of varying aetiologies, from psoriasis and rheumatoid arthritis to HIV, have been linked to cardiovascular disease(6-8). Cardiovascular disease is fast becoming a significant cause of mortality and morbidity in both high and low and middle income countries. There are a number of lines of evidence supporting an association between eczema and cardiovascular disease. Mechanistic studies suggest that platelet dysfunction and decreased fibrinolysis may contribute to increased clotting in eczema(9, 10), whilst severe eczema has been associated with increased incidence of coronary artery disease using cardiac computed tomography angiography (CCTA)(11). The association between psoriasis and cardiovascular risk factors and outcomes is well established. In eczema, studies have reported associations between cardiovascular risk factors including raised BMI(12), and type 1 diabetes(13), and used proxies for cardiovascular disease including erectile dysfunction(14). However, epidemiological studies have inconsistently linked eczema to cardiovascular outcomes e.g. myocardial infarction (MI) and stroke across different populations(15-18). Potentially important confounders which are often unavailable in administrative databases, or difficult to quantify, include the contribution of smoking, raised BMI, the effect of decreased sleep, increased stress, or the contribution of treatments used for eczema, all of which may increase cardiovascular risk(19, 20).

Considering different biases and confounding factors is one of the most challenging and exciting aspects of dermatology. For example, lack of sleep due to itch may contribute to neuropsychiatric associations of eczema e.g. attention-deficit hyperactivity disorder (ADHD)(21). Information bias from increased health seeking behaviour in higher socio-economic groups may contribute towards the reduced prevalence of eczema in lower socioeconomic groups(22). Theories from basic science are also involved, as altered immune profiles in eczema may explain the reduced incidence of malignancies such as pancreatic tumours, childhood leukaemia, glioma and other brain tumours, but an increased incidence of meningioma(21). Possible explanations for these associations include the activation of natural killer cells in allergic diseases, which could provide surveillance against malignant cells(23).

Working within a research team:

I have spent my elective time at the London School of Hygiene and Tropical Medicine (LSHTM), in the Department of Non-communicable Disease Epidemiology, where I have developed my interest in dermatology. Dermatology involves the consideration of all factors from health seeking behaviour, health systems, data types and data collection methods, to epidemiological and

statistical methods, in the generation and appraisal of evidence in order to improve skin health at a population level. This requires collaboration from different disciplines, including clinical dermatology, epidemiology, and statistics, in order to produce high quality and clinically relevant research. Being part of the collaboration between academics from different disciplines has been one of the most exciting and rewarding experiences of my elective.

During the first week, I attended the first dedicated dermatoeidemiology conference in Europe, the EDEN Forum, which introduced me to the spectrum of dermatoeidemiology work in the EU and beyond. I was able to meet researchers in the field from all backgrounds and partake in stimulating discussions with experienced academics. The aim of the EDEN Forum was to facilitate collaboration and I found it a very welcoming atmosphere for someone at my stage. I also had the opportunity to write the meeting report for the British Journal of Dermatology, which introduced me to the history of dermatoeidemiology organisations, its increasingly recognised importance in dermatology research, and to become familiar with the new and exciting research in the field.

Back at the LSHTM, I thoroughly enjoyed joining the meetings of the eczema working group, where epidemiologists and statisticians collaborate under the leadership of Sinead Langan, a clinical academic leading a programme of work on population health research in eczema. Their research network extends to other researchers at the university, and in universities across the world. One of the team's current projects is a study of the association between eczema and cardiovascular disease. It was a privilege to join their meetings and to observe the challenges and successes of their epidemiological study using routinely collected electronic health data in the UK. I was surprised that I was able to contribute at all to the discussions, however I quickly found that my medical training was a useful contribution to the different disciplines.

Within this project I have been leading a systematic review study investigating the association between eczema and cardiovascular outcomes (specifically angina, myocardial infarction, coronary revascularisation, heart failure, cardiac arrhythmias, stroke, and cardiovascular death) in population based studies, which has been an opportunity to challenge myself to lead research. The review is needed in order to increase our understanding of the comorbidities of eczema, to inform management and prevention strategies at an individual and population level, and highlight research gaps. I have had the opportunity to work with researchers in Canada, USA, Denmark and at the LSHTM to produce a protocol for the study, which I have registered on PROSPERO International prospective register of systematic reviews (registration number: CRD42017060359) and submitted the protocol to a journal for publication. Through this experience I have developed my skills in research management, literature searching, academic writing and the journal submission process, and will further my critical appraisal skills as I continue with the review. Critical appraisal of included studies will be academically challenging due to the likely strong collinearity between eczema severity and level of treatment, as factors such as confounding by severity could contribute to an observed increase in cardiovascular disease and stroke in eczema.

Medical statistics and basic data management skills:

The group at the LSHTM primarily use routinely collected electronic health data, which provides large datasets with good external validity to answer important research questions. Whilst at the LSHTM I have been learning about the uses of these datasets, for example the Clinical Practice Research Datalink, by completing the training exercise developed by the research group and observing how CPRD data are used in practice. I have gained data management skills using STATA, which I have found

challenging to learn without a dedicated face-to-face course. However, it is the gateway to exciting possibilities for me to be able to do my own analysis in future research. In the environment of LSHTM it has been clear to me how important it is to understand medical statistics and the software used in order to contribute meaningfully to dermatoeidemiology projects. I have also realised how important it is to maintain the regular use of statistical software, which presents yet another challenge for finding the time to combine clinical and academic duties, whilst maintaining and developing skills in both!

Spending an extended period of time in the academic environment of the LSHTM has been inspiring, and confirmed my commitment to a career as an academic dermatologist, with the aim of having a positive impact on population skin health.

References:

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