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“I don’t want to manage it, I want to get rid of it”:

A narrative analysis of living with chronic plaque psoriasis,

and an investigation into vitamin D as a treatment

A thesis presented in partial fulfilment of the requirements for the degree of

Doctor of Philosophy

in

Nutritional Science

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Michelle Anne Ingram

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Abstract

As a chronic skin disease, plaque psoriasis can cause significant psychosocial, emotional and physical burden. Psoriasis sufferers perceive others as lacking understanding around what it is like to live with this condition, and there has been little research exploring the experience of psoriasis in depth. The burden of psoriasis can be compounded by the difficulty of treating it, and the inconveniences, side effects and risks of available treatments, suggesting the importance of finding a safe, effective and convenient treatment for psoriasis. Vitamin D and psoriasis have a long-standing relationship, with topical vitamin D analogues used to treat mild-to-moderate disease, and observational studies suggesting an association between higher systemic vitamin D (serum calcidiol) concentrations and less severe psoriasis. These findings suggest vitamin D₃ supplements, which raise serum calcidiol concentrations, might improve psoriasis.

In this thesis, two studies were conducted to address the limited in-depth understanding of the experience of psoriasis, and the need for a safe, effective treatment, respectively. The aims were 1) to gain a deeper understanding of the experience of living with psoriasis; and 2) to investigate whether oral vitamin D₃ supplements can effectively treat psoriasis.

For 1), data from semi-structured interviews with 10 men and women with psoriasis was analysed using narrative analysis. Narrative trajectories involving three predominant narrative forms shaped participants’ stories: restitution, where the focus was on overcoming psoriasis through trying to find an effective treatment or cure; chaos, where psoriasis was experienced as overwhelming and brought about a sense of hopelessness, and resignation, which was centred on begrudgingly accepting psoriasis in order to be able to get on with life. Participants had different narrative trajectories and shifted between forms over time, with the nature of experience linked with the relative stability and severity of a person’s psoriasis and their beliefs about their ability to manage it.

For 2), a randomised, double-blinded, placebo-controlled trial was conducted with 101 participants ≥ 18 years allocated to 100,000 International Units (IU) vitamin D₃/month (n = 67)
for 12 months (200,000 IU at baseline), or an identical placebo (n = 34). Psoriasis severity (Psoriasis Area and Severity Index [PASI]) and serum calcidiol concentrations were assessed at 3-monthly intervals. The primary outcome was the difference in PASI between treatment and placebo over time, assessed using a linear mixed model. Psoriasis severity did not differ between groups at any time (group $F(1, 106) = 0.59$, $p = 0.44$, group*time $F(4, 370) = 0.52$, $p = 0.72$). Yet these findings are inconclusive, as serum calcidiol significantly increased from baseline in both the treatment and the placebo group, and a mild improvement in PASI score from baseline also occurred in each group. A non-predetermined secondary analysis was performed by assessing the strength of the relationship between serum calcidiol concentration and PASI score across the whole sample, and this showed a significant inverse relationship between the two variables, in that elevation of serum calcidiol concentration by increments from 25 nmol/L to 125 nmol/L was associated with very mild decreases in PASI (estimated range of decrease 0 – 2.6; $p = 0.002$). Therefore, despite being unable to determine a benefit of vitamin D$_3$ supplements for psoriasis, these findings support the notion of a potential benefit of increasing serum calcidiol concentrations across the psoriatic population.

In conclusion, this thesis offers insight into ways in which people can experience psoriasis over time: as a temporary and fixable condition that must be overcome, as an overpowering force and source of significant suffering, and as a permanent condition that is reluctantly accepted. As the findings emphasise the negative influence of the difficulties around managing and treating psoriasis on the experience of psoriasis, they provide further support for the need for an effective, safe and convenient treatment. While the findings were inconclusive in regards to whether oral vitamin D$_3$ can help people to manage their psoriasis, the significant association between psoriasis severity and systemic vitamin D concentration supports continued research into this potential.
I was engaged in a relentless physical assault on my symptoms, at war with my skin . . . and inevitably losing. The disease and its treatment merged, combining inextricably to impact upon my personal experience and social identity; a sad fact that both were in effect demeaning…. If my self-esteem was affected by the disease, the treatment made the damage worse (Jobling, 2007, pp. 953-4).
Preface

The origins of this thesis began in an interest in vitamin D, and the subsequent decision to conduct a randomised controlled trial investigating whether vitamin D could effectively treat psoriasis. I had also intended to assess participants’ quality of life and the extent they suffered from physical disability because of their psoriasis, and I was going to do so by using quantitative questionnaires over the five times I met with each participant over their year of enrolment in the trial. Yet, once I began to meet with participants, out came telling anecdotes, outlooks on life, conversational snippets that alluded to formative experiences but never quite explained them. I sensed that some participants lived in the throes of the burden of psoriasis, while those who did not had left the weight of their concerns somewhere in the past. Psoriasis seemed much more than a disease of the skin, of the body; it appeared to have shaped the lives of many of my participants through impacting their self-perception and experiences. I also suspected that the comments that were shared did not usually reach the open, yet here, in the privacy of the researcher/participant relationship, they were inching their way to the surface. I reflected on my research project: in the hands of Likert-scaled questionnaires, these stories would disappear amongst the coding. I wanted to hear more, to look deeper, and in some sense, to provide an anonymous voice for these experiences. I wanted to know how having psoriasis affects a person’s life through impacting the experiences that they navigate over time, each inevitably leaving its mark somehow etched in the present day. I was also aware that available psoriasis treatments are not always effective, can be inconvenient, and have risks and side effects, and therefore can compound the reduced quality of life that is frequently seen in people with psoriasis. I wondered, what are the implications of the drawbacks of treatments on a personal level? Why is it so important that I investigate the potential of vitamin D (which is safe, easily administered and has no side effects) as a treatment for psoriasis? And thus, my thesis metamorphosed, from a story based around serum vitamin D concentrations and somewhat objective skin assessments, to include a story about people, their experiences of living with psoriasis and their search for effective treatments, all of this adding meaning to my
investigation into the treatment potential of vitamin D. This thesis is therefore comprised of
two complementary parts, each aligning with one of the overall aims as set out below. In order
to conduct both parts of this research it has been necessary to take an inter-disciplinary approach
to this thesis, using narrative theory and analysis based on qualitative research traditions
alongside quantitative methods. My hope is that this approach provides a deeper, richer
understanding of the impact of psoriasis on people’s lives, and illustrates why it is so important
to find a treatment for psoriasis that is free of risks and side effects.

Aims of Thesis

This thesis has two distinct aims, which are approached as two separate research studies. The
specific aims of each study are as follows:

Study One: To gain a deeper understanding of how people experience living with psoriasis
through identifying and analysing the narratives they use to describe their experiences.

Study Two: To determine whether oral vitamin D$_3$ supplementation is an effective treatment for
psoriasis.

This thesis is presented over seven chapters. Chapter 1 introduces the thesis as a whole,
prevents a rationale for each study and demonstrates how these studies have complementary
aims that fit together as part of one thesis. Chapter 2 provides an overview of psoriasis in order
to provide context for the aims of this thesis. This overview discusses the characteristics of
psoriasis (both clinical and at a cellular level), the numerous co-morbidities it has been
associated with, and the limited body of knowledge relating to the causes and triggers of
psoriasis. It also includes a discussion of the treatments that are currently available for psoriasis
and their advantages and disadvantages.
Chapter 3 presents the background, theoretical and methodological approaches, and the methods of Study One: A narrative analysis of living with psoriasis. It opens with a critical discussion of the literature as it pertains to the experience of living with psoriasis, to provide an understanding of the broad range of issues that relate to living with psoriasis and thereby providing the background for the present study. This is followed by a presentation of the epistemological and methodological approaches for this research, including a critical discussion of the approaches taken in previous studies about the experience of psoriasis in order to justify the need for a narrative approach. This chapter concludes with a description of the methods used in the present study, including the process that was followed to conduct the narrative analysis.

Chapter 4 presents the findings of Study One, followed by a discussion of these findings in the context of the wider literature.

Chapter 5 presents the background, methodological approach and methods used in Study Two: An investigation into the potential of oral vitamin D3 supplementation as a treatment for psoriasis. It begins with an overview of vitamin D, including its various functions, sources and an in-depth discussion of required levels and intakes. This is followed by a critical discussion of the literature regarding the relationship between psoriasis and vitamin D, arguing for the need to investigate the potential for vitamin D3 supplements for the treatment of psoriasis. This is followed by a description of the methods and procedures used in the trial.

Chapter 6 presents the findings of Study Two, and a discussion of these findings in relation to the wider literature.

Finally, an overview of the findings of this thesis, a discussion of their implications and the original contributions that this thesis offers are presented in Chapter 7.
Acknowledgements

As I reach the point of culmination of work on this thesis, and conduct the necessary revisions of a research story I have lived and grappled with for many years, I have had the chance to reflect on, and sometimes, it feels, to even re-live all the rather amazing experiences that have formed part of the PhD experience for me. Most of all, however, it has been the people who have stayed with me; first of all, the many, many wonderful participants who gave up their precious time to come and help me find out whether there might be hope for psoriasis in vitamin D. You showed me why this research was important and why I had to keep going, and inspired me to look deeper into the experience of psoriasis. Equally, to the wonderful people who so openly and generously shared their stories and experiences about living with psoriasis, my deepest thanks; you taught me so much through your stories, and I hope I have been able to do you justice in my analysis. Thank you all so much for taking part; without you, this thesis would not be.

I have also been fortunate that in my three supervisors, I have had a wealth of support and a range of expertise to draw from. To Dr Pam von Hurst, your encouragement, enthusiasm and friendship have kept me going through the challenging times as well as the good. To both you and Dr Welma Stonehouse, you have believed in me from the very beginning and you were instrumental in me embarking on this PhD journey, and I feel immensely grateful for that. Welma, I especially thank you for sticking with me even when you left New Zealand, and for your extremely encouraging words, always when I needed them. Prof. Kerry Chamberlain, you opened my mind to the world of qualitative research and to a greater awareness of the paradigms within which both I and others operate – a liberating thing. I am grateful you were open to taking a chance on me, as with me coming to health psychology from a different background, we started from scratch. I have learned an incredible amount working with you, and I thank you too for your unwavering belief in me.
There are numerous other people who supported me immensely in the research process. Dr Beatrix Jones, I will be eternally grateful for your statistical expertise, and of course, your patience, as I tried to make sense of data that turned out to be much more complex than expected! Thank you also for composing the graph showing frequency of correlations that is included in this thesis as Figure 10. To Owen Mugridge, Nutrition Trials Manager, thank you for moving to New Zealand at the exact time I was going on maternity leave and needed you and your many talents to run the RCT for three months, as well as your ongoing help with the trial upon my return (including your indispensable phlebotomy skills!). Simon Bennett, thank you also for your generous and ever-helpful support as a phlebotomist. To PC Tong, thank you for processing and storing participants’ blood samples and doing all things lab-related, as well as for always being willing to lend a hand and for keeping the humour alive in the HNRU.

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Finally, these acknowledgements would not be even half complete without mention of my family, as for all the work that you have put into enabling me to get this thesis done, its completion has been equally earned by all of us. To my parents-in-law, Jenni and Doug, thank you from the bottom of my heart for all the selfless hours of childcare you provided so I could work, not to mention all the other ways in which you support my family. To my own parents, thank you for teaching me that I can do anything if I set my mind to it. To my precious boys, Hamish and William, you both arrived along the way and are therefore forever entrenched in my PhD experience! Even though it has been a juggling act, I couldn’t imagine it without you,
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have finally finished my book! Thank you for being so patient. William, thank you for learning
to sleep six months ago so I could get my work done. To Jamie; words are not enough, but I
can say that this would have been impossible without you. Thank you for always seeing the
bigger picture, for shouldering the load, for bringing me back to centre and for helping me keep
my eye on the goal. You and our boys are my world and I love you so much. We have a life to
live now!
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<th>Definition</th>
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<tbody>
<tr>
<td>1α-OHase</td>
<td>1-alpha-hydroxylase</td>
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<tr>
<td>25-OHase</td>
<td>25-hydroxylase</td>
</tr>
<tr>
<td>7-DHC</td>
<td>7-dehydrocholesterol</td>
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<tr>
<td>BIA</td>
<td>Bioelectrical impedance analysis</td>
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<tr>
<td>BMI</td>
<td>Body mass index</td>
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<tr>
<td>BSA</td>
<td>Body surface area</td>
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<tr>
<td>BUVB</td>
<td>Broadband ultraviolet-B</td>
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<tr>
<td>CI</td>
<td>Confidence interval</td>
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<tr>
<td>CRP</td>
<td>C-reactive protein</td>
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<tr>
<td>CV</td>
<td>Coefficient of variation</td>
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<tr>
<td>DBP</td>
<td>Vitamin D binding protein</td>
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<td>ES</td>
<td>Endocrine Society</td>
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<td>hsCRP</td>
<td>High-sensitivity C-reactive protein</td>
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<td>IFN</td>
<td>Interferon</td>
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<td>IL</td>
<td>Interleukin</td>
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<tr>
<td>IOM</td>
<td>Institute of Medicine</td>
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<td>IU</td>
<td>International units</td>
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<tr>
<td>MED</td>
<td>Minimum erythema dosage</td>
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<tr>
<td>mRNA</td>
<td>Messenger ribonucleic acid</td>
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<tr>
<td>NSAIDs</td>
<td>Non-steroidal anti-inflammatory drugs</td>
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<tr>
<td>NUVB</td>
<td>Narrowband ultraviolet-B</td>
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<tr>
<td>OR</td>
<td>Odds ratio</td>
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<tr>
<td>OV/BV</td>
<td>Osteoid volume per bone volume</td>
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<tr>
<td>PASI</td>
<td>Psoriasis Area and Severity Index</td>
</tr>
<tr>
<td>PSORS1</td>
<td>Psoriasis susceptibility locus 1</td>
</tr>
<tr>
<td>PUVA</td>
<td>Psoralen and ultraviolet-A</td>
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<tr>
<td>RXR</td>
<td>Retinoid X receptor</td>
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<tr>
<td>SD</td>
<td>Standard deviation</td>
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<td>Th</td>
<td>T-helper</td>
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<tr>
<td>TNF</td>
<td>Tumour necrosis factor</td>
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<td>Treg</td>
<td>Regulatory T-cells</td>
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<td>United Kingdom</td>
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<td>Ultraviolet-B</td>
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<tr>
<td>VDR</td>
<td>Vitamin D receptor</td>
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