RISK COMMUNICATION AND LIFESTYLE BEHAVIOUR CHANGE IN PEOPLE WITH PSORIASIS

A thesis submitted to the University of Manchester for the degree of Doctor of Philosophy (PhD) in the Faculty of Medical and Human Sciences.

2015

CHRISTOPHER KEYWORTH

SCHOOL OF MEDICINE
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List of abbreviations

ANOVA – Analysis of Variance

BMI – Body Mass Index

CVD – Cardiovascular Disease

DSN – Dermatology Specialist Nurse

GP – General Practitioner

GPwSI – General Practitioner with a Special Interest in Dermatology

LBC – Lifestyle Behaviour Change

NHS – National Health Service

NICE – National Institute for Health and Care Excellence

NIHR – National Institute for Health Research

PMT – Protection Motivation Theory

TPB – Theory of Planned Behaviour

TRA – Theory of Reasoned Action

UK – United Kingdom
People with psoriasis are known to engage in high levels of unhealthy lifestyle behaviours which may lead to poorer psoriasis outcomes and increase the risk of cardiovascular disease (CVD). Thus, helping individuals with psoriasis understand the link between behaviours and health risks, that is health risk communication, and direct support for lifestyle behaviour change (LBC) are important aspects in optimal management of psoriasis, a long-term inflammatory skin condition. There are two aspects of the literature that remain unclear. First, whether adequate support is given to patients to enable them to understand the links between lifestyle behaviours and health outcomes is part of psoriasis patient management strategies. Second, whether there is agreement around effective health risk communication techniques. This programme of research aimed to examine these gaps in the literature using four related studies.

The first study used content analysis to examine general and dermatology-specific healthcare professionals’ core training competencies for evidence of skills relating to LBC. An important finding was the lack of explicit skills relating to LBC and changing understanding of health risks. There was little or no reference to recognised LBC techniques that could be used to support and facilitate LBC with patients.

The second study used observational techniques to examine messages about the links between behaviour and health outcomes and LBC signposting (such as leaflets or posters about healthy living) for patients with psoriasis in primary and secondary care patient waiting areas. There was little evidence of psoriasis-specific information about healthy living. Generic information (not specifically about psoriasis) was often of poor quality and was poorly displayed, and did not conform to evidence-based recommendations for effective LBC signposting.

The third study combined observational and qualitative techniques to examine how healthcare professionals communicate information about CVD risk to patients and the role of LBC in reducing risk in the context of primary care risk assessments with people with psoriasis. A key finding was that interpretation of risk information was not always linked to specific advice about how to modify each risk factor. Discussion was mostly instructional rather than a shared collaborative discussion about behaviour change and risk reduction.

The fourth study used experimental methods to examine the effects of message framing theory as a health risk communication strategy on reported behavioural intentions (BIs) in people with psoriasis. An important finding was that for messages about psoriasis symptom reduction, gain-framed (positively-framed) messages were more effective in increasing BIs for alcohol reduction. Conversely, for messages about CVD risk reduction, loss-framed (negatively-framed) messages were more effective for increasing BIs to reduce alcohol consumption.

The body of work presented in this thesis demonstrated that much needs to be done to increase the skill sets of healthcare professionals in order to help people with psoriasis recognise the specific links between their own health behaviours and health outcomes. In addition specific recommendations have been suggested as a way of improving risk communication strategies, such as using theory-based personally-relevant health information for people with psoriasis.
Psoriasis is a long-term skin condition which often appears as skin redness and ‘plaques’ on the surface of the skin. People with psoriasis are known to engage in an unhealthy lifestyle (increased alcohol intake, smoking, insufficient physical activity, and poor diet). This worsens psoriasis and leads to the additional risk of cardiovascular disease (e.g. heart attack). Telling people about these risks should be a key part of healthcare management in patients with psoriasis. Yet there is limited evidence of the best way of doing this, in a way that leads people to live healthier lives and reduce long-term health risks.

The programme of research aimed to examine this using four research studies. The first study examined whether the core training goals for primary and secondary healthcare professionals (e.g. doctors, nurses, dermatologists) included information about the importance of healthy lifestyle. An important finding was the lack of reference to specific ways that healthcare professionals could encourage and support patients to live healthier lifestyles (e.g. setting small achievable goals, setting an action plan).

The second study examined information available to patients about healthy living (such as leaflets or posters about healthy living) in primary and secondary care patient waiting areas (e.g. doctor’s surgeries). There was little evidence of psoriasis-specific information about out healthy living. Generic information (not specifically about psoriasis) was sometimes available but the quality was often poor and not displayed in a way that patients could read and understand the information.

The third study examined how doctors and nurses talk about cardiovascular disease to patients with psoriasis. A key finding was the lack of specific advice about how patients could have healthier lifestyles to reduce long-term health risks.

The fourth study examined the effect of differently worded health messages (positively-worded or negatively-worded) on whether people would decide to make healthy changes to their lifestyle (e.g. increasing physical activity).

When told that healthy living improves the visible appearance of psoriasis positively-worded messages were more effective than negative ones in encouraging people to consider making lifestyle changes. When told that healthy living would reduce the likelihood of CVD (e.g. heart attack) negatively-worded messages were more effective.

The research presented in this thesis suggests that more attention could focus on encouraging patients with psoriasis to live healthier lives. Specific ways of improving how patients with psoriasis are told about this involves appropriate worded personally-relevant health information.
Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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**Rationale for submitting in alternative thesis format**

The alternative format used in this thesis is based on a number of reasons. First the PhD is constructed in a way that allows for individual research papers to be produced, which addresses a different aspect of the overall aims of the PhD. Second the student has been focused on preparing and submitting scientific research papers since the PhD commenced. This has resulted in success with two papers (Chapters 5 and 6) accepted for publication in peer-reviewed journals (The British Journal of Dermatology and BMC Health Services Research respectively). There is currently one under review (Chapter 7) and another two are in preparation. This includes a narrative review paper (Chapter 1) and a methodology paper (Chapter 3). Due to the progress made in the early stages of this PhD regarding designing and submitting research papers it was deemed an appropriate and efficient way of submitting the thesis in alternative format.
Acknowledgements

Thank you to the National Institute for Health Research (NIHR) who funded this PhD studentship. Also to the European Health Psychology Society, the British Association of Dermatologists, the British Psychological Society Division of Health Psychology, and the Faculty of Medical and Human Sciences, University of Manchester, for funding elements of the dissemination phase of this research.

To Drs Lis Cordingley, Chris Bundy and Pauline Nelson. I could not have asked for a better supervisory team. Thank you for sharing your incredible knowledge and experience, for your guidance, the endless support and encouragement, and for always making time for me regardless of how busy you were. You are all an inspiration. To Dr Lis Cordingley, thank you giving me the opportunity to be part of such a wonderfully intriguing area of research, for instilling your confidence in me, and for the countless opportunities you have given me to develop as an early career researcher.

Dr Jo Hart, thank you for your support, comments and helpful suggestions throughout this PhD, and for your calming influence during the final stages of this research; Dr Mark Hann and Stephen Pye for your generous statistical analysis advice; and Christine Burns and Sue Bailey for your helpful administrative support.

Thank you to the IMPACT research user group for allowing me to pilot aspects of my research with you, and for the vital feedback you provided. Also to Helen McAteer and the Psoriasis Association for your generous help with participant recruitment. Thank you to all of the participants and healthcare professionals that have been involved in this research, without you this would not have been possible.

To the IMPACT team. Being a PhD student can often be an isolating experience. The past three years have been quite the opposite. I feel privileged to have been working alongside such an enthusiastic and immensely knowledgeable team. Your incredible work ethic and dedication to research, among many other things, is something I will take with me from this experience. Particular thanks go to Karen Kane, Alison Littlewood, Anna Chisholm, Christina Pearce and Rachael Thorneloe. Thank you for your words of encouragement, support, and generally making the office a warm environment to be in, and making my PhD experience a positive one. It has been a pleasure working with you all.

Finally, to my wonderful fiancée, Laura. Thank you for your patience, encouragement, and motivational talks over the last three years. I dedicate this thesis to you.
The author

Christopher Keyworth has a Bachelor of Science (Honours) degree in Psychology from Lancaster University. He also has a Master of Science degree in Clinical and Health Psychology from the University of Manchester. He worked as a research assistant in Health Services Research at the University of Manchester from September 2011 to March 2012 prior to commencing this PhD.

Background to the IMPACT programme

The IMPACT (Identification and Management of Psoriasis Associated Comorbidities) programme of research (http://www.impactpsoriasis.org.uk/) aims to better understand the association between psoriasis and associated co-morbidities. The programme is divided into 5 Workstreams, with the candidate’s PhD research contributing to three of those Workstreams. Workstream 2 aims to evaluate the effectiveness of cardiovascular disease risk assessment, and understand the process of risk communication in people with psoriasis. Workstream 4 aims to understand the healthcare professional role, and the barriers to providing support for lifestyle behaviour change in people with psoriasis. Workstream 5 aims to develop a training package to improve the physical and psychological outcomes for people with psoriasis. The candidate commenced work as part of IMPACT on 1st April 2012.

How the candidate’s PhD fits within IMPACT

The candidate’s PhD fits within IMPACT in several ways. The candidate explored how information about CVD risk is communicated in the context of primary care risk
assessment consultations. This included the methods used by healthcare professionals to communicate this information to patients. The candidate also explored the type and quality of information currently available to patients with psoriasis in relation to lifestyle behaviour change, with a view of informing strategies aimed at developing more appropriate, high quality information for people with psoriasis. The systematic examination of healthcare core competencies informed the training intervention as part of the IMPACT programme in terms of improving patient management strategies. The experimental work examined new ways of providing personally-relevant health information to patients with psoriasis.

**What is unique about the candidates PhD and how will this add to the IMPACT programme?**

There are four unique contributions this PhD makes to the IMPACT programme. First, the examination of healthcare core training competencies showed that dermatology non-dermatology healthcare professionals’ training has little focus on behaviour change as part of patient management strategies in the context of psoriasis. Second, the observational study highlighted the need to provide high quality psoriasis-specific information to patients. Third, the findings around the effects of message framing on changes to behavioural intentions have informed new strategies for providing important health information to patients with psoriasis. Fourth, the examination of specific techniques that were used by healthcare professionals to communicate information about CVD risk used an existing data set that was also used as part of the wider IMPACT programme. However the candidate developed an original analytical framework to analyse the data. This work has informed the next
phase of the IMPACT programme which aims to develop training resources for primary care practitioners to identify and manage CVD risk in people with psoriasis, in particular the development of theoretically-informed psoriasis-specific patient information leaflets.

**Candidate contributions to thesis and journal articles**

The candidate, Christopher Keyworth, conceived and wrote the first drafts of all of the journal articles and wrote the sub-sections contained within this thesis. The supervisors of this PhD (LC, PAN & CB) provided feedback on all chapters.

The candidate’s contributions to each of the four studies contained within this thesis are detailed below.

*Study One:*

The candidate, under the supervision of his PhD supervisory team conceived and designed the study, conducted data analysis and wrote the first draft of the journal article. LC acted as second coder during the analysis phase. Co-authors of the journal article (PAN, AC, CEMG, LC and CB) contributed to redrafting the manuscript and read and approved the final version.

*Study Two:*

The candidate, under the supervision of his PhD supervisory team conceived and designed the study, conducted data analysis and wrote the first draft of the journal article. The candidate, CB and PAN participated in the data collection. Co-authors of
the journal article (PAN, CEMG, CB, and LC) contributed to redrafting the manuscript and read and approved the final version.

Study Three:

Data were collected as part of a National Institute for Health Research Programme Grant (IMPACT Psoriasis; http://www.impactpsoriasis.org.uk/), however, the candidate undertook a different analysis from that undertaken in the IMPACT programme, and he was responsible for ensuring this represented a novel piece of research independent of the aims of the wider programme of research.

The candidate, under the supervision of his PhD supervisory team conceived and designed the study using a novel analytical framework, conducted data analysis and wrote the first draft of the journal article. The candidate was involved in recruitment and data collection. Co-authors of the journal article (PAN, CEMG, CCG, AC, CP, KK and LC) contributed to redrafting the manuscript and read and approved the final version.

Study Four:

The candidate, under the supervision of his PhD supervisory team conceived and designed the study, recruited the participants, collected the data, conducted data analysis and wrote the first draft of the journal article. Co-authors of the journal article (PAN, CEMG, CB and LC) contributed to redrafting the manuscript and read and approved the final version.
List of Publications and Presentations related to this research

Papers accepted for publication directly from this doctoral research:


Conference presentations arising from this research

*Based on Chapter 4:*


Keyworth, C., Bundy, EC, Nelson, PA, Griffiths, CEM, Cordingley, L. Helping patients with psoriasis achieve health behaviour change: A content analysis of the health professional core competencies. EADV, Istanbul, Turkey, October 2013 (poster presentation).

Based on Chapter 5:

Keyworth, C., Nelson, P.A., Cordingley, L., Griffiths, C.E.M., Bundy, C. Understanding lifestyle behaviour change signposting for people with psoriasis: The application of nudge theory. 28th Conference of the European
Health Psychology Society, Innsbruck, Austria, August 2014 (oral presentation).


Based on Chapter 6:

of Behavioural Medicine, Groningen, the Netherlands. August 2014 (oral presentation).


*Based on Chapter 7:*

Justification for the journals selected for publication

Health Psychology Review was chosen as the target journal for the manuscripts of Chapters 1 and 2 for two reasons. Firstly the journal welcomes reviews that develop connections between different disciplines. Chapter 1 brings together for the first time health risk communication and psoriasis. A rationale for integrating the health risk communication and the dermatology literature is presented, with a particular focus on applying theoretical insights to understanding the psychological experiences of people with psoriasis. Secondly, the methodological paper focuses on providing a theoretical overview of conducting mixed-methods research, outlining the challenges and considerations of research in the area of health risk communication and psoriasis. Given the novelty of such studies in the area of health psychology/dermatology it was deemed appropriate to submit these portions of the thesis to this particular journal.

The British Journal of Dermatology was chosen for the Chapter 5 article given the relevance of the findings in terms of informing dermatology training curricula. This is particularly true given that the scope of the journal includes articles that aim to improve understanding, management and treatment of skin disease and improve patient outcomes. It was deemed that the findings of this particular study meet these aims.

BMC Health Services Research was chosen for the Chapter 6 article given that the focus of the study was around the delivery of health information. This article focuses on how information is provided to patients within the context of the healthcare system, which fits with the journal’s remit for research focused on the content and delivery of health care services.
The International Journal of Behavioural Medicine was chosen for the **Chapter 7** publication given that the scope of the journal includes aspects of public health which include health prevention. The study aimed to examine how information about CVD risk is communicated to patients including how information about behavioural and biomedical CVD risk factors is discussed with patients. The article consequently meets the scope of the journal.

The British Journal of Health Psychology was chosen for the **Chapter 8** output given the journal’s focus on applying theoretical insights to health risk communication. It is hoped that the study’s novelty in terms of its experimental design and application of theory to a real-world health issue makes it of interest to this particular journal.
List of awards/grants related to this research

The candidate has received the following awards and grants related to this PhD programme of research:


Faculty of Medical and Human Sciences, University of Manchester, UK, Graduate Travel Fund. Covered registration fee and travel costs for the European Association of Dermatology and Venereology Conference in Istanbul. October 2013.

National Institute for Health Research Trainee Bursary. (Covered travel and conference fees to NIHR trainees meeting, University of Leeds). September 2012.

British Psychological Society Division of Health Psychology conference bursary. Covered registration fee for the Division of Health Psychology Postgraduate Conference, University of Bedfordshire. June 2012.
Introduction to research studies and thesis structure

This thesis comprises a series of studies relating to a programme of research examining health risk communication in the context of psoriasis. Psoriasis is a long-term inflammatory skin condition which affects around 2% of the UK population. There are a number of co-morbidities associated with psoriasis, both physical (including psoriatic arthritis, inflammatory bowel disease, diabetes and cardiovascular disease), as well as psychological, (such as increased risk of depression and anxiety, feelings of stigmatisation and suicidal thoughts and reduced quality of life). People with psoriasis are also known to engage in high levels of unhealthy lifestyle behaviours (excess alcohol intake, smoking and being sedentary and increased BMI). This is problematic for two reasons. First, unhealthy lifestyle contributes to the severity of psoriasis. Second, unhealthy lifestyle increases the associated risk of cardiovascular disease. This makes health risk communication a key aspect of the management of psoriasis and is therefore the primary focus of this PhD thesis.

Each of the studies included in this thesis aims to add to current understanding of health risk communication in the context of psoriasis and suggest ways of improving the communication of complex health information to enable health risk reduction.

As the thesis is presented in alternative format each chapter will be labelled as either a journal article or thesis sub-section. Where journal articles are presented, the formatting will be consistent with the relevant target journal. This will be clearly labelled at the start of each chapter with the most up-to-date submission status.
Brief overview of included sections

Section One presents a narrative literature review (Chapter 1) written in the style of a journal article. The review introduces the general concept of risk communication, including the different ways that information about risk can be presented. It then describes the theoretical frameworks utilised in risk communication research. The review then outlines cardiovascular disease as an exemplar health threat, and introduces psoriasis in order to demonstrate why risk communication is important to people living with the condition.

Chapter 2 (thesis sub-section) presents the main aims and objectives of the research which address the gaps in research identified in the narrative literature review.

Section Two presents a critical appraisal of mixed methodology research. Written in the style of a journal article, Chapter 3 presents a critical review of mixed methodology with a focus on how mixed methods can be applied to psoriasis research. The primary aim is to present a rationale for integrating qualitative and quantitative studies to further our understanding of effective health risk communication to psoriasis patients. The review first gives a theoretical overview of recognised mixed methods approaches. It then presents examples of mixed methods risk communication research, and how these can be applied to the context of psoriasis and its management. The remaining part of this section (Chapter 4; thesis sub-section) explains the theoretical and methodological justification of using a mixed methods approach in this PhD.

Section Three comprises two studies which investigate the current level of health risk communication (related to poor lifestyle; smoking, alcohol, diet and exercise) for people with psoriasis. First, a systematic examination of the healthcare professional
core training competencies is presented (Chapter 5; journal article). This examines the amount of coverage and depth given to health risk communication (related to poor lifestyle) as part of healthcare professionals’ core training. The second study (Chapter 6; journal article) presents an observational study examining the current level of lifestyle behaviour change signposting for patients with psoriasis. This study is set in a key location for health communication; primary and secondary healthcare waiting rooms.

**Section Four** comprises two studies examining health risk communication using cardiovascular disease (CVD) as an exemplar health threat; one that is associated with psoriasis. The first study in this section (Chapter 7; journal article) presents a study examining how healthcare professionals communicate information about CVD risk to patients with psoriasis during primary care CVD risk assessment. The second study (Chapter 8; journal article) presents a randomised experimental study examining methods of CVD risk communication using message framing as a theoretical framework and behavioural intentions as the primary outcome.

Finally, **Section Five** (Chapter 9; thesis sub-section) presents a general discussion aiming to synthesise the results of each of the studies contained within this PhD, and explain the significant contribution of each of the studies to the literature. Directions for further research in health risk communication studies in psoriasis are suggested. A diagrammatic representation of the thesis structure is provided in Figure 1.
Figure 1. Structure of PhD thesis

Section 1
Introduction
Chapter 1
Narrative synthesis
*Journal Article*
Chapter 2
Aims and Objectives

Section 2
Methodology
Chapter 3
Mixed methods
*Journal Article*

Section 3
Lifestyle behavioural change support in psoriasis
Chapter 5
Training competencies
*Journal Article*

Section 4
Health risk communication CVD
Chapter 7
Communicating CVD risk
*Journal Article*

Section 5
General Discussion
Chapter 9
Discussion and synthesis
Chapter 6
Observational study
*Journal Article*
Chapter 8
Message framing Experimental study
*Journal Article*
Section One Introduction

This section presents the theoretical overview and current understanding of health risk communication. Chapter 1 presents a narrative literature review (written in the style of a journal article). The review introduces the concept of risk communication, and then describes the theoretical frameworks relating to risk communication. Then the review makes reference to cardiovascular disease as an exemplar health threat, and introduces psoriasis in the context of why risk communication is important to people who have psoriasis. Chapter 2 (thesis sub-section) presents the main aims and objectives of the research in accordance to the gaps identified in the narrative literature review.
Chapter 1: Health risk communication and Psoriasis

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Note. As this paper is in preparation, the formatting and layout are consistent with the requirements for the Health Psychology Review. For this chapter only, references will be placed at the end of the chapter rather than at the end of the thesis.
1.1 Abstract

Cardiovascular disease (CVD) is a major cause of death globally, and importantly one that is at least partially preventable by modifiable behavioural risk factors such as smoking, obesity and excess alcohol intake.

The way that messages about behaviour change and CVD risk are communicated is crucial in terms of increasing patient understanding about personal health risks, and encouraging positive behaviour change. It is crucial to identify methods of risk communication most likely to lead to more informed health decisions and intentions to reduce risky health behaviours.

Health risk communication is particularly important for people with psoriasis, a long-term, complex, inflammatory skin condition. Psoriasis is associated with unhealthy lifestyle behaviours known to be associated with increased risk of CVD. This makes health risk communication important for this population, yet there is little agreement about the most effective risk communication methods.

There is considerable evidence that lifestyle behaviour is important in psoriasis for two reasons. First, improving diet, limiting alcohol and tobacco intake, and exercising regularly have been shown to improve psoriasis outcomes. Second, positive behaviour change reduces the associated CVD risk.

This review of the literature will argue the importance of identifying the most effective ways of communicating personally-relevant health risks for people with psoriasis. Information about risk must be presented in a way that empowers patients and increases the likelihood of engaging them in risk reduction behaviour.

Theoretical frameworks from the field of health psychology, including message
framing theory, are presented to illustrate directions for further research in the context of examining more effective risk communication techniques.

1.2 What is risk communication and why is it important?

Risk communication is challenging for healthcare professionals (Gigerenzer, Gaissmaier, Kurz-Milcke, Schwartz, & Woloshin, 2007) and is a crucial part of primary and secondary prevention strategies. Yet the evidence base concerning best practice for risk communication is underdeveloped (Ghosh & Ghosh, 2005). Current methods fail to adopt a theory-informed approach (Naik, Ahmed, & Edwards, 2012). Risk as a concept is difficult to understand for both healthcare professionals and patients. A number of cognitive biases are known to affect risk perception (Kahneman & Tversky, 1979; Weinstein, 1984) and will be discussed in detail in this review. As a result there is a need to understand how people interpret risk and particularly how people use information about risk to make important decisions concerning health behaviours (Berry, 2004).

How information about health risk is communicated to patients is likely to influence: (1) patients’ perception of risk magnitude; and (2) their consequent behavioural decisions (reducing alcohol intake or increasing levels of physical activity for example) to reduce associated health risks (Edwards, Elwyn, Covey, Matthews, & Pill, 2001; Rothman, Salovey, Antone, Keough, & Martin, 1993). It is therefore important to identify factors that are more likely to lead to behaviour change and use these to develop effective risk communication strategies. Ignoring perceptions of health risk information can often result in detrimental, risky health behaviours (Schuz, Schuz, & Eid, 2013).
Current thinking in the risk communication literature suggests that poorly presented information may lead to ill-informed health decisions, whereas personally-relevant information may increase patient understanding and consequently lead to more appropriate health decisions (Ahmed, Naik, Willoughby, & Edwards, 2012; Trevena, Davey, Barratt, Butow, & Caldwell, 2006). An essential part of developing effective risk communication is to understand and target the thought processes that will most likely lead to behaviour change (Ruiter & Kok, 2012).

This paper has two main aims: (1) to examine and synthesise the risk communication literature; and (2) to provide a rationale that effective health risk communication is important for people with psoriasis.

Psoriasis is a multifaceted long-term inflammatory skin condition, associated with a number of risky health behaviours known to increase the risk of additional co-morbidities. Whilst there is a body of evidence which examines risk communication generally, to date there has been no research examining health risk communication specifically in psoriasis patients. We use an exemplar health threat of CVD which is known to be associated with psoriasis (to be discussed in more detail later in this review). We suggest how current theory can be applied to developing appropriate health risk communication strategies in this population.

This review will expand on previous reviews by bringing together for the first time health risk communication and psoriasis. A rationale for integrating the health risk communication and the dermatology literature will be presented, making reference to key review papers. We will suggest a theoretical framework to inform future studies of risk communication in patients with psoriasis.
1.3 The effect of format on risk perception

1.3.1 Numerical, verbal and visual formats

A number of challenges must be overcome when developing effective risk communication methods, including the format of risk information which plays an important role in delivery of health messages (Edwards, Elwyn, & Mulley, 2002). These have included visual methods (e.g. pictures, bar graphs) (Goodyear-Smith et al., 2008; Lipkus & Hollands, 1999), numerical formats (e.g. ‘your risk of getting the disease is 20%’) (Gurmankin, Baron, & Armstrong, 2004) and verbal formats (e.g. ‘your risk is high’, ‘smoking increases your risk’) (Knapp et al., 2009). Whilst a range of formats have been studied in the literature, there is no general agreement about the most effective methods of risk communication. Numerous studies have been conducted in the context of hypothetical (non-personal) risk communication scenarios. Gurmankin and colleagues found that participants believed, and were more trusting of, information presented numerically, compared to verbally (Gurmakin et al., 2004). However, Lipkus et al. (2001) found that even a highly educated sample of participants had difficulty processing numerical information related to a hypothetical health risk (either breast cancer or colon cancer). Participants were unable to identify the larger risk magnitudes when presented as percentages (20% of participants could not identify the larger risk of 1%, 5%, and 10%).

This creates an additional layer of complexity; numeracy skills of both the healthcare professional and the patient must also be considered. Whilst numerical descriptors of risk may facilitate understanding of risk (Gurmakin et al., 2004) some suggest it is
difficult for patients to process and interpret (Gigerenzer et al., 2007; Lipkus et al., 2001).

There are few studies in the context of patient consultations. One study found that verbal descriptors of CVD risk were more frequently used by practitioners in consultations with patients (in 73% of cases) compared to verbal combined with numerical information (in 11% of cases) (Neuner-Jehle, Senn, Wegwarth, Rosemann, & Steurer, 2011). In the wider field of risk communication many studies are in the context of perceived risk of medicine side effects. Studies show that verbal descriptions of risk result in patients over-estimating risk magnitude (Berry, Raynor, Knapp, & Bersellini, 2004; Knapp, Raynor, & Berry, 2004; Knapp et al., 2009). This can lead to detrimental effects on subsequent behaviour, such as reducing the likelihood of taking the medicine as prescribed.

1.3.2 Absolute and relative risk format

Risk can also be presented using relative risk formats (comparison of risk between two different groups; ‘heavy drinkers have three times the risk of developing heart disease compared to moderate drinkers’) and absolute formats (risk of developing a disease over a given time period; ‘you have a 1 in 10 risk of developing X disease in your lifetime’) (Ahmed et al., 2012). However the use of absolute and relative risk formats must be used with caution, particularly given the inappropriate use and interpretation of statistics both in the media and in public health campaigns. To illustrate this Gigerenzer et al. (2007) described ‘The Contraceptive Pill Scare’ case in October 1995. The U.K. Committee on Safety of medicines issued a warning that the latest contraceptive pill ‘increased the risk of life-threatening blood clots twofold’
(or by 100%). This relative risk format was passed to 190,000 healthcare professionals and issued via a media announcement. A significant number of women consequently stopped taking contraception, or switched brands, resulting in a significant number of unwanted pregnancies, particularly in younger women, costing the National Health Service approximately £46 million (Furedi, 1999). The research that this finding was based on showed that thrombosis had increased from 1 to 2 of every 7,000 cases (the relative risk increased by 100%, where the absolute risk was 2 in 7,000) (Gigerenzer et al., 2007). Reporting complex health information must be done with caution given the determinate effect this can often have on an individual’s subsequent behaviour.

1.3.3 Personalising risk information

Providing personalised health risk information is a way of improving risk perception, which includes tailored risk communication strategies around considerations of immediate versus future consequences (O'Connor, Warttig, Conner, & Lawton, 2009). Bogardus et al’s (1999) five-point framework outlining the challenges of communicating risk information illustrates the difficulty faced by health communication researchers (Bogardus, Holmboe, & Jekel, 1999). This framework may help us to understand the challenges of risk communication. First, identity refers to whether the risk is known or unknown. Previous empirical research has shown that people are more concerned with unknown risk (Bennett, 1998). Second, whether risk is temporary (pain following surgery) or permanent (risk of complications following surgery) is referred to as permanence. Third, beliefs about the timing of the health risk concerns whether risk has short-term or long-term implications. Fourth,
probability relates to the likelihood of a given health threat. Finally, the value domain states that risk perception depends on the importance that patients attribute to a given health risk. Consideration of the specific content of health messages, as well as risk format, should be an important consideration of message delivery and should be a focus for future research.

To summarise, multiple methods of risk communication have been subject to empirical investigation. There is no consensus about the most effective risk formats, particularly the role that numerical information plays in risk communication. Additionally we also know little about the specific methods used in clinical practical. Identifying the most effective methods that lead to more accurate risk perceptions may consequently lead to better informed health decisions (Bogardus et al., 1999; Naik et al., 2012). Providing personalised information about risk may be one method of improving risk perceptions but needs further research.

1.4 Theoretical frameworks for understanding risk communication

1.4.1 Cognitive biases in risk perception

A number of cognitive biases affect the interpretation of risk information and consequently judgement and decision making (Berry, 2004; Tversky & Kahneman, 1974). Tversky and Kahneman highlighted up to twenty biases (or ‘systematic errors in thinking’) that influence decision making. One such bias particularly important for health risk communication concerns ‘unrealistic optimism’. People may be ‘unrealistically optimistic’ about a given health problem (Weinstein, 1983, 1984) and justify unhealthy behaviours due to inaccurate perceptions of risk and susceptibility.
When asked to rate the likelihood of a given health problem, participants rated themselves as less likely to suffer from a given health risk compared to others of the same demographic.

Weinstein (1987) identified four cognitive processes that contribute to unrealistic optimism, suggesting that when assessing their risk of an adverse event, individuals have a tendency to believe that the problem: (1) has yet to appear, so never will; (2) is preventable by individual action; (3) is infrequent; and (4) is not within their realm of personal experience. Therefore, Weinstein argued that if a given problem meets these characteristics individuals will not identify themselves as being at risk of a health threat. Weinstein did not explicitly state whether all the conditions have to be met to accurately perceive a health threat. Rather, that a prediction equation involving the first three factors accounts for 57% of the variance of unrealistic optimism elicited by a given event. This framework is one in which views risk perception as a non-rational process and is associated with later work on decision biases (Kühberger, 1998).

Risk communication format may also lead to decision biases related to the over- and under-estimation of risk magnitude. For example research has shown that certain treatments are viewed more favourably when presented in absolute rather than relative risk formats (Covey, 2007). Such misunderstandings can lead patients to believe that a treatment is more effective than the evidence suggests (Fagerlin, Zikmund-Fisher, & Ubel, 2011). Individuals are also prone to overestimating the likelihood of low probability risks, and underestimate the risk of more common health threats (Pidgeon, Hood, Jones, Turner, & Gibson, 1992).
1.4.2 Emotional biases in risk perception

Communicating complex medical information involving risk and uncertainty is challenging not only due to cognitive biases but emotional biases that may be involved in responses to health risk information (Berry, 2004). Emotional responses to health messages have important implications for psychological well-being, decision making and behavioural outcomes (Lipkus, 2007).

Emotional reactions to risk information act as a barrier to accurate risk perception by diverting people’s cognitive assessments (Loewenstein & Hsee, 2001; Naqvi, Shiv, & Bechara, 2006; Quartz, 2009) and producing less systematic decision-making (Keysar, Hayakawa, & An, 2012). Consequently, emotions are recognised as a driver of risky behaviours (Loewenstein & Hsee, 2001; Naqvi et al., 2006; Quartz, 2009).

In measuring emotional responses to risk information, it is possible to determine which health messages induce such emotional reactions, and examine whether these produce less systematic decision-making as indicated in the literature (Keysar et al., 2012). Importantly research can begin to identify appropriate health messages; ones that induce positive behavioural changes.

1.4.3 Fear-inducing health messages and overcoming message rejection

The use of fear appeals (persuasive messages that aim to arouse fear) is an area of continued debate in the risk communication literature. Using fear arousal as a risk communication strategy may result in avoidance behaviour due to a perceived negative outcome (a person may avoid screening due to the fear that a health condition may be detected) (Lipkus, 2007).
However not all fear-inducing messages are detrimental for behaviour change. Hammond at al. (2004) showed that negative emotional reactions were associated with greater message effectiveness for smoking cessation. Participants that reported experiencing fear (44% of participants) and disgust (58% of participants) when presented with the health information, were more likely to have quit smoking, made an attempt to quit, or reduced smoking at follow-up.

Whether fear appeals can be detrimental for behaviour change is an area of continued debate. In a meta-analysis strong fear appeals were shown to result in high levels of perceived severity and susceptibility, with a weak but reliable effect on motivating changes in attitudes, intention and behaviour (Witte & Allen, 2000). The authors argue that fear may have a detrimental effect on behaviour change if individuals believe they are not able to avert the threat. Consequently, individuals may respond to personally-relevant health information in a biased way if they perceive the information as threatening, resulting in the message being rejected (Liberman & Chaiken, 1992).

Ruiter and Kok (2012) argue that health messages must be personally-relevant and evidence-based. They suggest that fear appeals that aim to induce fear are not currently designed in relation to theoretical understanding of how messages can change cognitions and behaviour. People are motivated to avoid such information due to a state Festinger (1957) refers to as cognitive dissonance. According to this theory, people are motivated to change an unpleasant state caused by a conflict between their belief systems and behaviour (people continue to smoke even though they know it causes cancer). Dissonance may be reduced by placing themselves out of risk (quitting smoking to reduce the risk of lung cancer). However, an easier way
of reducing the dissonance between the behaviour and its negative consequences is to ignore the message (Ruiter & Kok, 2012). Biased perceptions of risk may be overcome by: (1) providing people with instructions on how to implement a particular behaviour, and (2) persuading them of their personal susceptibility to the threat. This helps us to understand the importance of providing personally-relevant health information to patients who may believe they are not personally susceptible to such health risks (Ruiter & Kok, 2012).

The literature provides insights into how cognitive dissonance may be overcome in the presence of threatening health messages. Steele’s (1988) self-affirmation theory provides an illustrative example. According to Steele, people are motivated to maintain a sense of self-worth, seeing themselves as moral, competent people. When a person behaves in a way that is inconsistent with their personal values cognitive dissonance occurs (Festinger, 1957). This dissonance can threaten the individual’s self-worth. Thus, to reduce dissonance individuals need to reaffirm the self as moral, compassionate and competent (Steele, 1998). Self-affirming techniques include asking participants to write about an important trait (Cohen, Aronson, & Steele, 2000) or rate their perceived most important value (Correll, Spencer, & Zanna, 2004). These techniques seek to affirm the individual as having positive attributes, thus protecting the self and reducing any defensive responding to health risk messages (Reed & Aspinwall, 1998).

Self-affirmation theory has been applied to a range of health behaviours. It has been shown to increase the effectiveness of threatening health information by reducing defensive responding and increasing message acceptance. This leads to positive intentions and health behaviours (Harris & Napper, 2005; Sherman, Nelson, &
Steele, 2000) which may be sustained over time (Harris & Epton, 2009) (Harris & Epton, 2009). Armitage et al. (2008) showed that self-affirmed heavy smokers were more likely than non-affirmed smokers to accept threatening health messages and were also more inclined to quit smoking. A brief self-affirmation manipulation has been shown to increase perceived threat following a health message about alcohol, which consequently resulted in reduced alcohol consumption (Armitage, Harris, & Arden, 2011)

To summarise, there are a number of cognitive and emotional biases that may inhibit a person’s ability to process and act upon information about risk. Whilst there is a body of research aiming to provide ways of overcoming such biases, little research has been undertaken with psoriasis perceive and respond to personally-relevant health messages. Given the number of psoriasis associated co-morbidities, this is an underdeveloped area of the literature. Cognitive biases have detrimental effects on behavioural choices and traditional approaches to judgement and health decision making advocate that health risk communication strategies consider such biases when presenting patients with information about health risks (Rothman, Martino, Bedell, Detweiler, & Salovey, 1999). Given the importance of healthy living for people with psoriasis, research must find effective ways of constructing effective, evidence-based messages.

1.4.4 Message framing theory

A theoretical approach to constructing effective risk communication in terms of behaviour change is message framing theory (Rothman et al., 1999; Rothman et al., 1993). Grounded in the principles of Prospect Theory (Kahneman & Tversky, 1979;
Rothman et al., 1999) this approach divides messages about behaviour change into either positive (‘gain-framed’) or negative (‘loss-framed’) messages associated with carrying out, or not carrying out, a particular behaviour. For example ‘quitting smoking lowers your risk of lung cancer’ (gain-framed) and ‘by not quitting smoking you increase your risk of lung cancer’ (loss-framed) is essentially providing the same health information but within different message frames.

According to prospect theory individuals respond differently to factually related health messages depending on the frame used. When gains are more salient, people avoid risk, and when presented with potential losses, individuals are more likely to tolerate risk. The theory proposes that this results in individuals either avoiding an unwanted outcome or more being more inclined to pursue a desirable outcome (Tversky & Kahneman, 1981). Consequently people’s responses to health messages will differ depending on how the message is framed. This results in two categories of behaviours. For detection behaviours perceived as risky (heart disease screening) a message focused on losses, according to the theory is more effective. For perceived ‘low-risk’ prevention behaviours (increasing physical activity levels to reduce heart disease risk) a gain-frame message is more effective (Rothman & Salovey, 1997).

The effectiveness of message-framing has often been debated. Two key meta-analyses examined the evidence for message framing according to the two categories of behaviours. Analyses of 93 studies showed that for encouraging disease prevention behaviours (e.g. smoking cessation and weight loss), gain-framed messages showed a significant, but weak advantage (effect size $r=0.032$, $p=0.015$) over loss-framed appeals (O’Keefe & Jensen, 2007). This was due to large effect sizes in studies related to dental hygiene. The review found no significant difference
in the effectiveness of gain- and loss-framed appeals for non-dental-related behaviours. In a similar review of 53 empirical studies examining detection behaviours (e.g. attending cancer screening) a significant, but weak advantage of loss-over gain-framed appeals ($r=-0.039$, $p=0.020$) was found (O'Keefe & Jensen, 2009). This advantage was limited to breast cancer studies only.

A more recent meta-analysis examined message framing with a focus on studies assessing health behaviour as an outcome (Gallagher & Updegraff, 2012). Whilst the effect of loss-over gain-framed messages were not significant for detection behaviours, a significant advantage was found for gain-over loss-framed messages ($r=0.083$, $p=0.002$) for encouraging prevention behaviours (although limited to smoking cessation and physical activity) (Gallagher & Updegraff, 2012). The authors also conclude there are insufficient studies available in each domain of prevention behaviours to make firm conclusions.

Message framing is an important aspect of health messages aimed at promoting disease prevention behaviours. This has been applied to a number of health behaviours. Gain-rather than loss-framed messages have resulted in increased intentions to request sun cream and repeatedly apply (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999). Although limited to its context of an immediate health risk only, rather than long-term behaviours. Similar findings are also reported for intentions to avoid high-calorie foods (Pavey & Churchill, 2014) and promoting vaccinations (Abhyankar, O'Connor, & Lawton, 2008). A review of the message framing literature suggests that manipulating risk information can also affect outcomes such as knowledge, risk perceptions, intentions and behaviour. Providing
more understandable information leads to improved patient knowledge (Edwards et al., 2001).

Results of previous reviews, and those of the studies included in those reviews, should be interpreted with caution given the paucity of well-designed experimental studies. Message framing provides a theoretical basis for developing a more tailored approach to health message presentation in order to increase message effectiveness (O'Connor et al., 2009). Indeed, considering how individual differences, how a person thinks and feels about a particular behaviour, may influence the likelihood of behaviour change is also important in developing personally-relevant health communication strategies (Covey, 2014).

1.5 Cardiovascular disease risk communication

1.5.1 Current understanding of CVD risk communication

Cardiovascular disease (CVD) is a major cause of death globally, and importantly one that is at least partially preventable by modifiable behavioural risk factors such as smoking, obesity and excess alcohol intake (Yusuf et al., 2004). Complex health information about CVD risk is often presented as a statistic, such as absolute risk (‘your risk of developing CVD over the next X years is 20%’) via freely available individual ‘risk calculators’ such as the internationally-recognised Framingham risk equation (D’Agostino et al., 2008). Risk calculators allow individuals to calculate their own risk (commonly presented as a percentage) of a CVD-related event based on a number of predictor variables such as smoking status and body mass index, within a specified time period. However, the effectiveness of such tools is still
unknown. Whilst risk calculators may prompt people to consider lifestyle changes, they may also lead to inaccurate risk perceptions and misunderstandings of CVD risk, particularly if the information is unexpected or negative, leading patients to potentially dismiss such information (Bonner, Jansen, Newell, et al., 2014). Whether such methods of risk communication lead to increased behavioural intentions and subsequent behaviour change is still uncertain. Further work must examine the extent to which risk calculators are used as part of CVD healthcare consultations. Particularly whether they facilitate patient understanding, improve risk perceptions and encourage risk through behaviour change.

Research must also aim to examine the process of CVD risk communication in the context of healthcare consultations. This is important in understanding risk communication strategies used in practice and whether these follow the relevant clinical guidelines for risk communication. Neuner-Jehle and colleagues found that verbal expressions of risk (also known as qualitative risk formats; ‘your risk is high’) were used by GPs in 73% of primary care consultations (Neuner-Jehle et al., 2011). However it is not always clear if these methods serve to facilitate patient understanding of risk. Practitioners may also demonstrate a lack of consistency in how risk is discussed with patients. In one study different risk communication strategies were used depending on how practitioners perceived the patient’s health risk. Where numerical expressions of risk were used, this resulted in patients misunderstanding their own risks (Bonner, Jansen, McKinn, et al., 2014; Bonner, Jansen, Newell, et al., 2014).

Effective risk communication involves a two-way exchange of information between a patient and healthcare professional which increases the patient’s understanding of
their personal risk (including risk magnitude) and enables both clinical decision-making and more informed choices about health behaviour change (Ahmed et al., 2012). However the literature lacks clarity on the most effective methods (e.g. verbal, numerical) of CVD risk communication in terms of whether this translates into (1) accurate perceptions of personal risk; and (2) increased motivation to engage in risk reduction behaviour (e.g. smoking cessation, weight loss, increasing physical activity).

A systematic review of CVD risk communication methods concluded that making patients aware of their personal risk can lead to more accurate risk perceptions and consequently decisions about reducing risk through behaviour change (Waldron, van der Weijden, Ludt, Gallacher, & Elwyn, 2011). The main findings of the review were as follows: first, of the fifteen studies identified, four investigated actual CVD risk, where the remaining studies were based on hypothetical risk scenarios (e.g. the risk of a hypothetical disease). Second, there is a lack of research conveying personally-relevant risk estimates, which aims to motivate people to change their behaviours to modify their risk of CVD. Third, there is a lack of well-designed studies investigating CVD risk communication. Due to the paucity of research as a result of this review, only limited conclusions can be made (Waldron et al., 2011) suggesting a need for further work in the context of providing personally-relevant health information, such as in the context of medical consultations where risk is likely to be discussed.

Clinical guidelines for the management of CVD risk states that patients must acquire knowledge of personal health risks to make informed health decisions (National Institute for Health and Care Excellence, 2010). A study conducted by Scott et al.
amongst female college students showed that message framing increases CVD-related knowledge, perceptions of CVD risk and behavioural intentions. For women identified as having at least one CVD risk factor, reading a gain-framed message resulted in a greater mean increase in self-efficacy to prevent CVD compared to loss-framed messages. Whilst limited in terms of the population studied, this work provides support for the use of tailored CVD risk messages. Future studies must build on this work in the context of personally-relevant health risks.

1.5.2 Risk information and lifestyle behaviour change

Public health strategies in the UK state that individuals identified as being at increased risk of CVD should be supported with appropriate lifestyle interventions to reduce their risk (Department of Health, 2008). Research aimed at developing effective CVD risk communication strategies must therefore consider effective methods of behaviour change. The more successful approaches aimed at changing behaviour are grounded in theoretical approaches to behaviour change in the field of health psychology (Hardeman, Griffin, Johnston, Kinmonth, & Wareham, 2000). Employing such approaches has shown considerable promise in terms of improving CVD knowledge, intentions to change behaviour and improving clinical risk factors associated with CVD in the context of rheumatoid arthritis, a common inflammatory condition (John, Hale, Treharne, Kitas, & Carroll, 2013). This approach has yet to be applied to patients with psoriasis. Given that people with psoriasis are more likely to engage in poor health behaviours associated with CVD (to be discussed in the following section), there is a clear need to understand how best to communicate
CVD risk in the context of psoriasis and this should inform future health communication strategies.

### 1.5.3 Improving patients’ understanding of CVD risk

Providing individuals with information about CVD risk may be one strategy to prompt risk reduction behaviours. Increasing knowledge and improving understanding of CVD risk is part of traditional approaches to patient education and information giving about healthy lifestyles, however, providing information alone does not necessarily translate into behaviour change (Egan, 1999). Rather, providing information about risk factors associated with CVD (such as information about blood pressure, BMI and cholesterol) must be done in parallel with interventions to increase understanding of specific ways to reduce CVD risk. Otherwise there is a danger that the increased understanding will lead to emotional change in the form of increased anxiety, without the knowledge that this can be reduced (Reed & Aspinwall, 1998). There are a number of recognised, effective, behaviour change techniques which can be incorporated into risk communication strategies (Michie et al., 2013). Providing risk information alongside effective behaviour change interventions may be an effective way of changing behavioural intentions as well as behaviour, but only in conducting well-controlled experimental studies can firm conclusions be made about the effectiveness of such an approach.

Difficulties arise, however, in identifying how practitioners currently communicate about CVD risk due to the paucity of studies available. Little is known about the content of those discussions in terms of the type of information provided and whether tailored information is used. Public health strategies in the UK advocate making use
of every patient-healthcare professional contact as an opportunity to engage in discussions about behaviour change, by employing a range of methods such as brief advice to more advanced behaviour change techniques (National Health Service (NHS) Yorkshire and the Humber, 2010). In establishing more effective communication strategies this would serve to increase patient knowledge and understanding of personally-relevant health risks in the context of patient-healthcare professional interactions as part of long-term condition management.

To recap, CVD risk communication is a developing research field. Outside academic study, there is a ‘common-sense’ view that giving risk information is relatively straightforward, however, this review demonstrates that we can investigate cognitive biases that lead to misinterpretation of risk information. In addition, the links between knowledge of risk and subsequent behavioural intention are unclear. A small number of studies have been conducted in this area, however the majority of which have focused on hypothetical (non-personal) risk scenarios, and yet the evidence shows that these are likely to have less ecological validity. More research is needed in the context of medical consultations where CVD risk is the main topic of conversation and information is of direct personal relevance for patients.

1.6 Psoriasis, lifestyle behaviours and associated CVD risk: Understanding of risk factors

1.6.1 Background to psoriasis: Characteristics and symptoms

Psoriasis is a long-term inflammatory skin condition affecting around 2% of the population (Parisi, Symmons, Griffiths, & Ashcroft, 2013). It is characterised by red
scaling plaques that are either localised or widespread (Stern, Nijsten, Feldman, Margolis, & Rolstad, 2004). The most common form is chronic plaque psoriasis, where patients would typically have sharply circumscribed, round-oval or coin sized plaques (nummular) plaques (Langley, Krueger, & Griffiths, 2005). Psoriasis creates substantial healthcare demand due to its common prevalence in medical practice, and associated treatments, with more than 90% of patients requiring some form of prescription therapy (Gelfand et al., 2005). Patients report dissatisfaction with primary care consultations about psoriasis. Particularly, healthcare professionals fail to recognise psoriasis as a long-term condition and lack the knowledge and expertise to help patients with psoriasis, often leading patients to disengage from healthcare professionals (Nelson, Chew-Graham, Griffiths, & Cordingley, 2013).

1.6.2 Co-morbidities associated with psoriasis

There has been growing awareness of an increased risk of physical and psychological co-morbidities in patients with psoriasis (Griffiths & Barker, 2007). This may have important implications for the delivery of healthcare, as recognised in recent clinical guidelines for the management of psoriasis. The presence of co-morbidities may add to the complexity of treatment and may have adverse effects on the efficacy or side effects of available therapies for psoriasis (National Institute for Health and Care Excellence, 2012).

Physical co-morbidities associated with psoriasis including diabetes, psoriatic arthritis, inflammatory bowel disease and cardiovascular disease (Dauden et al., 2012; Gottlieb, Chao, & Dann, 2008). Psoriasis is associated with a number of
psychological co-morbidities including increased risk of depression and anxiety (Gupta, Gupta, Schork, & Ellis, 1994; Richards, Fortune, Griffiths, & Main, 2001), stigmatisation due to the visible nature of the condition (Kimball, Jacobson, Weiss, Vreeland, & Wu, 2005) and suicidality (Kurd, Troxel, Crits-Christoph, & Gelfand, 2010). In a recent study of distress in long-term conditions, psoriasis was associated with increased risk of suicide, with only epilepsy, eczema and migraine having higher associated risk (Singhal, Ross, Seminog, Hawton, & Goldacre, 2014). This is particularly important because understanding of the high psychological burden experienced by people with psoriasis is not widely known, even amongst health care professionals, and thus they are less like to provide appropriate support to patients with the condition.

A number of studies discuss the challenge of understanding the complex psychological experiences of patients with psoriasis. Some authors speculate that psoriasis severity acts as a mediator in the reduction in quality of life associated with psoriasis (Gelfand et al., 2004; Zachariae et al., 2002), however this finding has proved inconsistent. Fortune et al. (2004) found that the clearance of visible psoriasis symptoms does not change the levels of distress experienced by patients who have psoriasis. This suggests that distress may be linked to beliefs about psoriasis, rather than the visible appearance of psoriasis. Further, medical management of psoriasis had no effect on the levels of worry linked to the evaluation of social concerns, beliefs about psoriasis, or the coping strategies used by patients (Fortune et al., 2004). Nevitt and Hutchinson (1996) also found that in a sample of patients with psoriasis, more than half described themselves as being bothered or concerned by the appearance of their condition.
Fortune, Main, O’Sullivan, and Griffiths (1997a) suggest that the psychosocial impact of psoriasis results from the stress associated with: (1) engaging in anticipatory or avoidant coping behaviour, and (2) the perception or belief of being evaluated by others on the basis of their skin. Social visibility of psoriasis has been shown to be associated with self-reported poor physical health, and patients classified as being more reactive to stress have been shown to have poorer mental health functioning (Fortune, Main, O'Sullivan, & Griffiths, 1997b). Importance has also been placed on understanding the cognitive processes such as anticipating the reaction of others and beliefs of being negatively evaluated that give rise to stress and contribute to problems with interpersonal relationships and everyday activities (Fortune et al., 1997b).

1.6.3 Psoriasis and lifestyle behaviours

It is recognised that people with psoriasis engage in high levels of risky health behaviours traditionally associated with CVD. Excess alcohol intake (Kirby et al., 2008), smoking (Favato, 2008) being sedentary and increased BMI (Naldi et al., 2005; Samarasekera, Neilson, Warren, Parnham, & Smith, 2013) are all more common in people with psoriasis than the general population. Unhealthy lifestyle behaviours can affect psoriasis onset and severity, and increase the risk of CVD.

1.6.4 Lifestyle behaviours and psoriasis onset

Previous studies demonstrated the adverse effects that smoking has on the skin (Freiman, Bird, Metelitsa, Bararkin, & Lauzon, 2004; Morita, 2007), and has led
many to conclude that smoking may be an independent risk factor in the development of psoriasis (Gerdes, Zahl, Weichenthal, & Mrowietz, 2010; Huerta, Rivero, & Rodriguez, 2007; Li, Han, Choi, & Qureshi, 2012). This may be particularly problematic amongst heavy smokers and people with a longer duration of smoking (Li et al., 2012). Smoking is also associated with a 70% increased risk of developing plaque psoriasis (Wolk et al., 2009).

The link between alcohol and psoriasis onset is much clearer. Alcohol intake is independently associated with severe forms of psoriasis (Gerdes et al., 2010), and may be a risk factor for onset of psoriasis particularly in young and middle aged men (Naldi, Peli, & Parazzini, 1999). Certain types of alcohol have been shown to be associated with an increased risk of developing psoriasis amongst women (Qureshi, Dominguez, Choi, Han, & Curhan, 2010). One study assessed alcohol intake in people with psoriasis compared to a control group twelve months before the onset of psoriasis (Poikolainen, Reunala, Karvonen, Lauharanta, & Karkkainen, 1990). Participants with psoriasis self-reported higher rates of alcohol consumption and were more likely to continue drinking, compared to the control group. The authors suggest this may be due to the emotional distress associated with living with psoriasis. However, it has previously been suggested that the link between alcohol consumption and onset of psoriasis is less clear than smoking for example, as previous studies may not have controlled for confounding factors such as smoking rates (Behnam, Behnam, & Koo, 2005; Naldi et al., 1992).

Being overweight (defined as having a Body Mass Index [BMI] ≥ 25) and in particular obese (BMI ≥ 30) (Finucane et al., 2011) is associated with the onset of psoriasis. Wolk et al. (2009) showed that obesity compared with normal body weight
is associated with a two-fold increased risk for psoriasis onset. Measures such as amount of fat, fat distribution and location of fat in the body have been suggested as risk factors for the development of incident psoriasis (Naldi et al., 2005). A large prospective study showed that risk of psoriasis was attributable to excess weight, whereby 30% of incident psoriasis cases were related to having a BMI of ≥25, and 50% of those with a BMI of ≥30 related to a 50% of cases (Setty, Curhan, & Choi, 2007). Similarly in a British study, patients with mild and moderate psoriasis were more likely to have an increased BMI compared to control patients, with obesity more prevalent in patients with severe psoriasis than mild psoriasis (Neimann et al., 2006).

1.6.5 Lifestyle behaviours and psoriasis severity

It is also recognised that unhealthy lifestyle behaviours such as smoking and alcohol intake contribute to the severity of psoriasis. Alcohol misuse in particular has exacerbating effects on the skin (Higgins & Vivier, 1994), and has also been shown to worsen psoriasis symptoms, being associated with an increase in skin surface involvement (Poikolainen, Reunala, & Karvonen, 1994). Similarly, cigarette smoking has been shown to be associated with the clinical severity of psoriasis (Fortes et al., 2005).

There is a growing body of evidence showing that improving health behaviours can have positive effects on psoriasis outcomes. Increasing physical activity reduces the severity of psoriasis (Frankel, Han, Li, & Qureshi, 2012). Weight loss improves the effectiveness of psoriasis treatments (Gisondi, Del Giglio, Di Francesco, Zamboni, & Girolomoni, 2008). Gisondi and colleagues showed that moderate weight loss in
obese patients with moderate-to-severe psoriasis improves response to systemic treatment. This led to conclusions that by making lifestyle modifications in terms of controlling calorie intake may support pharmacological treatments in obese patients with psoriasis (Gisondi et al., 2008). Further, dietary components may also be an important factor in relation to psoriasis severity. Low energy/calorie diets have been shown to be an important factor in the prevention of moderate psoriasis (Rucevic, Perl, Barisic-Drusko, & Adam-Perl, 2003).

1.6.6 Psoriasis and CVD

Psoriasis is associated with a number of physical and psychological co-morbidities. The relationship between psoriasis and CVD in particular is receiving widespread attention. In their review of the literature, Tobin et al. (2010) identified 14 studies demonstrating a link between CVD and patients with psoriasis and psoriatic arthritis. There is increasing recognition that psoriasis, particularly severe forms, is associated with CVD (Gelfand et al., 2006; Mehta et al., 2010) although the precise mechanisms are still under debate (Parisi et al., 2015).

A Danish study found that psoriasis was associated with atrial fibrillation (irregular and often abnormally fast heart rate) and ischaemic stroke (Ahlehoff et al., 2011). This association was independent of age, gender, co-morbidity, concomitant medication and socioeconomic status. The authors acknowledge that this study’s observational design does not allow for conclusions regarding causality, and fails to account for CVD risk factors such as lipid levels, obesity, and smoking. However this study suggests a need for increased awareness of CVD risk factor management (Ahlehoff et al., 2011).
A higher prevalence of major risk factors for CVD (diabetes mellitus, hypertension, dyslipidaemia, obesity, and smoking) are shown to be more prevalent in patients with psoriasis than those without psoriasis (Fortes et al., 2005; Kimball et al., 2008; Prodanovich et al., 2009; Shapiro et al., 2007). Severe psoriasis particularly may be an independent risk factor for CVD mortality independent of traditional risk factors such as age, sex, hypertension, diabetes, and smoking (Mehta et al., 2010).

Prodanovich et al. (2009) showed that psoriasis is a systemic inflammatory condition, showing similarities with other inflammatory immune disorders. Given the risk of myocardial infarction is increased in rheumatoid arthritis (Wolfe, Freundlich, & Straus, 2003), also an inflammatory condition, the association between psoriasis, CVD risk factors and myocardial infarction is also receiving attention (Kremers, McEvoy, Dann, & Gabriel, 2007).

Whilst a number of studies suggest that people with psoriasis may be at an increased risk of CVD, it is currently unclear whether there is a direct or indirect relationship at play here, due to increased prevalence of traditional CVD risk factors in people with psoriasis (National Institute for Health and Care Excellence, 2012). Some researchers argue that psoriasis is unlikely to be a clinically useful independent risk factor for CVD (Stern, 2010; Wakkee, Herings, & Nijsten, 2010). Results from a previous cohort study suggest that when assessing causes of mortality in patients with psoriasis there is no evidence of increased CVD mortality (Stern & Lange, 1988). This is supported by a recent systematic review which found a small but significant increased risk of cardiovascular events in people with psoriasis, particularly related to more severe forms (Horreau et al., 2013). However the review found no evidence of increased risk of CVD mortality
The exact nature of the relationship between psoriasis and CVD is currently debated (Samarasekera et al., 2013; Shelling, Federman, Prodanovich, & Kirsner, 2008). However little attention has been paid to understanding how people might interpret risk of CVD, particularly issues around the prevention of such co-morbidities associated with psoriasis.

Psoriasis is a complex long-term condition, associated with a number of other co-morbidities. People with psoriasis may exhibit high levels of psychological co-morbidities and engage in high levels of unhealthy lifestyle behaviours. Poor lifestyle in particular has detrimental effects on psoriasis, both in terms of onset and severity and the associated increased risk of CVD. All of these factors considered makes effective risk communication even more important in this population and must therefore be a focus of research.

1.7 Psychological drivers of behaviour change in psoriasis

There are a number of considerations when developing effective risk communication strategies for people with psoriasis. Particularly those aimed at encouraging health behaviour change. This includes the format used (e.g. numerical, verbal), the cognitive and emotional biases people may exhibit and the psychological considerations of this population. These contribute to an individual’s perception of risk magnitude, and the likelihood that individuals will engage in health protective behaviours in order to reduce health risks. A further consideration when developing health communication strategies is the psychological responses evoked as a result of receiving health risk information. For example, the benefits of behaviour change have both short and long-term effects on health. Yet we know little about whether
short-term or long-term thought processes motivate people with psoriasis to modify their health behaviours. People may be motivated to adopt healthier lifestyles through (a) a desire to alleviate psoriasis symptoms, or (b) to reduce long-term CVD risk. This strategy may be one way of informing more effective risk communication strategies.

Finding effective ways of communicating CVD risk in particular is crucial given the psychological burden that psoriasis already holds for people (Richards et al., 2001). Psychological factors involved in processing risk information are particularly important in the context of psoriasis where affected individuals are known to experience a number of psychological co-morbidities such as anxiety (Richards et al., 2001) and stress (Berg, Svensson, Brandberg, & Nordlind, 2008) which are traditionally known to affect information processing capacity, inhibiting new information uptake and preventing recall of previously learned information (Schoofs, Preuss, & Wolf, 2008; Sorg & Whitney, 1992).

Increased CVD risk is an additional psychological burden for people with psoriasis. Considering the condition-relevant psychological processes will help to inform tailored risk communication strategies. The thought processes that drive risky health behaviours are important for targeting psychological mechanisms responsible for motivating behaviour change. Communicating information about health risks can influence a number of psychological constructs that are traditionally associated with behaviour change, such as increasing motivation to seek appropriate interventions and beliefs concerning the effectiveness of interventions (McBride, Koehly, Sanderson, & Kaphingst, 2010).
1.7.1 Theories of health behaviour

When developing effective health risk communication strategies involving complex health information which aim to increase motivation of prompt behaviour change, the first step is to identify what specific aspects of behaviour needs to change (Abraham, 2012). Consequently social cognition models provide a useful theoretical framework to predict behaviour and/or behavioural intention.

An in-depth synthesis of the different models of health behaviour is beyond the scope of this review, but meta-analyses have been previously conducted for the theory of planned behaviour (Armitage & Conner, 2001), and protection motivation theory (Floyd, Prentice-Dunn, & Rogers, 2000; Milne, Sheeran, & Orbell, 2000). These two models provide a useful theoretical approach to risk communication. In examining an individual’s appraisal of threat this may help us to understand the conditions under which individuals will engage in preventive and protective health behaviours (Vernon, 1999).

Protection Motivation Theory (PMT)

The PMT is one of the most commonly used models applied to a wide range of health related issues, from health information giving and disease prevention and beyond (R.W. Rogers & Prentice-Dunn, 1997). Rogers’s (1975) original model included four components: (1) severity (e.g. ‘CVD is a serious illness’), (2) susceptibility (e.g. ‘My chances of getting CVD are high’), (3) response effectiveness (e.g. ‘Changing my lifestyle would improve my health’), and (4) self-efficacy (e.g. I am confident that I can change my lifestyle, such as decreasing my
alcohol intake, having a healthy balanced diet, smoking less, and exercising more). These components predict behavioural intentions, which are related to behaviour (Ogden, 2007). Rogers (1985) later added fear as a fifth component to the model, suggesting that people may show an emotional response to information concerning a health threat, for example.

The PMT assumes that individuals are motivated to have high protection motivation as a result of two cognitive appraisals: (1) threat appraisal, and (2) coping appraisal. Threat appraisal is comprised of perceived severity, susceptibility and fear. The coping appraisal allows individuals to evaluate their ability to cope with and avert a given threat, comprising both response effectiveness (‘do I believe my response will be effective in protecting me?’), and self-efficacy (‘do I believe I have the ability to carry out the response?’) (Floyd et al., 2000).

Considering the ever-growing evidence base suggesting psoriasis may be associated with risk factors of CVD (Shelling et al., 2008), it is important to understand the beliefs of people with psoriasis and the extent to which these beliefs drive changes in behavioural intentions. Specifically whether people believe they have the skills and confidence to change (self-efficacy) and whether people show emotional responses (i.e. fear) to risk information. Floyd et al. (2000) argue that the purpose of the PMT research is to persuade the recipient to follow the communicator’s recommendations, and thus identify behavioural intentions as the best measure of assessing this.

Norman, Boer and Seydel (2005) argue that the model is able to “provide a more general account of the impact of persuasive communications, with an emphasis on the cognitive processes that mediate behaviour change” (p. 81). In addition, the model provides a framework to evaluate persuasive communications and predict
health behaviours. Therefore, The PMT provides a useful theoretical framework when applied to health communication messages that aim to change beliefs concerning a health risk, and which target intentions to change behaviour. Therefore, this model may provide a useful framework for understanding: (1) how beliefs about psoriasis may affect attempts to reduce CVD risk by attempting to change lifestyle behaviours, (2) which strategies are the most effective in communicating risk, and (3) The relative role of risk information in driving behaviour change.

Whilst PMT is a model specifically developed to explain how individuals respond to information about risk, more recent arguments state that PMT assumes that individuals process information in a systematic way, thus neglecting the role of social and environmental factors found in other models of health behaviour (Ogden, 2007; Wright, 2010).

Theory of Planned Behaviour

The theory of planned behaviour (TPB) (Ajzen, 1988, 1991) is one of the most widely used models in assessing health related behaviours. One of the strengths of the model lies in its consideration of social and environmental factors, such as social pressure from others to perform a particular behaviour (Conner & Sparks, 2005).

According to the TPB, behaviour is guided by three considerations: beliefs concerning the outcomes of a behaviour (attitude towards the behaviour), beliefs about the expectations of others (subjective norm), and beliefs about factors that may hinder or enhance performance of a behaviour (perceived behavioural control)
Ajzen, (1991, 2002). The combination of these factors leads to behavioural intentions, which then leads to actual behaviour (Ajzen, 2002).

Armitage & Conner’s (2001) meta-analysis suggests that the TPB can be successfully applied to predicting a wide range of health behaviours. Perceived behavioural control seems to contribute solely to predicting behaviour, demonstrating the efficacy of this component. Further, the TPB was developed to extend the theory of reasoned action (TRA) beyond volitional behaviours, taking into account perceived behavioural control (Conner & Sparks, 2005). Armitage and Conner (2001) found a multiple correlation of attitude, subjective norm and perceived behavioural control with intention, providing support for the model over TRA.

To successfully apply the model to understanding the beliefs that drive health behaviours in the context of people with psoriasis it is necessary to identify which component of the model to target.

Using these two models of health behaviour, two key constructs related to intention to change are central to understanding whether a person may consider making changes to their behaviour: emotional response (i.e. how a person responds to information about risk) and self-efficacy. Given the high levels of problematic lifestyle behaviours in people with psoriasis illustrated in the literature, it is necessary to understand whether people believe they are capable of changing their health behaviours (that is, their level of self-efficacy) (Ogden, 2007).

Self-efficacy, a key construct of social cognition theory (Bandura, 1977), is also an important motivational factor involved in the initiation of behaviour change. Behaviour change is facilitated by perceived control over the behaviour, which plays
an important role in determining whether health behaviours are adopted (Schwarzer & Fuchs, 1995). Self-efficacy concerns the perceived capability the person believes they have to carry out a behaviour (Ogden, 2007) and is similar to the perceived behavioural control construct of the theory of planned behaviour (Ajzen, 1991, 2005), shown to be a strong predictor of behaviour (Armitage & Conner, 2001). Self-efficacy has important implications relating to how people think, feel and act (Schwarzer & Fuchs, 1996) whilst we cannot be certain about levels of self-efficacy in psoriasis populations, we know generally that:

1. Low self-efficacy is associated with depression, anxiety and a sense of helplessness,

2. A strong sense of competence facilitates cognitive processes, and

3. Self-efficacy can positively or negatively influence motivation to act.

All of these factors may be responsible for driving behavioural decisions in people with psoriasis. It is therefore necessary to further examine the psychological mechanisms involved in behaviour change which would help to inform personally appropriate risk communication strategies. The PMT and TPB provide useful frameworks for understanding the barriers to health behaviour change, and in particular suggest ways to overcome them.

1.8 Conclusions

Unhealthy lifestyle behaviours lead to poorer outcomes for people with psoriasis in two ways: (1) they effect psoriasis severity; and (2) increase the risk of CVD. Added to this mix is the knowledge that low mood such as depression and anxiety is
associated with these behaviours, and these are both prevalent in people with psoriasis. This means that information about poor lifestyle behaviours and their impact on people with psoriasis must be communicated in a way that takes account of peoples’ understanding of relevant health risks, and the strategies needed to reduce such risks through positive health behaviour change. Consequently, integrating the risk communication literature with the psoriasis literature would result in a more informed evidence base for researchers aiming to develop the most effective communication strategies specifically for people with psoriasis. This could lead to a better understanding of health risks and more informed decisions about behaviour change in the context of psoriasis.

Research should therefore focus on understanding: (1) current risk communication strategies aimed at people with psoriasis; and (2) the most effective ways of communicating risk, focused on modifying risk through behaviour change. Despite the overwhelming evidence of lifestyle behavioural health risks for people with psoriasis, personally-relevant risk communication strategies is a new area for health communication research and is currently under-recognised and lacks empirical testing. In learning from what is already known about effective health risk communication and its role in behaviour change we can begin to apply theoretical insight into developing effective risk communication strategies for patients with psoriasis with the aim of reducing the overall health burden of psoriasis, including acquired CVD risk.
1.9 References


Covey, J. (2014). The role of dispositional factors in moderating message framing effects. *Health Psychology, 33*(1), 52-65. doi: 10.1037/a0029305


models and behaviour change methods. *International Journal of Obesity and Related Metabolic Disorders, 24*(2), 131-143.


Archives of Internal Medicine, 167(15), 1670-1675. doi: 10.1001/archinte.167.15.1670

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Chapter 2. Thesis aims and objectives

With a focus on both patients and healthcare professionals, this PhD has two overarching aims:

(1) To investigate the ways in which the links between health outcomes and health behaviours are communicated to people with psoriasis, and

(2) To examine new ways of communicating health risks in a way that may lead to increased behavioural intentions.

Specific research questions being addressed are presented according to each study contained within this thesis.

Study one (Chapter 5) research questions:

To what extent are skills related to health risk communication and lifestyle behaviour change (LBC) covered as part of core training curricula for healthcare professionals across general practice and dermatology?

Study two (Chapter 6) research questions:

How much and what type of information is used to communicate about health risks and LBC to patients with psoriasis in primary and secondary care health centre patient waiting areas?

What is the quality of the information about according to a theoretically-informed checklist?
Study three (Chapter 7) research questions:

How do primary care practitioners communicate risk information when conducting CVD risk assessments?

What types of information are used to communicate information about CVD risk?

Study four (Chapter 8) research questions:

What are the effects of different types of risk framing upon intentions to change lifestyle behaviours?

Using theoretical frameworks from cognitive psychology (Prospect Theory and Message Framing) and health psychology (Protection Motivation Theory and Theory of Planned Behaviour), this study will empirically examine the effects of message framing on behavioural intentions in people with psoriasis.

How do beliefs about psoriasis affect attempts to reduce CVD risk by undertaking improvements in lifestyle?

This will determine whether people’s decisions to change their behaviour are driven by the desire to improve psoriasis symptoms or reduce CVD risk.

What is the effect of alternative health message frames on emotional responses?
Section One Summary

The narrative review of the literature presented in Chapter 1 highlighted little agreement around the most effective health risk communication strategies in the context of psoriasis. This is particularly true for health messages that focus on CVD and modifying CVD risk through behaviour change. The review argued that health risk communication is central to psoriasis management, because people with psoriasis are known to engage in high levels of problematic lifestyle behaviours which can worsen psoriasis symptoms and increase CVD risk.

The majority of research was focused on risk communication scenarios outside psoriasis (such as risks of medication side effects) or on studies examining a hypothetical (non-personal) health risk. Studies examining personally-relevant risk communication strategies aimed at people with psoriasis are currently absent in the literature highlighting a need for empirical testing. Further, lifestyle as a health risk in people with psoriasis may not be receiving appropriate recognition thereby presenting a case for further examination.

The thesis aims and objectives presented in Chapter 2 aimed to address the gaps identified in the narrative literature review.
Section Two Introduction

This section aims to present the theoretical and practical considerations in conducting mixed methods risk communication research. Written in the style of a peer-reviewed journal article, the first section describes the theoretical background of mixed methods research, and then apply this to developing a rationale for conducting mixed methods research in the context of health risk communication in patients with psoriasis. The second part of this section describes the mixed methods design adopted for the present PhD making specific links to each of the studies contained within it.
Chapter 3: Health risk communication research in the context of psoriasis: a call for a mixed methods approach

Chapter type: Journal article

Journal: Health Psychology Review
Submission status: In Preparation

Note. As this paper is currently in preparation, the formatting and layout are consistent with the requirements for Health Psychology Review. For this chapter only, references will be placed at the end of the chapter rather than at the end of the thesis.
3.1 Abstract

Health risk communication is a fundamental part of patient management strategies. This is particularly important in the context of psoriasis, a complex long-term inflammatory skin condition. Whilst there is a growing body of research around health risk communication generally, research has yet to apply this to understanding in the context of people with psoriasis, a complex condition with high risks of future comorbidities, some of which may be preventable.

Mixed methods study designs allow the researcher to take the best qualitative and quantitative approaches and apply them to the research questions. If used appropriately they are superior to single-method studies and are particularly important for areas of research that are currently under-developed.

Combining qualitative and quantitative approaches can enable a more detailed interrogation and understanding of the processes involved in health risk communication, and may identify new ways of providing health risk information aimed at encouraging risk reduction or disease prevention behaviour for individuals with psoriasis.

This review outlines potential approaches for undertaking high quality mixed methods research examining health risk communication in the context of psoriasis. It provides the methodological justification for the research reported in subsequent chapters and shows how data collection, data analyses and interpretation can benefit from combining research methods.
3.2 Why is health risk communication important for people with psoriasis?

Risk communication is an important part of health communication research. The ability to communicate complex health risks to patients is a fundamental part of the healthcare professional role. This is particularly true in the case of psoriasis, a complex long-term inflammatory skin condition. Psoriasis is associated with a number of co-morbidities related to health behaviours, such as smoking, excess alcohol intake, increased BMI and being sedentary (Naldi et al., 2005; Samarasekera, Neilson, Warren, Parnham, & Smith, 2013) which subsequently increase the risk of other long-term conditions such as diabetes and cardiovascular disease (CVD).

Whilst health risk communication is a major research field in its own right, studies in the context of psoriasis are currently lacking. Specifically, little is known about: (1) the process of risk communication in healthcare settings between healthcare professionals and patients, and (2) the most effective methods of communicating risk (those that practitioners currently use, and which facilitate patient understanding of personal risk). This paper will suggest a new approach to health risk communication research using psoriasis as an exemplar of a long-term condition in which risk communication is important. We will make reference to risk communication in the context of CVD, which is known to be associated with psoriasis (Gelfand et al., 2006; Samarasekera et al., 2013). Using a mixed methods theoretical overview, we will present a rationale for integrating qualitative and quantitative studies to further our understanding of effective health risk communication to psoriasis patients.
3.3 Definitions and theoretical approaches in mixed methods research

Mixed methods studies involve ‘the collection or analysis of both quantitative and/or qualitative data in a single study in which the data are collected concurrently or sequentially, are given a priority, and involve the integration of the data at one or more stages in the process of research’ (Creswell, Plano Clark, Gutmann, & Hanson, 2003). More broadly, with integration as a key concept, mixed methods research is defined as a process whereby ‘the investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or a program of inquiry’ (Tashakkori & Creswell, 2007, p. 4).

Historically, researchers have shown a tendency to root themselves in one or the other of the major social and behavioural science paradigms, which have been described as either the positivist/empiricist or the constructivist/phenomenological approach (Creswell, 2003; Lincoln, Lynham, & Guba, 2011; Tashakkori & Teddlie, 1998). Accordingly, quantitative methods are associated with the positivist approach, where qualitative approaches are used in constructivist approaches to research.

Quantitative theorists (positivists) suggest that research should allow for bias-free objectivity of social observations. Qualitative theorists tend to reject positivism, arguing that time- and context-free generalisations are simply not possible, nor are they considered desirable. Rather, knowledge is embedded in, and is a product of individual- and culture-specific conceptual frameworks inductively generated from the data collected (Bishop, 2015; Johnson & Onwuegbuzie, 2004).

Authors have previously called for an end to viewing qualitative and quantitative research as opposing categories (Henwood & Pidgeon, 1994). They argued that
rather than representing different paradigms, qualitative and quantitative methods
differ primarily in the point at which the data reduction process occurs; in
quantitative methods, data reduction occurs early on in the process, when variables
are operationalised into questionnaire scores or specific observed examples of a
phenomenon. In contrast, data reduction occurs at the end of qualitative methods at
the point where complex analysis is reported as a series of interrelated themes.
Another argument for mixed methods also arises in the shift towards a multi-faceted,
pragmatist approach to answering research questions, that is embracing both
qualitative and quantitative methods, where research not only involves interpretation,
but is grounded in empirical research (Yardley & Bishop, 2008). Pragmatism has two
levels; the practical, concerned with choosing the most appropriate method for the
research aims such as measurement and experimental designs for hypothesis testing,
or in-depth interviews for exploratory work in a new area; and the philosophical,
where both approaches are seen as complementary because both involve knowledge
production (Yardley & Bishop, 2015). Mixed methods are proving to be an
increasingly popular mode of enquiry compared to single-method designs, and are
becoming particularly important in health research (O'Cathain, Murphy, & Nicholl,
2007). The goal of mixed methods approaches is to capitalise on the strengths and
minimise weaknesses of each approach in a study or across a series of studies
(Johnson & Onwuegbuzie, 2004). Indeed both approaches are seen as important and
useful, and work together as a way of completing each other.

Utilising a mixed methods approach allows the researcher to take the strengths of
each approach and combine them into a single design. One of the major advantages
of using mixed methods designs is the ability to develop the research
comprehensively and completely, whereas a single method approach may have
methodological constraints (Morse, 2003). For example a qualitative approach enables a mass of qualitative data to be understood in terms of ‘themes’, and may involve studying or observing patterns of behaviour to give a more enhanced understanding of a given phenomenon (Creswell, 2003). The value of using such an approach is in the ability to examine in depth unexplored areas of the literature, such as complex experiences that cannot be fully understood by measurement scales and closed-ended questionnaires (Plano Clark, Huddleston-Casas, Churchill, O'Neil Green, & Garrett, 2008). This is particularly important for psoriasis, where patients’ often report psychological experiences (Richards, Fortune, Griffiths, & Main, 2001) suggesting a need for further in-depth research. In contrast, quantitative research allows for data collection under controlled experimental conditions, enabling research with large numbers of people, to increase generalizability of findings when using a random sample of sufficient size. In addition data collection and analysis can often be relatively less time-consuming than in qualitative research (Johnson & Onwuegbuzie, 2004).

By using a mixed methods approach, if findings are consistent (or confirmatory) across methods the researcher can be confident of making a single conclusion. If any discrepancies exist, the researcher has greater knowledge of the given phenomenon and conclusions can be modified accordingly. In both cases the goal of mixed methods research the goal is to increase understanding (Johnson & Onwuegbuzie, 2004). Johnson and Onwuegbuzie explain that in order to mix approaches, researchers must consider the characteristics of each. Specifically, quantitative approaches are focused on deduction, confirmation, hypothesis testing, prediction, standardised data collection procedures and statistical analysis. Qualitative
approaches are focused on induction, exploration and generating a theory, such as grounded theory approaches (Johnson & Onwuegbuzie, 2004).

3.4 Practical and theoretical considerations when designing mixed methods research

Tashakkori and Creswell (2007) explain six different ways that mixed methods research can utilize both qualitative and quantitative approaches which focus on integrating methods, specifically by:

(1) Developing two types of research questions (requiring different methodological approaches to answer them);

(2) Adopting two types of sampling procedure (such as purposive sampling for qualitative approaches);

(3) Having two types of data collection procedure (questionnaires as well as structured observations or interviews);

(4) Having two types of data (numerical as well as non-numerical);

(5) Using two types of analytic procedure (statistical and thematic analysis);

and

(6) Having two types of conclusion (objective integrated with subjective) (Tashakkori & Creswell, 2007).

Creswell (2003) describes four considerations when choosing a strategy for data collection as part of a mixed methods study. First, implementation concerns whether
qualitative and quantitative data are collected sequentially (in phases) or concurrently (at the same time). If sequential methods are adopted, the researcher decides whether qualitative or quantitative is collected first. Where qualitative research is collected first, the aim is to explore a given topic or phenomena in-depth, using quantitative data from a large number of people to expand this knowledge. Concurrent data collection allows both methods to be implemented simultaneously. Second, *priority* refers to the weighting given to each strategy of data collection. Qualitative and quantitative strategies may be given equal priority, or one may be given more priority depending on the aims and emphasis of the study. This may also depend on whether theory is used as an inductive or deductive framework of enquiry. Third, *integration* refers to how the researcher ‘mixes’ the data, which may occur in the data collection, analysis or interpretation phases. An example of integration may be to transform qualitative ‘themes’ into quantitative units of measurement. This is related to whether sequential or concurrent methods are used. Finally, *theoretical perspective* guides the research design. It may be the case that an explicit theoretical framework guides the study, whilst running independent of the previous three considerations.

To recap, there are two main considerations when designing mixed methods studies: whether a *dominant paradigm* should be used (qualitative or quantitative), and whether studies should be conducted *sequentially* or *concurrently* (Johnson & Onwuegbuzie, 2004). According to the matrix presented in Figure 2, mixed methods studies can be designed in a number of ways depending on the methodological aims. Within each design, qualitative and quantitative methods can be of equal weight or one can be more dominant than the other (illustrated by upper and lower case in Figure 1). Whilst mixed methods designs may share equal weight between
qualitative and quantitative methods, designs must involve mixing or integrating the findings at some point. For example, qualitative findings may inform a quantitative arm of a research study or vice versa. Alternatively, in the case of concurrent methods, findings must be integrated when interpreting findings from the research (Johnson & Onwuegbuzie, 2004).

**Figure 1.** Considerations of mixed methods designs (adapted from Johnson and Onwuegbuzie, 2004)

<table>
<thead>
<tr>
<th>Paradigm Focus/Status</th>
<th>Time order</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Concurrent</td>
</tr>
<tr>
<td>Equal</td>
<td>QUAL + QUANT</td>
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<tr>
<td></td>
<td>QUANT → QUAL</td>
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<td>Dominant</td>
<td>QUAL + quant</td>
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<td></td>
<td>qual → QUANT</td>
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<td></td>
<td>QUANT + qual</td>
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<td></td>
<td>quant → QUAL</td>
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### 3.5 Strengths and limitations of qualitative research methods

Using solely qualitative or quantitative study designs has often been debated. For example, some researchers have argued that by using a solely qualitative approach to a research question, generalizability of findings is made more difficult due to small or unrepresentative samples (Castro, Kellison, Boyd, & Kopak, 2010). However,
qualitative researchers argue that such an approach can provide detailed and rich information about a given phenomenon that may not be possible through a purely quantitative approach, and that many of the elements of research such as generalizability, replication, reliability and validity are simply not relevant to qualitative research (Denzin & Lincoln, 1994). Specifically related to the provision of healthcare, qualitative research can also be used in the development, design and implementation of interventions, and can be employed at different stages of the research process to improve the effectiveness and the delivery of interventions (O’Cathain & Thomas, 2006). The Medical Research Council’s strategy for developing and evaluating complex interventions encourages the use of qualitative methods, such as focus groups and case studies should be used to understand the components of an intervention (modelling phase) or to understand how an intervention works (Campbell et al., 2000; Craig et al., 2008; Medical Research Council, 2000). Qualitative methods are often used to provide complementary insights into the reasons for intervention effectiveness (and indeed reasons or explanations for ineffectiveness) (Bradbury, Dennison, Little, & Yardley, 2015).

3.6 Strengths and limitations of quantitative research methods

Researchers have argued that quantitative approaches ‘detach’ themselves from the ‘real world’ context, also known as ‘decontextualisation’ (Moghaddam, Walker, & Harre, 2003; Viruell-Fuentes, 2007). More recent ‘pragmatist’ approaches posit that quantitative methods such as laboratory experiments and randomised controlled trials allow for testing of effectiveness of a given intervention. Early stages of such
intervention work (when generating hypotheses) are often grounded in qualitative exploration (Yardley & Bishop, 2008).

In using quantitative approaches the researcher ‘tests a theory by specifying narrow hypothesis and the collection of data to support or refute the hypotheses’ (Creswell, 2003). The aim is to collect data using precise reliable measures, conducted under tightly controlled experimental conditions (Yardley & Bishop, 2008). There are many examples from the health risk communication literature where such approaches have been successfully implemented (Abhyankar, O'Connor, & Lawton, 2008; O'Connor, Warttig, Conner, & Lawton, 2009; Pavey & Churchill, 2014). Studies typically involve randomly allocating participants to different experimental conditions in order to test a given manipulation on a desired outcome. For example, *health message framing* studies (whereby the same health messages are presented differently according to the wording) test whether positively- or negatively-framed messages influence the likelihood of increasing an individual’s levels of physical activity (de Bruijn, Out, & Rhodes, 2014), reducing the amount of alcohol consumed (Hutter, Lawton, Pals, O'Connor, & McEachan, 2014), or engagement in other health protective behaviours such as sun protection (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999). The strengths of using quantitative methods have been described as: (1) allowing for accurate measurement of a targeted construct (such as behavioural intentions or self-efficacy), (2) conducting group comparisons, (3) test the strength of an association between any given variables, and (4) allow for testing of a stated hypothesis (Castro et al., 2010).
3.7 Strengths of a mixed methods research approach

Mixed methods approaches can be used effectively and if used appropriately can be superior to single-method studies. Combining experimental methods with qualitative approaches (such as qualitative interviews or systematic observations using content analysis) can not only examine patient perspectives of a given phenomenon, often in the context of obtaining first-hand experience of the phenomena, but also eliminate potential limitations of using experimental methods alone (Johnson & Onwuegbuzie, 2004).

There are a number of specific advantages of conducting mixed methods studies which provide researchers with different strategies depending on the purpose of the study. Greene et al. (1989) developed a mixed methods conceptual framework that was used to analyse 57 empirical studies. Five purposes for mixed methods studies were identified: triangulation (multiple methods used to seek convergence of the results and therefore strengthen the validity of the results), complementarity (to measure overlapping and different facets of a social phenomenon), development (where results from one method inform or help the development of another method), initiation (discovering a paradox or contradiction or new perspectives of a social phenomenon), and expansion (seeking to expand the breadth and scope of enquiry).

Hence, mixed methods approaches allow the researcher to combine the strengths of both qualitative and quantitative approaches in complementary ways, resulting in a more comprehensive data analysis strategy (Creswell, 2003). The result is a more complete understanding and insight that may otherwise be missed when the research approach is restricted to a single method, consequently providing more complete knowledge to inform theory and make appropriate recommendations for practice.
In addition the use of mixed methods studies has increased in popularity due to a number of factors: (1) the introduction of new methodological tools, (2) the development of new technology to access those tools (for example software to assist with qualitative research such as the data management application NVivo), and (3) an increase in communication across the fields of social and behavioural science (Tashakkori & Teddlie, 1998).

### 3.8 Different types of mixed methods research studies

Both numerical data (such as questionnaires) and text data (such as interviews or recorded observations) are collected in the same study, which can be either single- or multi-phased (Tashakkori & Teddlie, 1998). There are two types of mixed methods designs; two-phase studies, whereby the researcher conducts qualitative research, followed by a quantitative aspect, or the reverse. Alternatively, parallel/simultaneous studies allow the researcher to conduct the qualitative and quantitative aspects of a study at the same time (Creswell, 2003). These are illustrated in Figure 2.

**Figure 2.** Types of mixed methods designs; summarised from Creswell (1995)
Where qualitative methods are followed by quantitative methods (two-phase studies or sequential designs) the researcher is able to ‘start with qualitative data collection and analysis on a relatively unexplored topic, using the results to design a subsequent quantitative phase of the study’ (Tashakkori & Teddlie, 1998). Three types of specific designs have been identified as: sequential explanatory, sequential exploratory and sequential transformative (Creswell, 2003).

1. **Sequential explanatory designs** use qualitative results to explain and interpret a quantitative study; a time-consuming method in terms of data collection, but one that allows for ease of implementation due to its clear step-by-step approach. This may include conducting in-depth qualitative interviews to understand the results obtained from a questionnaire.

2. **Sequential exploratory designs** are conducted again in two phases. A primary qualitative phase is then followed by a quantitative phase, where the findings are integrated when interpreting the results. The purpose of this approach is to use the quantitative findings to assist the interpretation of the qualitative findings, and therefore explore a phenomenon. This may include conducting a large-scale survey to explore the findings from qualitative interviews.

3. **Sequential transformative designs** similarly have two distinct data collection phases. Priority here can be given to either qualitative or quantitative phases, or both. In contrast with the previous designs the transformative model uses a theoretical framework to guide the study, where specific methods are used depending on the theoretical perspective adopted (Creswell, 2003). A limitation of using this approach is the lack of specific guidance on how to use the transformative approach to guide the methods (Creswell et al., 2003). This may involve questionnaire development; qualitatively obtaining themes.
and statements from individuals to create scales and items in a questionnaire. Alternatively, modify an existing scale using the findings from prior qualitative work (Creswell et al., 2003).

Parallel/simultaneous studies allow for both quantitative and qualitative data to be collected at the same time, thus complementing each other (Tashakkori & Teddlie, 1998) and answering similar research questions. Creswell (2003) identifies three types of parallel mixed methods designs: concurrent triangulation (to define relationships between variables of interest), concurrent nested (qualitative or quantitative may be given more weight than the other), and concurrent transformative (theoretically driven).

1. The concurrent triangulation design is used to confirm or cross-validate findings within a study, which typically minimise the weaknesses and capitalise on the strengths of qualitative and quantitative methods. Priority can be given to either approach, or can be shared equally, and is generally used to strengthen knowledge claims from the study or explain any conflicting findings. The main strength of this approach is the shorter data collection period compare to the other methods. For example, a direct comparison between results of qualitative interviews and quantitative data collection.

2. A concurrent nested design is used to collect qualitative and quantitative data simultaneously. Here one method will guide the study rather than being equally weighted. The method given less priority is nested in the dominant strategy. The two types of data are mixed during the analysis phase. A large
questionnaire based study may be supplemented with a qualitative interview study was a small sample for example.

3. **Concurrent transformative designs**, similar to concurrent transformative designs, are guided by a theoretical framework or perspective. The two types of data are collected at the same time and may be given equal or unequal priority. Whilst sharing characteristics with the nested and triangulation approaches, this design allows researchers to work within a transformative framework to guide their analysis. This may involve qualitative findings being used to voice opinions about change in an organisation which being studied primarily quantitatively (Creswell et al., 2003).

It is important to choose the most appropriate design in relation to the research aims. The strengths and weaknesses of both approaches when used within health psychology has been described in detail (Bishop, 2015). Sequential designs for examples allow the integrity of each approach to be maintained; as one comes after the next, each method can be independently evaluated using method-specific criteria. In concurrent designs, methods are more closely related, which often disguises the strengths and weakness of each approach, however relationships between the two data sets are naturally more apparent (Bishop, 2015).

These types of design can be particularly useful for research areas that are currently underdeveloped and subsequently in need of in-depth exploration and examination (Creswell, 2003). Specifically, mixed methods designs have a number of benefits where the researcher is able to identify the most appropriate strategy, select the relevant methods of data collection, and engage the most appropriate practices to answer the research question (illustrated in Figure 3; Creswell, 2003). Given the
paucity of research examining heath risk communication in the context of psoriasis, such as approach can be used to study both the patient experience and that of the healthcare professional.

**Figure 3.** Benefits of mixed methods research. Summarised from Creswell, 2003

| Philosophical assumptions and strategies of enquiry employed | • Pragmatic knowledge claims  
• Sequential, concurrent, and transformative |
|-------------------|--------------------------------------------------|
| Methods used      | • Open- and closed-ended questions  
• Emerging and pre-determined approaches  
• Both quantitative and qualitative data and analysis |
| Practices of research used by the researcher | • Collect both quantitative and qualitative data  
• Develops a rationale for mixing methods  
• Integrates data at different stages of the research  
• Employs the practices of both qualitative and quantitative research |

**3.9 Examples of mixed methods research**

Bishop (2015) discusses a number of successful applications of mixed methods design specifically in the field of health psychology, such as in questionnaire development (Francis et al., 2004), using quantitative findings to examine ideas...
identified in qualitative work (Bishop, Massey, Yardley, & Lewith, 2011), and using qualitative and quantitative methods to examine the same phenomenon by using questionnaires and interviews concurrently (Bishop et al., 2014; Howick et al., 2013).

Additionally, O’Cathain and Thomas (2006) suggest mixed methods can be used as a way of expanding enquiry into a given topic by accessing a wider range of data. There are three examples used to illustrate this with a particular focus on healthcare and healthcare services. First, mixed methods may be used in the evaluation of healthcare for example in the process evaluations of randomised controlled trials using observational methods or interviews to explore how an intervention works in practice. Bradbury et al (2015) used mixed methods to develop and evaluate an online weight management intervention. A series of qualitative and quantitative studies were used in the development phase (to plan and gain feedback about the intervention) and also in the evaluation phase (to assess intervention acceptability and feasibility, and the effectiveness of the intervention). In this case mixed methods were used effectively to inform all phases of the intervention, and is consistent with the iterative phased approach encouraged for intervention development that harnesses both qualitative and quantitative methods (Craig et al., 2008; Medical Research Council, 2000). This leads to improved study design, execution of intervention and generalizability of result. Second, mixed methods may be used in exploratory research combining survey and qualitative methods. Examples of which can be found in the literature, which include conducting sequential studies involving quantitative survey analysis which are subsequently used to inform the sampling and conduct of interviews to gain a richer understanding of healthcare use (Rogers & Nicolaas, 1998). Finally, mixed methods may be used to inform the development of
questionnaires, such as using interviews to generate or inform specific questionnaire items, subsequently ensuring items are relevant and understandable for the target population.

3.10 Risk communication research: bridging the gap between quantitative and qualitative approaches

A mixed methods approach enables the researcher to conduct a more enhanced examination of the health risk communication process, and utilizing both approaches may lead to a more comprehensive understanding of risk communication.

3.10.1 Quantitative approaches

The initial focus may be on observing medical consultations between patients and healthcare professionals (which can be done using either qualitative or quantitative methods). For example, Van Dillen et al. (2014) observed ‘real-life’ consultations between practice nurses and patients and examined the content of discussions about health risk communication related to weight, nutrition and physical activity. In using an observational checklist, the authors used a content analysis approach to identify specific examples of health risk communication used during the consultation. The authors were able to conclude that a quarter of discussions focused on weight loss, two thirds were about nutrition, and one third was about physical activity. Using such approaches allows the researcher to gain an understanding of the specific methods used to communicate information about risk and may involve methodological
approaches allowing for quantification of communication techniques (van Dillen et al., 2014).

Noordman and colleagues analysed video-recordings of GP-patient consultations that took place between 1975 and 2008, specifically for examples of discussions about lifestyle in the consultation room (Noordman, Verhaak, & van Dulmen, 2010). Data were analysed using an observational checklist and logistic regression conducted to determine how discussions about lifestyle behaviour with patients were conducted by the GP over time. Whilst discussions about smoking and physical activity increased over time, it is uncertain whether discussions about alcohol and nutrition followed the same pattern. Indeed, discussions about alcohol were the least discussed lifestyle behaviour and generally, discussions about lifestyle were present in only a minority of consultations. GPs did not refer to lifestyle behaviour as routine procedure, suggesting more focus should be on primary prevention. GPs mainly referred to lifestyle when it was relevant to the patients’ complaint, but did not actively raise it as a topic for discussion (taking a symptom approach to the consultation). Such approaches involve an in-depth examination of the communication process in a natural setting. More studies in this area, particularly with patients with psoriasis, would help to build an evidence base relating to ‘real-life’, context-specific research.

Health information-giving (defined in this thesis as providing appropriate and accurate information about healthy living, enabling people to understand the link between behaviours and health risks) is an important aspect of psoriasis management, and the healthcare setting is an ideal setting to address this with patients. Examining this further would lead to increased understanding about the extent to which this happening in the healthcare context.
Outside psychology, health promotion tends to include political, economic, social and policy level perspectives, however Bennett (2000) argues that health promotion and health education should not be viewed as synonymous. Health information-giving is a key component of most health promotion strategies, and health psychologists tend to define health promotion in a comparatively narrow way, that is, the aim to promote positive health behaviours and reduce risky health behaviours through information, educational strategies and interventions to reduce risky behaviours (Ayers and De Visser, 2011). In this thesis, the term health promotion is largely used with this focus.

In addition to observational work, there are also examples of controlled experiments examining methods of health risk communication. A number of studies in the field of genetic risk communication have successfully implemented such approaches. Providing genetic risk information about heart disease to smokers for example may potentially motivate quitting, with personalised information more likely to lead to higher intentions to quit compared to non-personalised information (Wright, French, Weinman, & Marteau, 2006). This study also found that stronger intentions to quit were associated with higher levels of self-efficacy. A similar study in which smokers were provided with genetic risk information about Crohn’s disease found that greater magnitudes of risk estimates resulted in greater intentions to engage in risk reduction behaviour (Wright, Takeichi, Whitwell, Hankins, & Marteau, 2008). Risk communication studies may also involve examining different types of risk communication presentation formats (Knapp, Gardner, Carrigan, Raynor, & Woolf, 2009; Wright, Whitwell, Takeichi, Hankins, & Marteau, 2009). Studies typically involve providing participants with vignettes or hypothetical risk scenarios. The advantage of using experimental designs such as these is in the ability to rigorously
control such studies which helps to develop a sound body of evidence around the most effective methods of risk communication in terms of increase patient understanding of risk, and subsequent decisions to engage in risk reduction behaviour. However such studies have yet to be applied to psoriasis populations suggesting an avenue for future research. We suggest a need for conducting tightly controlled experimental studies which can develop the evidence base further and apply the current evidence base to conducting studies with psoriasis populations.

3.10.2 Qualitative approaches

The next stage of the research may then typically involve qualitative research exploring in more detail the process of risk communication, such as the type of risk communication techniques used by healthcare professionals, or understanding patients’ perspective, and experiences of, risk communication. Semi-structured interviews have been used to explore patient experiences of risk communication for example (Bonner, Jansen, Newell, et al., 2014). Bonner and colleagues interviewed patients with CVD/lifestyle risk factors about their experience of using internet-based heart age calculators such as the internationally-recognised Framingham risk equation (D’Agostino et al., 2008). The authors concluded that risk calculators such as these can be misunderstood and often disregarded if they produce results that did not fit with patients’ preconceptions. However the study also found that risk calculators may still have the potential to motivate lifestyle changes. Semi-structured interviews can also be carried out with healthcare professionals such as GPs about their experiences of communicating with patients about CVD risk (Bonner, Jansen, McKinn, et al., 2014). In this study GPs reported using different communication
techniques depending on their perception of patient risk. Qualitative interviews can therefore enable researchers to examine the views of both patients and practitioners to identify any potential conflict in risk communication and risk perception.

3.11 Conclusions

More recently, mixed methods studies have specifically examined the risk communication process from both the patient and practitioner perspective. Nelson et al. (2015) used tape-assisted recall methods (where the consultation is replayed during an interview with the participant) to examine CVD risk communication, observing CVD risk assessment consultations, and conducting interviews with both healthcare professionals and patients to assess both how healthcare professionals communicate information about CVD risk, and the patient understanding of the same experience. Quantitative methods were also used to collect and analyse data relating biomedical risk factors for CVD. This enabled triangulation of the data leading to increased rigour in the research design used.

Combining qualitative and quantitative approaches would enable a more detailed understanding of the most effective methods of health risk communication. Using a mixed methods approach allows the researcher to take the best qualitative and quantitative approaches and apply them to the research questions. Such methods are important for areas of research that are currently under-developed.

Mixed methods research designs in risk communication research would enable researchers to: (1) examine the process of health risk communication in the context of people with psoriasis, and (2) experimentally test the effectiveness of providing
health risk information in terms of encouraging disease prevention behaviour. However, high quality mixed methods research is needed in psychology (Yardley & Bishop, 2008) and particularly within the field of health risk communication. Whilst there are a number of studies examining health risk communication generally, research has yet to apply this to understanding risk communication in the context of people with psoriasis. Utilising a mixed methods approach would serve to increase understanding of how to improve health risk communication in this complex long-term condition.
3.12 References


Chapter 4: Mixed methods design adopted for the present PhD (thesis sub-section)

A parallel/simultaneous design (Creswell, 2003) was used in the present PhD which allowed each of the four studies to be conducted simultaneously enabling the studies to complement each other (Tashakkori & Teddlie, 1998). The specific type of mixed methods design was a concurrent triangulation approach as described by Creswell (2003). A diagrammatic representation is presented in Figure 1 of this section. This approach provided a way to cross-validate findings from across the four studies, whilst capitalising on the strengths of using both qualitative and quantitative methods of enquiry (Johnson & Onwuegbuzie, 2004). As each of the studies aimed to answer the over-arching research question, priority of both methods of enquiry was shared equally.

The methodological techniques used in each study are presented in Figure 1. The first study used content analysis techniques to examine general and dermatology-specific healthcare professionals’ core training competencies for evidence of skills relating to lifestyle behaviour change (LBC). The second study used structured observational techniques to examine the health messages and LBC signposting (such as leaflets or posters about healthy living) for patients with psoriasis in primary and secondary care patient waiting areas. The third study combined observational and qualitative techniques to examine how healthcare professionals communicate information about CVD risk to patients and the role of LBC in reducing risk in the context of primary care risk assessments with people with psoriasis. The fourth study used experimental methods to examine the effects of message framing theory as a health risk communication strategy on reported behavioural intentions in people with
psoriasis. A series of 2 by 2 ANOVAs and hierarchical multiple regression analyses were performed. A more detailed account of the methods employed in each study are presented in the appropriate chapter of this thesis.

Triangulation is a key element of the present PhD as the four different study components attempt to bring together for the first time unexplored areas of the literature, particularly unknown aspects of health communication in the context of people with psoriasis. As described by Tashakkori and Teddlie (1998) Denzin’s (1978) concept of data triangulation concerns the combination of different data sources to examine the same social phenomenon. According to Denzin there are four types of data triangulation: (1) data triangulation which uses a variety of data sources; (2) investigator triangulation using multiple researchers; (3) theory triangulation using different theoretical perspectives when interpreting the results of a study; and (4) methodological triangulation using multiple methods to examine a research area. The present PhD has incorporated all of these characteristics into the design of the research as follows:
Figure 1. Design of the present PhD programme of research

Examining Health Risk Communication in Patients with Psoriasis: A Mixed Methods PhD

Study 1: Providing Lifestyle Behaviour Change Support for Patients with Psoriasis: An Assessment of Healthcare Professional Training Competencies

Study 2: Do English Healthcare Settings Use 'Choice Architecture' Principles in Promoting Healthy Living for People with Psoriasis? An Observational Study

Study 3: Communicating Cardiovascular Disease Risk to People with Psoriasis: What Techniques do Practitioners Use?

Study 4: Risk Framing and Behavioural Intentions: An Experimental CVD Risk Communication Study

Methods

- Qualitative: Content analysis
- Quantitative: Content analysis
- Qualitative: Content analysis
- Quantitative

Data collected simultaneously (concurrent design)
1. **Data triangulation:** Multiple sources of data have been used in each of the four studies: healthcare professional core training competency documents obtained from professional organisations (Study 1); examples of patient information about healthy living identified in primary and secondary healthcare centres across North West United Kingdom (Study 2); ‘real-life’ healthcare professional-patient consultation audio-recordings to examine the risk communication process (Study 3); and questionnaire data using a sample of patients with psoriasis to experimentally examine different methods of risk communication (Study 4).

2. **Investigator triangulation:** The PhD was supervised by a team of researchers from the fields of health psychology and applied health services research. The supervisors have extensive experience in both qualitative and quantitative methods. Data in each study were analysed and interpreted until a consensus was reached by all of the study team. Information can also be found in the relevant publication related to each study.

3. **Theory triangulation:** Multiple theories/theoretical frameworks from health psychology and the health risk communication literature were used to inform the studies as part of this PhD. Literature around choice architecture and environmental determinants of behaviour were used (Study 2); as was the Theory of Planned Behaviour used to develop the questionnaire as part of the quantitative data collection (Study 4). Findings from each of the studies were triangulated in order to answer the over-arching research question. These have been discussed in Section 5 of this thesis (general discussion).

4. **Methodological triangulation:** Both qualitative and quantitative methods were used in this PhD. Different types of quantitative methods were used such as
content analysis (Study 2) and statistical analysis techniques (Study 4). Variations of qualitative methods were also used to obtain more detailed, theoretically driven findings (Studies 1 and 3). A combination of methods was used to capitalise on the strengths of the various approaches, selected according to the research questions of each study.

**Ensuring appropriate and high-quality mixed methods designs**

Creswell et al. (2003) proposed a criteria for selecting and designing appropriate, high quality mixed methods research. This framework has informed the current PhD research in the following ways:

1. **Implementation:** Both qualitative data (Studies 1 and 3) and quantitative data (Studies 2 and 4) were collected simultaneously.

2. **Priority:** Currently little is known about health risk communication in the context of people with psoriasis, therefore due to the exploratory nature of the study each of the four studies were given equal priority. This also enabled the research to be conducted simultaneously with a focus on healthcare professionals (analysis of training competencies and current risk communication techniques used in practice), and patients (observation study and experimental risk communication study).

3. **Integration:** Due to the concurrent nature of this research, qualitative and quantitative data were integrated at the interpretation phase. The results of the four studies were compared and discussed in the context of the current literature in the general discussion (Section 5). A diagrammatic representation of this process is presented in Figure 2.
4. **Theoretical perspective:** Theoretical insights from health psychology were used to inform the design of this research as described above.
Figure 2. Process of data integration of results from the four studies of the present research. Concurrent triangulation design. Based on Creswell (2003)

Study 1: Providing Lifestyle Behaviour Change Support for Patients with Psoriasis: An Assessment of Healthcare Professional Training Competencies

Study 2: Do English Healthcare Settings Use 'Choice Architecture' Principles in Promoting Healthy Living for People with Psoriasis? An observational study

Study 3: Communicating Cardiovascular Disease Risk to People with Psoriasis: What Techniques do Practitioners use?

Study 4: Risk Framing and Behavioural Intentions: An Experimental CVD Risk Communication Study

Data collected concurrently

Results compared

Quantitative Data Analysis

Qualitative Data Analysis

Interpretation (General Discussion)
Section Two Summary

Chapter 3 presented a critical review of mixed methodology research. The review provided a rationale for integrating qualitative and quantitative studies to understand effective health risk communication, and specifically how this can be applied in the context of psoriasis. The review concluded that mixed methods research designs would enable researchers to examine the process of health risk communication. In addition there is a need to experimentally test the effectiveness of providing health risk information in terms of encouraging disease prevention behaviour in the context of psoriasis. Chapter 4 explained the theoretical and methodological justification of using a mixed methods approach in this PhD in relation to the studies contained within it.
SECTION THREE: INVESTIGATING LIFESTYLE BEHAVIOURAL CHANGE SUPPORT FOR PATIENTS WITH PSORIASIS
Section Three Introduction

The first stage of examining health risk communication is to establish the current level of lifestyle behaviour change (LBC) support for people with psoriasis. From the current literature, we are unable to determine whether: (1) LBC is recognised as a key aspect of psoriasis management, and (2) current health communication strategies focus on encouraging healthy living.

This section contains two studies, with a focus on both healthcare professionals and patients. Chapter 5 presents an examination of healthcare professionals’ core training competencies, examining the extent to which key issues about health risk communication (smoking, alcohol, diet and exercise) is part of the professional role.

Chapter 6 presents an observational study examining the current level of lifestyle behaviour change information signposting for patients with psoriasis. The setting is healthcare centre waiting rooms; a key location for health risk communication strategies.
Chapter 5: Providing lifestyle behaviour change support for patients with psoriasis: an assessment of the existing training competencies across medical and nursing healthcare professionals

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*Note. As this paper has been published, the formatting and layout are consistent with the requirements for The British Journal of Dermatology. For this chapter only, references will not follow APA style and will be placed at the end of the chapter rather than at the end of the thesis.*
5.1 Abstract

**Background:** Psoriasis is associated with unhealthy lifestyle behaviours which contribute to psoriasis onset and severity. Healthcare professionals who manage psoriasis patients are well placed to support lifestyle change but few feel confident to do so. Little is known about the extent to which health information-giving and lifestyle behaviour change (LBC) skills are included within post-qualification training curricula.

**Objectives:** This study aimed to systematically examine the content of post-qualification UK training curricula for healthcare professionals across General Practice and Dermatology for evidence of behaviour change skills relating to healthy lifestyles.

**Methods:** Core curricula documents from professional organisations were content analysed to examine the extent to which curricula: a) mentioned health information-giving and LBC as part of the professional role; and / or b) included health information-giving and LBC as explicit training competencies or requirements for qualification.

**Results:** Of the 11 core curricula documents analysed, we found 67 occurrences of terms related to LBC and health information-giving. Most were in the General Practitioner curriculum (n=42; 62.7%), followed by the Dermatology Specialist Nurse curriculum (n=14; 20.9%) and Dermatologist curriculum (n=11; 16.4%). No occurrences were found in the General Practitioner with a Special Interest in Dermatology curriculum. LBC knowledge, skills and attitudes were not clearly specified and only basic level LBC competencies were included.
**Conclusions:** Development of post-qualification curricula would ensure healthcare professionals are equipped with the necessary knowledge, skills and attitudes to support LBC for psoriasis patients. This is of particular relevance, given the evidence linking unhealthy lifestyles with psoriasis outcomes.
5.2 Introduction

Psoriasis is a long-term, immune mediated inflammatory skin disease affecting between 1.3% and 2.6% of the UK population.¹ It is characterised by red scaling plaques that can be either localised or more widespread.² Psoriasis creates a substantial healthcare demand in medical practice with more than 90% of patients requiring some form of prescription therapy.³ Not only do people with psoriasis exhibit high levels of depression⁴ and anxiety,⁵ but this distress persists after the clearance of psoriasis.⁶ Further, existing and recent qualitative research suggests that healthcare professionals fail to acknowledge this distress and they lack the knowledge and expertise to manage psoriasis as a long-term condition, often leading to patients disengaging from expert healthcare.⁷,⁸

Unhealthy lifestyle behaviours are more common in people with psoriasis than in the general population. These include excess alcohol intake and smoking,⁹ excessive weight gain and living a sedentary lifestyle,¹⁰ all of which contribute to both psoriasis onset¹¹-¹⁴ and severity.¹⁵-¹⁹

Poor lifestyle and psoriasis onset

Smoking is associated with a 70% increased risk of developing plaque psoriasis¹¹ and alcohol intake is independently associated with more severe psoriasis.¹² Being overweight (defined as having a Body Mass Index [BMI] ≥ 25) and obese (BMI ≥ 30)¹³ is associated with psoriasis onset. Obesity is associated with a two-fold increased risk for psoriasis onset.¹¹ The amount of fat, and its distribution and location in the body are also recognised as risk factors for psoriasis onset.¹⁰ Low
energy/calorie diets help in prevention of moderate psoriasis. A recent study also suggests that regular vigorous physical activity is associated with decreased risk of psoriasis onset.

Lifestyle and psoriasis severity

Unhealthy lifestyle behaviours also contribute to psoriasis severity. Smoking is associated with clinical severity of psoriasis, excess alcohol use in particular can exacerbate psoriasis.

Making lifestyle behaviour changes (LBC) may serve as health protective factors in people with psoriasis. Weight loss has been shown to improve response to systemic treatments in obese patients with moderate-to-severe psoriasis. A recent study also shows that an intervention combining diet restriction and promoting physical exercise significantly reduces psoriasis severity beyond the effects of systemic treatment.

Healthy lifestyle interventions

Healthcare professionals managing patients with psoriasis are well placed to intervene to reduce health risk factors by encouraging and supporting LBC. Nurses in particular have more opportunities to deliver LBC interventions. Nurse-led LBC interventions can lead to improved outcomes including reduced weight, improved diet, and increased physical activity related to the prevention of other long-term conditions. A systematic review suggested that a wide range of healthcare
professionals, including doctors and nurses, could deliver effective interventions for diet and/or physical activity\textsuperscript{24} due to their frequent contact with patients who are likely to benefit from LBC.\textsuperscript{25} Healthcare professionals are a respected, trustworthy and expected source of advice.\textsuperscript{26-28} Whilst this presents opportunities to provide brief, relevant and timely health information messages,\textsuperscript{28} few healthcare professionals demonstrate the knowledge of and skills in LBC techniques.\textsuperscript{29, 30}

Recent NICE guidelines in relation to behaviour change state that healthcare professionals are expected to: (1) deliver LBC interventions as part of their role using evidence-based techniques when doing so; and (2) receive the necessary training to deliver such interventions.\textsuperscript{31}

\textit{Current understanding of competence to deliver health information / LBC}

Providing health information is recognised as a fundamental skill for both nurses\textsuperscript{32} and medical school graduates\textsuperscript{33} but clinical competence in this area varies both nationally and internationally.\textsuperscript{34} Additionally, as curricula are not delivered in a uniform way, healthcare professionals are likely to provide health information to differing extents due to the varied approaches in curriculum delivery.\textsuperscript{35-38} Given the recognition of this as a key role for healthcare professionals, LBC training should be reflected in the post-qualification core curricula (often referred to as core competencies) but to date there has been no systematic examination of this in health professional core curricula.

More specifically, little is known about the extent to which LBC skills are included within training curricula for healthcare professionals who manage patients with
psoriasis. The healthcare professionals most likely to have contact with patients with psoriasis in both primary and secondary care are: Dermatologists; General Practitioners (GPs); General Practitioners with a Special Interest in Dermatology (GPwSIs); and Dermatology Specialist Nurses (DSNs). Given the role of lifestyle as a health risk in patients with psoriasis, there is a pressing need to examine the content of post-qualification training curricula for healthcare professionals across general Practice and Dermatology to assess whether health information-giving and LBC skills are adequately covered in training.

5.3 Aims

To examine the content of the UK post-qualification curricula for general and dermatology specialist healthcare professionals for evidence of key terms relating to health information-giving and LBC training.

5.4 Method

Content analysis of documental data (a summary is presented in Table 1) using qualitative analysis software.
Table 1. Healthcare professional core curriculum documents searched.

<table>
<thead>
<tr>
<th>Health Professional</th>
<th>Document title</th>
<th>Document Author/Editor</th>
<th>Document objective</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Practitioner</strong></td>
<td>The core curriculum statement: Being a General Practitioner</td>
<td>Royal college of General Practitioners (2010)</td>
<td>Outlines the core competencies required to become a GP</td>
</tr>
<tr>
<td></td>
<td>3.01 Healthy people: Promoting Health and Preventing disease</td>
<td>As above</td>
<td>As above</td>
</tr>
<tr>
<td></td>
<td>3.12 Cardiovascular Health</td>
<td>As above</td>
<td>As above</td>
</tr>
<tr>
<td></td>
<td>3.21 Care of People with Skin Problems</td>
<td>As above</td>
<td>As above</td>
</tr>
<tr>
<td></td>
<td>RCGP: The Learning and Teaching Guide</td>
<td>As above</td>
<td>As above</td>
</tr>
<tr>
<td><strong>Dermatology Specialist Nurse</strong></td>
<td>Dermatology Nursing competencies: Developing dermatology nurses from novice to expert</td>
<td>British Dermatological Nursing Group (2012)</td>
<td>‘Focuses on the core competencies for every registered nurse working in the speciality of dermatology, irrespective of the healthcare delivery setting’</td>
</tr>
<tr>
<td><strong>Dermatologist</strong></td>
<td>Speciality training curriculum for dermatology</td>
<td>Joint Royal College of Physicians Training Board (2012)</td>
<td>‘Define the process of training and the competencies needed for accreditation in Dermatology’</td>
</tr>
<tr>
<td><strong>General Practitioner with a Special Interest in</strong></td>
<td>Revised guidance and competencies for the provision of services using GPwSIs- Dermatology and skin surgery</td>
<td>Department of Health; British Association of Dermatologists; The Primary Care Dermatology</td>
<td>‘Designed to help dermatology GPwSIs, and those developing or commissioning GPwSI services, understand and develop the extended knowledge, competences and skills’</td>
</tr>
<tr>
<td>Dermatology</td>
<td>Society; The Royal College of General Practitioners; and The Skin Care Campaign (2011)</td>
<td>they require to provide services beyond the scope of their generalist roles’</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Implementing care closer to home: Convenient quality care for patients Part 1 Introduction and overview</td>
<td>As above</td>
<td>As above</td>
<td></td>
</tr>
<tr>
<td>Implementing care closer to home: Convenient quality care for patients Part 2 Step-by-step guide to commissioning services</td>
<td>As above</td>
<td>As above</td>
<td></td>
</tr>
<tr>
<td>Implementing care closer to home: Convenient quality care for patients Part 3: The accreditation of GPs and Pharmacists with Special Interests</td>
<td>As above</td>
<td>As above</td>
<td></td>
</tr>
</tbody>
</table>
Identification of key terms

We identified a search strategy to identify occurrences of key terms associated with health information-giving and LBC: lifestyle, health promotion, health behaviour, smoking, diet, exercise, activity, alcohol, overweight, and obesity. The search strategy was based on a review of the literature and consensus within the study team. A hand search was also used to augment the search for related key terms.

Analysis

Content analysis techniques were used to examine the presence and extent of target training competencies or requirements specified. Content analysis is a way of providing knowledge and new insights as a practical guide to action. Using this method enables the researcher to use a transparent coding system, and provides a systematic method of examining what content exists and what is omitted within a given data set. NVivo Version 9 was used to examine the documents for all relevant key terms.

Summative content analysis is a technique whereby the process of analysis begins with identifying and quantifying occurrences of key terms within text with the aim of understanding the context in which these are used. This approach goes beyond quantifying uses of particular terms and includes latent content analysis, where content is subject to a process of interpretative analysis to test theoretical issues to enhance understanding of the data. This method allows researchers to probe beneath the surface of the data to ask deeper questions, and has been adopted in a number of studies examining a range of health-related issues.
The analyses probed: (1) the prominence of LBC and/or health information-giving in the health professional curricula; and (2) the level of knowledge and skills expected in relation to supporting LBC in patients with psoriasis.

Framework for analysis

Analysis of the curriculum was conducted on two domains: (1) Specificity of the curriculum content (whether occurrences of key terms related to LBC and health information-giving were general or specific); and (2) the assessment of the level of LBC skills in each curriculum by mapping the occurrences to an existing behavioural competence framework.\textsuperscript{47}

Analysis Domain 1: Specificity of curriculum content

Occurrences were assessed based upon how clearly knowledge, skills and attitudinal components of health information-giving and LBC were specified:

**Level 1:** Absence of any specified skills. Language considered vague, and lacked clear learning outcomes.

**Level 2:** General description of a competence but failure to define specific techniques.

**Level 3:** Clearly specified skills with indication of how assessment of competence was performed.
Analysis Domain 2: Mapping the core curricula skills to the Prevention and LBC Competence Framework

Skills were mapped to an existing behaviour change competence framework\textsuperscript{48} to allow a direct comparison with a framework designed specifically to monitor health professional competencies related to LBC and health information-giving. This competence-based framework ensures healthcare professionals are able to identify opportunities to introduce LBC and act skillfully. Occurrences were coded according to the three levels of the framework:

**Level 1:** Basic skills of awareness, engagement and communication in introducing the idea of behaviour change.

**Level 2:** Identification and referral or signposting to opportunities for LBC support.

**Level 3:** Provision of long-term support and LBC facilitation.

**5.5 Results**

Of the 11 documents analysed we found 67 occurrences of terms related to LBC and health information-giving. A breakdown of terms identified in each document is provided in Table 2. Most were found in the GP curriculum (n=42; 62.7%), followed by the DSN curriculum (n=14; 20.9%) and Dermatologist curriculum (n=11; 16.4%). None were found in the GPwSI curriculum therefore this health professional group was not included in the final analysis.
Table 2. Total number of occurrences of key terms related to health information-giving and lifestyle behaviour change

<table>
<thead>
<tr>
<th>Health professional group / Document Title</th>
<th>Number (%) of the total occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Practitioner curriculum</strong></td>
<td></td>
</tr>
<tr>
<td>The core curriculum statement</td>
<td>7 (10.4)</td>
</tr>
<tr>
<td>3.01 Healthy people: Promoting Health and Preventing disease</td>
<td>19 (28.4)</td>
</tr>
<tr>
<td>3.12 Cardiovascular Health</td>
<td>7 (10.4)</td>
</tr>
<tr>
<td>3.21 Care of People with Skin Problems</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td>RCGP: The Learning and Teaching Guide</td>
<td>8 (11.9)</td>
</tr>
<tr>
<td><strong>Dermatology Specialist Nurse curriculum</strong></td>
<td></td>
</tr>
<tr>
<td>Dermatology Nursing competencies: Developing dermatology nurses from novice to expert</td>
<td>14 (20.9)</td>
</tr>
<tr>
<td><strong>Dermatologist Curriculum</strong></td>
<td></td>
</tr>
<tr>
<td>Speciality training curriculum for dermatology</td>
<td>11 (16.4)</td>
</tr>
<tr>
<td><strong>General Practitioner with a Special Interest in Dermatology curriculum</strong></td>
<td>0</td>
</tr>
<tr>
<td>Revised guidance and competencies for the provision of services using GPwSIs- Dermatology and skin surgery</td>
<td>0</td>
</tr>
<tr>
<td>Implementing care closer to home: Convenient quality care for patients Part 1 Introduction and overview</td>
<td>0</td>
</tr>
<tr>
<td>Implementing care closer to home: Convenient quality care for patients Part 2 Step-by-step guide to commissioning services</td>
<td>0</td>
</tr>
<tr>
<td>Implementing care closer to home: Convenient quality care for patients Part 3: The accreditation of GPs and Pharmacists with Special Interests</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total number of occurrences of key terms</strong></td>
<td><strong>67</strong></td>
</tr>
</tbody>
</table>
Data are presented by the two domains of the analysis framework: (1) Specificity of curriculum content; and (2) Mapping the core curricula skills to the Prevention and LBC Competence Framework.

**Analysis Domain 1: Specificity of curriculum content**

Figure 1 shows the results of the analysis determining how clearly knowledge, skills and attitudinal components of health information-giving and LBC were specified in the curricula. A total of 26 (38.2%) occurrences coded at level 1 (absence of specified skills). A further 40 (58.8%) occurrences coded at level 2 (general description of a competence only). The remaining 2 (2.9%) occurrences coded at level 3 (clearly specified skills).

**Breakdown by health professional category**

Of the occurrences found in the GP curriculum 22 (52.4%) were coded at level 1 (absence of specified skills) and 20 (47.6%) were coded at level 2 (general description of a competence only). No occurrences were coded at level 3 (clearly specified skills). Of the occurrences found in the DSN curriculum 1 (7.1%) was coded at level 1 and 13 (92.9%) were coded at level 2. No occurrences were coded at level 3. Of occurrences found in the Dermatologist curriculum 3 (27.3%) were coded at level 1, 6 (54.5%) were coded at level 2, and 2 (18.2%) were coded at Level 3.
Analysis Domain 2: Mapping the core curricula skills to the Prevention and LBC Competence Framework

Results of the analysis of mapping the core curricula skills to an existing LBC competence framework\textsuperscript{47} are presented in Figure 2. Of the 67 occurrences found in the curricula, 21 (27.3\%) were coded as Level 1 competencies (basic skills of awareness of opportunities to introduce LBC) and 13 (16.9\%) were coded as Level 2 competencies (identification and referral or signposting to opportunities to LBC support). Whilst these occurrences could be mapped at Level 2, no recognised behaviour change techniques could be identified.\textsuperscript{34,49} The remaining 33 (55.8\%) occurrences were unable to be mapped to the LBC competence framework. None of the core curricula skills were coded as Level 3 competencies (provision of long-term support and LBC facilitation) in relation to the LBC competence framework.
Breakdown by health professional category

Of the 16 occurrences in the GP curriculum mapped to the LBC competence framework, 9 (56.3%) were coded as Level 1 competencies (basic skills of awareness of opportunities to introduce LBC) and 7 (43.8%) were coded as Level 2 competencies (identification and referral or signposting to opportunities to LBC support). Of the 10 occurrences in the DSN curriculum mapped to the LBC competence framework, 6 (60%) were coded as Level 1 competencies and 4 (40%) were coded as Level 2 competencies. Of the 7 occurrences in the Dermatologist curriculum mapped to the LBC competence framework, 5 (71.4%) were coded as Level 1 competencies, whilst 2 (28.6%) were coded as Level 2 competencies.

Figure 2. Core curricula mapped to the Prevention and Lifestyle Behaviour Change Competency Framework by professional group
5.6 Discussion

This is the first systematic examination of post-qualification core curricula related to health information-giving and LBC across key professional groups. Curricula content in these areas was poorly specified, with little or no reference to recognised LBC techniques. Detailed core competencies were lacking, as were clear learning outcomes relating to health information-giving and LBC. We found no evidence of post-qualification training competencies related to provision of long-term support for, and facilitation of, LBC when compared to an existing LBC competence framework. We suggest a need for further post-qualification curriculum development for healthcare professionals managing people with psoriasis to equip them with the necessary knowledge, attitudes and skills to support LBC in line with the recent NICE Guidance.31 This study reinforces recent work suggesting that healthcare professionals want clearer guidelines in relation to expectations for LBC activity with patients.50 Given the role of lifestyle as a health risk in patients with psoriasis, plus the role that healthcare professionals have in supporting patients to achieve lifestyle change, it was surprising that little emphasis is given to this area in healthcare professionals’ training.

The poor agreement between an existing evidence-based competence framework and the post-qualification core curricula examined in this study suggests that further work is needed to develop the core curricula in line with training recommendations for LBC.51 Lifestyle behaviour change methods are well established34,49,51 and could be integrated into the post-qualification core curricula of professionals who work with dermatology patients. Whilst the importance of using recognised techniques to support behaviour change has been well documented, providing advice alone in
routine primary care consultations is ineffective in eliciting sustained behaviour change.\textsuperscript{52} This further reinforces the need to develop the core curricula for LBC skills in line with evidence-based LBC techniques.

There is emerging evidence that LBC interventions can be successfully delivered by healthcare professionals in primary care\textsuperscript{53, 54} and may be particularly important for both primary and secondary cardiovascular disease (CVD) prevention\textsuperscript{53}. Given lifestyle issues such as smoking and obesity (CVD risk factors) are highly prevalent amongst people with psoriasis, it is essential that healthcare professionals are efficiently equipped with the knowledge and skills to deliver appropriate LBC interventions.

Whilst this study identifies key omissions from the post-qualification core competencies of both general medicine healthcare professionals and dermatology specialists, this study has limitations. It may be possible that these topics are adequately covered during undergraduate training, as students begin to develop skills in clinical practice.\textsuperscript{33, 55} Although we cannot be certain, we suspect they are not covered well but until future studies indicate otherwise we reserve judgement. As post-qualification core curricula competencies provide the framework for best practice as a health professional, further developments to include recognised LBC techniques which emphasise poor lifestyle as a health risk in people with psoriasis are necessary.
5.7 Implications and Conclusions

Recent UK National Institute for Health and Care Excellence (NICE) guidelines for the assessment and management of psoriasis state that healthcare professionals should offer ‘healthy lifestyle information and support for behavioural change tailored to meet the needs of the individual’. In order for these standards to be met, post-qualification curricula need to be improved by delivering more explicit LBC training in the competencies, and thus addressing the training gaps identified in this study. Further work must also examine how to implement health professional training into practice in an efficient and timely manner.
5.8 References


14. Frankel HC, Han J, Li T, Qureshi AA. The association between physical activity and the risk of incident psoriasis. *Arch Dermatol* 2012, 148:918-924.


32. Nursing and Midwifery Council. Standards for Pre-registration Nursing Education. Available at: [http://standards.nmc-uk.org/Documents/Pre-registration%20nursing%20education%20in%20UK%20Final%2006092010.pdf](http://standards.nmc-uk.org/Documents/Pre-registration%20nursing%20education%20in%20UK%20Final%2006092010.pdf).


Chapter 6: Do English Healthcare Settings Use 'Choice Architecture' Principles in Promoting Healthy Lifestyles for People with Psoriasis? An observational study

<table>
<thead>
<tr>
<th>Chapter type:</th>
<th>Journal article</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal:</td>
<td>BMC Health Services Research</td>
</tr>
<tr>
<td>Submission date:</td>
<td>February 2015</td>
</tr>
<tr>
<td>Submission status:</td>
<td>Accepted 19th March 2015</td>
</tr>
</tbody>
</table>

Note. As this paper is now accepted, the formatting and layout are consistent with the requirements for BMC Health Services Research. For this chapter only, references will not follow APA style and will be placed at the end of the chapter rather than at the end of the thesis.
6.1 Abstract

Background

The influence of environmental factors in shaping behaviour is becoming increasingly prominent in public health policy, but whether information-giving strategies use this knowledge is unknown. Promoting healthy living is important in the management of psoriasis, a long-term inflammatory skin condition, and health centre waiting areas are ideal places to promote health information to such patients. We systematically examined patient information materials containing either general, or specific, health messages for patients with psoriasis.

Methods

An observation schedule was used to record the frequency and quality of leaflets and posters addressing lifestyle behaviour change in health centre waiting areas. Content analysis was used to analyse: frequency, characteristics and standard of the materials.

Results

Across 24 health centres 262 sources of lifestyle information were recorded (median per site = 10; range= 0-40). These were mainly: generic posters/displays of lifestyle support (n = 113); and generic materials in waiting areas (n = 98). Information quality was poor and poorly displayed, with no high quality psoriasis-specific patient materials evident.

Conclusions

There is little attempt to promote healthy lifestyle as an important aspect of psoriasis management in the clinic environment. Evidence about using environmental
cues/techniques to prompt behaviour change in people with psoriasis does not currently inform the design and display of such information in standard health centre settings, which are prime locations for communicating messages about healthy lifestyle. Future research should test the efficacy and impact of theory-informed, high quality health information messages on health outcomes for patients with psoriasis.
6.2 Background

Evidence for the role of environmental factors in shaping healthy lifestyle is increasing [1, 2]. A growing body of research is examining the influence of the environment on behavioural choices related to health information. Changing the environment in subtle ways can influence a range of behaviours including encouraging healthier food choices and promoting physical activity such as increasing the accessibility to stairs rather than elevators [3-8]. This is referred to as ‘nudge theory’ or ‘choice architecture’ [9].

Whilst the environment can have a detrimental effect on health, such as promoting the availability of ‘fast foods’ and ‘convenience foods’ [10], a number of studies also emphasise its potential in prompting positive behaviour change [6, 7] in a range of settings such as schools, food stores and health care [6]. Something as simple as a change in poster size can positively affect stair use [11].

According to some theorists human behaviour is often automatic, where positive behavioural change is ‘cued’ by environmental stimuli. These often go unnoticed by the individual and therefore absent of any conscious reflection and are considered habitual or unconscious desires [11, 12]. Brief, and somewhat subtle interventions employing this strategy, have proved successful in prompting behavioural change through changing implicit environmental cues [7, 13]. Although evidence that locating visual prompts in a person’s physical environment can serve as cues to action, it is unclear from the current literature if and how health information signposting within health care settings (specifically primary and secondary care health centres) is drawing upon the growing evidence related to choice architecture [9].
As part of traditional ‘health promotion’ strategies at the individual level, health care settings have long been recognised as places where patients are exposed to written and visual information about healthy lifestyle. Patient health information leaflets are viewed as a vehicle to improve attitudes towards, and increase knowledge about health and illness behaviour, and promote behaviour change. This information can be used to ‘prompt’ behaviour change. Whilst this strategy may rely on conscious engagement with the information, this is recognised as an intervention strategy, whereby micro-environments can be altered by adding visual prompts [13]. These can be processed by individuals either automatically, or at a more engaged, reflective level [13]. However, for this to happen often complex health messages should be clear, visible and accessible to have the desired impact on behaviour.

Hartley [14] and Houts et al. [15] have listed criteria on which to base the design of health information/leaflets to facilitate understanding, with a focus on both design and content. According to information processing theory [16], comprehension is central to message acceptance and is particularly important for complex health information [17]. Patient information leaflets must therefore be designed in such a way that makes them easily understood. Information about the causes and consequences of a disease must also be understood in order to motivate preventive action [18]. Images can be used to support text in order to increase health literacy, through attention, comprehension and recall of the often complex health information found in patient information leaflets [15].

Health information-giving is central to the management of psoriasis, a long-term inflammatory skin condition associated with a number of problematic health behaviours. People with psoriasis are more likely than the general population to
engage in excess alcohol use and smoking [19], and be overweight and sedentary [20]. These behaviours are linked to poorer psoriasis outcomes and increase the risk for cardiovascular disease (CVD) and Type 2 diabetes. Recent UK National Institute for Health and Care Excellence (NICE) guidelines for the assessment and management of psoriasis emphasise the importance of providing ‘healthy lifestyle information and support for behavioural change tailored to meet the needs of the individual [21]. The benefit of supported lifestyle behaviour change for other long-term conditions such as CVD [22] and diabetes [23] is well documented. However recent studies suggest that while healthcare professionals are aware of the importance of health information-giving in people with psoriasis, many often miss opportunities to address such issues in consultations with psoriasis patients [24, 25]. Furthermore, in a systematic review of adherence in people with psoriasis none of the studies addressed adherence to recommendations for healthy lifestyle [26].

Providing patients with information about healthy lifestyle in the patient waiting area can prime patients before a consultation with a healthcare professional, and may increase the likelihood of a conversation about healthy lifestyle [27, 28]. Given the evidence that: (1) the environment is important in guiding behavioural choices, and (2) healthy lifestyle is central to psoriasis management, we conducted an observation study to investigate: the amount of information about healthy lifestyle available to patients; the sources of information (e.g. poster vs. leaflet); and the quality of information made available to patients with psoriasis in primary and secondary care health centre patient waiting areas.
6.3 Methods

Design

This was a non-participant observation study. Ethical approval was obtained from the University of Manchester research ethics committee (reference number: 12017). An observation check-list was designed to map the content and quality of patient leaflets and posters signposting healthy lifestyle against the ‘quality indicators’ (see section below) available in primary and secondary care health centre patient waiting areas across Northwest England. Health centres were randomly selected from a full list that was publicly available via an online database of health centres. A structured observation approach was used, whereby explicitly defined rules are followed for observing and recording a particular event/occurrence [29]. By using this approach the observer was able to record and observe the environment directly and had first-hand experience of the social phenomena under investigation [30].

Materials

The observation check-list, developed to identify information relevant to problematic health behaviours (smoking, alcohol, weight gain, restricted activity) was refined and modified iteratively by four members of the study team. It was divided into 3 sections. Information about healthy lifestyle was also categorised based on whether it was generic (not specifically for patients with psoriasis; such as an information leaflet about weight loss), or psoriasis-specific (patient information specifically tailored to patients with psoriasis).

(1) Lifestyle information available in patient waiting areas (generic versus psoriasis-specific information),
(2) Lifestyle information used by practitioners to give directly to patients (generic versus psoriasis-specific); and

(3) Posters/displays of available support for lifestyle.

**Data collection: Structured observations**

Researchers visited health centre patient waiting areas and, with permission, recorded evidence of lifestyle materials available to patients. Both primary and secondary care health centres were included in the sample.

As a secondary aim, researchers also attempted to identify the extent to which lifestyle materials were used by clinicians and given directly to patients. This was done by opportunistically asking a member of the practice team (practice manager, nurse or GP) when available, whether this was done as part of routine practice.

**Data analysis**

Data were analysed using principles of content analysis [31]. Frequency rates were calculated in order to identify the number of different types of materials observed both within and between health centre waiting areas. The unit of analysis was the occurrence of lifestyle information/signposting, whether in the form of a patient information leaflet or a poster. Items were recorded if the information made reference to any problematic health behaviours (smoking, alcohol, weight gain, restricted activity).
Quality indicators

In the absence of a suitable tool for evaluating the presence and quality of health information materials, we devised a quality checklist of desirable criteria to meet recommendations in relation to the following principles: a) whether health information was clearly presented and of good visual condition; and b) whether health information displays (notice boards; carousels) were physically accessible to patients (see Table 1). The criteria were discussed and agreed upon within the study team of experienced researchers from the fields of health psychology and applied health services research based upon quality criteria identified from the literature with a focus on the design of health information/leaflets [14]. All criteria used a binary scale (0 and 1).

Visual condition of lifestyle information

Each waiting area was coded based on the observation rating and assigned to one of three levels: Level 3 (good signposting) if the recommendations were fully met, Level 2 (poor signposting) if meeting 4-5 of the criteria, and Level 1 (very poor signposting) if meeting 3 or fewer recommendations.

Visibility/accessibility of notice boards

Health information displays (such as notice boards and leaflet stands) were also assessed on the basis of whether information was clearly visible and accessible to patients. Waiting areas were assessed on the basis of the criteria presented in Table 1. Information displays within the waiting areas were coded as having good visibility if
they met all of the desirable criteria to follow recommendations relating to
visibility/accessibility of information. For displays not meeting these criteria, they
were coded as having poor visibility/accessibility.

**Table 1.** Criteria for assessment of visual condition and visibility/accessibility of healthy lifestyle information

<table>
<thead>
<tr>
<th>Visual condition criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Large, well-organised notice boards.</td>
</tr>
<tr>
<td>• Large posters, with appropriately sized text which is clearly visible.</td>
</tr>
<tr>
<td>• Lifestyle information is clearly visible and not obscured by other notices (e.g. contact details on self-referral posters for smoking cessation services are clear).</td>
</tr>
<tr>
<td>• Visually high quality information (e.g. no torn or crumpled leaflets).</td>
</tr>
<tr>
<td>• All information is up-to-date (e.g. details of exercise classes or organised walking groups previously held in the local area).</td>
</tr>
<tr>
<td>• Information is visible in the health centre waiting area or not easily accessible from the immediate waiting area.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Visibility/accessibility criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Notice boards/displays/leaflet stands unobstructed by chairs or tables.</td>
</tr>
<tr>
<td>• Notice boards/displays/leaflet stands in sight of people in waiting area (as opposed to in the corridor or outside the main waiting area).</td>
</tr>
</tbody>
</table>
Patient information leaflets: Layout and typographic features and use of graphics

In order to further analyse the quality of the patient information leaflets identified in the present study, a framework was used to analyse the content of a sub-sample of the lifestyle patient materials following the theoretical framework/recommendations outlined by Hartley [14] (see Table 2). To analyse the use of images in accompanying complex health information, the framework recommended by Houts et al. [15] was applied to the sub-sample of patient information leaflets (Table 2).
Table 2. Recommendations for layout and typography (summarised from Hartley, 2012) and the use of images (summarised from Houts et al., 2006) in patient information leaflets

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description /Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Margin spacing</td>
<td>The top, bottom and outer margins should be at least 10mm, where inner-right and inner-left margins should be at least 25mm.</td>
</tr>
<tr>
<td>Column format</td>
<td>Consistent number of columns per page should be used. Double or multiple column formats used for landscape designs. Varying column formats may confuse the reader.</td>
</tr>
<tr>
<td>Consistent spacing</td>
<td>Systematic spacing should be used (such as one line separating a heading from the main text or two lines separating page titles from sub-headings). Horizontal spacing (unjustified text) is also recommended.</td>
</tr>
<tr>
<td>Appropriate font size</td>
<td>A font size of at least 10, 12, or 14pt is recommended for the main text, and 14, 18, or 24 for headings. Line spacing of 1.5 lines is also recommended.</td>
</tr>
<tr>
<td>Capital letters</td>
<td>Paragraphs of text in capital letters are hard to read, and capitals should be limited in headings.</td>
</tr>
<tr>
<td>Italicized text</td>
<td>Continuous italicized text is hard to read and should be limited to signalling important words or points.</td>
</tr>
<tr>
<td>Bold text</td>
<td>Bold text loses its effect when over-used, so should be used sparingly.</td>
</tr>
<tr>
<td>Bullet points</td>
<td>Should be used appropriately in outlining a series of points within a paragraph</td>
</tr>
<tr>
<td>Use of graphics to support key points</td>
<td>Pictures are linked with text frequently</td>
</tr>
<tr>
<td>Use of simple graphics</td>
<td>Simple graphics are used to understand the intended message which prevents the reader from being distracted by irrelevant details. Minimize the use of abstract symbols. When using a sequence of images explain the connection between them in simple terms</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Simplified language accompanying graphics</td>
<td>Appropriate text should be used to accompany the images to avoid ambiguity. Language should be clear.</td>
</tr>
<tr>
<td>Closely link graphics and text</td>
<td>Link images and text through close proximity. Captions to describe images where possible should be written at a low literacy level, thereby aiding people with limited reading skills understand any images presented to them</td>
</tr>
<tr>
<td>Graphics should be culturally sensitive</td>
<td>Consider the culture of the target audience, which may affect whether people attend to the education materials. Particularly for audiences who may not have been exposed to western medicine</td>
</tr>
<tr>
<td>Involve healthcare professionals in designing the graphics</td>
<td>Healthcare professionals should design the images or be involved in guiding the design of the images. This is done to successfully communicate complex information through images.</td>
</tr>
<tr>
<td>Evaluate the effects of graphics</td>
<td>Systematically evaluate the effects of graphics through follow interviews which can be implemented to assess: attention, understanding, remembering and adherence</td>
</tr>
</tbody>
</table>
6.4 Results

Twenty-four health centres across Northwest England were observed in primary care (n=21) and secondary care (n=3). Characteristics of the sample are presented in Table 3.

Table 3. Health centre characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number (%) unless otherwise stated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of primary care centre</strong></td>
<td></td>
</tr>
<tr>
<td>GP surgery</td>
<td>17 (70.8)</td>
</tr>
<tr>
<td>Intermediate community dermatology clinic</td>
<td>4 (16.7)</td>
</tr>
<tr>
<td><strong>Total primary care centres</strong></td>
<td>21</td>
</tr>
<tr>
<td><strong>Type of secondary care</strong></td>
<td></td>
</tr>
<tr>
<td>Dermatology clinic</td>
<td>2 (8.3)</td>
</tr>
<tr>
<td>Hospital-based dermatology unit</td>
<td>1 (4.2)</td>
</tr>
<tr>
<td><strong>Total secondary care centres</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Patient list size</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;3000</td>
<td>0</td>
</tr>
<tr>
<td>3,000-5,000</td>
<td>4</td>
</tr>
<tr>
<td>5,000-7,000</td>
<td>3</td>
</tr>
<tr>
<td>7,000-9,000</td>
<td>2</td>
</tr>
<tr>
<td>9,000-11,000</td>
<td>3</td>
</tr>
<tr>
<td>11,000-13,000</td>
<td>3</td>
</tr>
<tr>
<td>13,000-15,000</td>
<td>0</td>
</tr>
<tr>
<td>15,000-17,000</td>
<td>1</td>
</tr>
<tr>
<td><strong>Number of General Practitioners</strong></td>
<td>1 - 10 (5)</td>
</tr>
<tr>
<td><strong>Number of Practice Nurses</strong></td>
<td>1 - 6 (2)</td>
</tr>
<tr>
<td><strong>Rank of health deprivation</strong></td>
<td>4 - 20,557 (5,353)</td>
</tr>
</tbody>
</table>

1 Hospital-based Dermatology Units’ are affiliated with hospitals and cover the full range of in-patient treatment options, where ‘Dermatology Clinics’ are usually out-patient based, may be independently run clinics or are clinics based in community settings.

2 According to the Office of National Statistics Health Deprivation index - by postcode, score out of 32782 (source: [http://www.neighbourhood.statistics.gov.uk/dissemination/](http://www.neighbourhood.statistics.gov.uk/dissemination/)). All 32,482 neighbourhoods in England are given a health deprivation score, where the most deprived has a rank of one. Considers premature death and impairment of quality of life by poor health, and considers both physical and mental health. Measurement of morbidity, disability and premature mortality are all considered.
A total of 262 sources of lifestyle information were recorded (median = 10, range = 0-40 per health setting), which are presented according to each health behaviour in Table 4.

The majority of lifestyle signposting occurred through the use of posters (n = 113; 43.1%) and generic lifestyle materials (leaflets and flyers) specifically for patients to take away (n = 98; 37.4%). Of the 24 health centres, themed notice boards were present in 10 (41.7%), of which five (20.8%) were generic lifestyle notice boards, one (4.2%) was lifestyle-related in the context of diabetes self-management, one (4.2%) was a general dermatology notice board, and three (12.5%) were psoriasis-specific notice boards. The remaining health centres (n = 14; 58.3%) did not contain themed notice boards.

Of the lifestyle information offered directly to patients (51 examples), collected from 12 health centres, 84.3% (n = 43) were categorised as generic lifestyle, whilst 15.7% (n = 8) were categorised as psoriasis-specific or tailored. Psoriasis-specific lifestyle written information was not freely available to patients in waiting areas of either primary care or secondary care health centres.
Table 4. Type and number of lifestyle materials observed in primary and secondary care health centre patient waiting areas (N = 24)

<table>
<thead>
<tr>
<th>Type of information</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generic lifestyle written information</strong></td>
<td></td>
</tr>
<tr>
<td>Smoking cessation</td>
<td>31 (31.6)</td>
</tr>
<tr>
<td>Alcohol Reduction</td>
<td>16 (16.3)</td>
</tr>
<tr>
<td>Weight Loss/Diet</td>
<td>28 (28.6)</td>
</tr>
<tr>
<td>Exercise</td>
<td>22 (22.5)</td>
</tr>
<tr>
<td>Substance misuse</td>
<td>1 (1)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>98/262 (37.4)</strong></td>
</tr>
</tbody>
</table>

| Psoriasis-specific written information |            |
| Smoking cessation                     | 0 (0)      |
| Alcohol Reduction                      | 0 (0)      |
| Weight Loss/Diet                       | 0 (0)      |
| Exercise                               | 0 (0)      |
| Substance misuse                       | 0 (0)      |
| **Total**                              | **0/262 (0)** |

| Generic lifestyle information supplied to patients by practitioners\(^a\) |            |
| Smoking cessation                     | 11 (25.6)  |
| Alcohol Reduction                      | 6 (14)     |
| Weight Loss/Diet                       | 16 (37.2)  |
| Exercise                               | 9 (20.9)   |
| Substance misuse                       | 1 (2.3)    |
| **Total**                              | **43/262 (16.4)** |

| Psoriasis-specific lifestyle information supplied to patients by practitioners\(^a\) |            |
| Smoking cessation                     | 2 (25)\(^b\) |
| Alcohol Reduction                      | 2 (25)\(^b\) |
| Weight Loss/Diet                       | 2 (25)\(^b\) |
| Exercise                               | 2 (25)\(^b\) |
| **Total**                              | **8/262 (3.1)** |

| Posters/displays of available support for lifestyle |            |
| Smoking cessation                     | 21 (18.6)  |
| Alcohol Reduction                      | 14 (12.3)  |
| Weight Loss/Diet                       | 22 (19.5)  |
| Exercise                               | 56 (49.6)  |
| **Total**                              | **113/262 (43.1)** |

\(^a\) Analysis based on data collected from 12 health centres. Data were unable to be collected from the remaining health centres (n=12)\(^b\) Relates to one patient information leaflet recorded in two different practices. Leaflet contains information applicable to all health behaviours.
**Breakdown by health behaviour**

There was considerable variation in the type of lifestyle signposting for the different health behaviours. Generic written information was more likely to be related to smoking cessation (n= 31; 31.6%) and weight loss/diet (n=28; 28.6%) than other health behaviours. Lifestyle information used by clinicians to give to patients was mainly focused on weight loss/diet (n= 16; 37.2%). Only one source of psoriasis specific written information was identified (a psoriasis leaflet advising of CVD risks related to unhealthy behaviours) and this was present in two health settings. Posters/displays signposting lifestyle support predominantly concerned weight loss (n= 56; 49.6%). (See details in Table 4).

**Breakdown by setting (primary care vs. secondary care)**

Signposting for lifestyle was more visible within primary care health centres (median= 10, range 0-40) than secondary care health centres (median= 11, range 0-15) and this was almost exclusively generic information about healthy lifestyle. A small number of lifestyle psoriasis-specific practitioner materials were recorded in both primary care (n=4) and secondary care (n=4).

**Breakdown by type of service (specialist psoriasis/dermatology health centre vs. general practice health centre)**

Signposting for lifestyle was more visible general practice health centres (median= 10, range 0-40) than specialist psoriasis/dermatology health centres (median= 3, range 0-29) and this was almost exclusively generic information about lifestyle, with the exception of a limited number of psoriasis-specific practitioner materials in the specialist services settings (n=8). (See Table 5).
Table 5. Type and number of lifestyle materials observed in specialist Psoriasis/Dermatology centres (N=7) compared with general practice health centres (N=17)

<table>
<thead>
<tr>
<th>Type of information</th>
<th>Number (%) in Specialist Psoriasis/Dermatology Health Centres</th>
<th>Number (%) in Primary care Health Centres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number (%) in Specialist Psoriasis/Dermatology Health Centres</td>
<td>Number (%) in Primary care Health Centres</td>
</tr>
<tr>
<td>Generic lifestyle written information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking cessation</td>
<td>10 (37)</td>
<td>21 (29.6)</td>
</tr>
<tr>
<td>Alcohol Reduction</td>
<td>2 (7.4)</td>
<td>14 (19.7)</td>
</tr>
<tr>
<td>Weight Loss/Diet</td>
<td>8 (29.6)</td>
<td>20 (28.2)</td>
</tr>
<tr>
<td>Exercise</td>
<td>7 (25.9)</td>
<td>15 (21.1)</td>
</tr>
<tr>
<td>Substance misuse</td>
<td>0 (0)</td>
<td>1 (1.4)</td>
</tr>
<tr>
<td>Total</td>
<td>27/262 (10.3)</td>
<td>71/262 (27.1)</td>
</tr>
<tr>
<td>Psoriasis-specific written information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking cessation</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Alcohol Reduction</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Weight Loss/Diet</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Exercise</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Substance misuse</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Total</td>
<td>0/262 (0)</td>
<td>0/262 (0)</td>
</tr>
<tr>
<td>Generic lifestyle information supplied to patients by practitioners(^a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking cessation</td>
<td>4 (26.7)</td>
<td>7 (25)</td>
</tr>
<tr>
<td>Alcohol Reduction</td>
<td>1 (6.7)</td>
<td>5 (17.9)</td>
</tr>
<tr>
<td>Weight Loss/Diet</td>
<td>6 (40)</td>
<td>10 (35.7)</td>
</tr>
<tr>
<td>Exercise</td>
<td>4 (26.7)</td>
<td>5 (17.9)</td>
</tr>
<tr>
<td>Substance misuse</td>
<td>0 (0)</td>
<td>1 (3.6)</td>
</tr>
<tr>
<td>Total</td>
<td>15/262 (5.7)</td>
<td>28/262 (10.7)</td>
</tr>
<tr>
<td>Psoriasis-specific lifestyle information supplied to patients by practitioners(^a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking cessation</td>
<td>2 (25)(^b)</td>
<td>0</td>
</tr>
<tr>
<td>Alcohol Reduction</td>
<td>2 (25)(^b)</td>
<td>0</td>
</tr>
<tr>
<td>Weight Loss/Diet</td>
<td>2 (25)(^b)</td>
<td>0</td>
</tr>
<tr>
<td>Exercise</td>
<td>2 (25)(^b)</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>8/262 (3.1)</td>
<td>0/262 ()</td>
</tr>
<tr>
<td>Posters/displays of available support for lifestyle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking cessation</td>
<td>5 (55.5)</td>
<td>16 (15.4)</td>
</tr>
<tr>
<td>Alcohol Reduction</td>
<td>0 (0)</td>
<td>14 (13.5)</td>
</tr>
<tr>
<td>Weight Loss/Diet</td>
<td>1 (11.1)</td>
<td>21 (20.2)</td>
</tr>
<tr>
<td>Exercise</td>
<td>Total number of materials observed</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------</td>
<td></td>
</tr>
<tr>
<td>3 (33.3)</td>
<td>9 (3.4)</td>
<td></td>
</tr>
<tr>
<td>53 (51)</td>
<td>104/262 (40)</td>
<td></td>
</tr>
</tbody>
</table>

Total number of materials observed

59
203

\[^a\] Analysis based on data collected from 12 health centres. Data were unable to be collected from the remaining health centres (n=12)

\[^b\] Relates to one patient information leaflet recorded in two different practices. Leaflet contains information applicable to all health behaviours.

**Quality indicators**

Results of the quality assessment of the lifestyle materials identified are presented according to each indicator.

**Visual condition of lifestyle information**

Each waiting area was coded based on the observation rating (criteria listed in Table 1). Of the health centres included in the study, two (11.8%) were coded as Level 3 signposting (good signposting), eleven (64.7%) were coded as Level 2 signposting (poor signposting), and one (5.9%) was coded as Level 1 signposting (very poor signposting). Three (17.6%) health centres contained no lifestyle information. The remaining health centres (n=7) were not assessed at the request of the health centre. Examples of poor lifestyle information are presented in Figure 1 for illustrative purposes.
Figure 1. Examples of low quality healthy lifestyle signposting
Visibility/accessibility of notice boards

Notice boards were clearly visible and accessible in eight (36.4%) health settings observed. Fourteen (63.6%) were assessed as having notice boards that were not easily accessible/visible. The remainder (n=2) were not assessed at the request of the health centre.

Analysis of patient information leaflets was based on a sub-sample of the leaflets identified in the study (n=13) and were randomly sampled across 11 of the health centres.

Layout and typographic and use of graphics/images in patients information leaflets

Results of the layout and typographical features and the use of graphics/images analysis are presented in Figure 2. These patient information leaflets conformed to guidelines in relation to column format (n=11; 84.6%) and the use of capital letters (n=11; 84.6%) but low agreement with guidelines related to the use of bold text (n=9; 69.2%), bullet points (n=8; 61.5%), use of consistent spacing (n=7; 53.8%), and appropriate font size (n=5; 38.5%). There was little agreement with margin spacing guidelines (n=1; 7.7%) and no agreement with use of italicized text.
Figure 2. Analysis of layout and typography and the use of images in a sub-sample of randomly selected patient information leaflets (n=13)
Of the indicators used to analyse the use of graphics/images in patient information leaflets, strongest agreement was shown with the use of simplified graphics (n= 8; 61.5%). Leaflets showed modest agreement with guidelines related to the use of graphics to support key points (n= 7; 53.8%), cultural sensitivity of graphics (n= 7; 53.8%), and the use of simplified language to support graphics (n= 7; 53.8%), and proximity of graphics and text (n=6; 46.2%). It was not possible to discern whether healthcare professionals were involved in the design of the leaflets, and whether the use of graphics was evaluated with patient groups. Therefore these guidelines were not included in the final analysis.

6.5 Discussion

This is the first study to examine the presence and quality of health information available to patients with psoriasis in primary and secondary care waiting areas. There are three important findings: (1) there was little attempt to promote healthy lifestyle as an important aspect of psoriasis management in the clinic environment; (2) generic patient materials were of poor quality and were poorly displayed; and (3) healthy lifestyle information failed to conform to evidence-based strategies, such as principles related to choice architecture. In order to conform to such principles information must be placed in the environment in a clear, visible and accessible way.

Our study demonstrates there is little attempt to provide tailored psoriasis-specific patient information about healthy living. Variation between health care centres in terms of the number and type of generic patient materials suggests a lack of patient exposure to information about healthy lifestyle in general. Information often
appeared disorganised and cluttered, and leaflets were often very poor in terms of visual appearance (in quality and how they were displayed on noticed boards).

It is possible that improving the amount and quality of generic information would serve to increase patient understanding of the benefits of a healthy lifestyle. However, given the role of behavioural factors in the maintenance and exacerbation of psoriasis (such as skin flare-ups), as well as associated CVD risk, psoriasis-specific information about behaviour change should be an important aspect of psoriasis management. Future studies should aim to examine the effectiveness and feasibility of providing psoriasis-specific information versus generic information for increasing healthy lifestyles.

Health centre waiting areas are a prime location for promoting healthy lifestyles where people have time to read and assimilate information. Restructuring the environment to make health information materials more accessible and understandable could be a way of engaging patients in behavioural change. Health information messages when embedded in people’s physical environment can prompt behavioural change [32]. Interestingly, Kerr et al. found that only posters larger than A3 were effective for health information-giving in the context of an immediate behavioural choice, suggesting studies such as this can be used to inform recommendations for the size of more effective materials in the context of the health centre environment. Posters in the current study generally did not conform to these guidelines. Patient information leaflets are one of the most commonly used methods of communicating health messages to patients [33]. Thus, the need to develop health information which is easily understood and then acted upon by the general public is crucial [34].
Whilst research around choice architecture (shaping the environment to encourage healthier behavioural choices) has been conducted in a range of settings to encourage positive behaviour change, this knowledge has yet to be applied to the immediate healthcare environment. Our findings demonstrate missed opportunities to promote behaviour change. The simple addition of clearer information about healthy lifestyle in settings where patients with psoriasis are managed could be an inexpensive way of 'priming' people for change. Priming patients before a consultation with their healthcare professional may increase the likelihood of discussions about behaviour change. For example receiving information about behaviour change in the waiting room via patient information leaflets or posters, preceding the healthcare professional-patient interaction may facilitate behaviour change [27, 28].

Strengths and limitations of the study

Health information signposting for people with psoriasis was examined systematically using key criteria from the literature and drawing on the expertise within the study team. The observational approach to this study meant that the researchers were able to gain first-hand experience of the healthcare settings in which the study took place, specifically from the patient’s perspective.

There are several limitations to this work. First, due to time and logistical restrictions, only one observer was able to carry out the coding at any one time, thus we were unable to calculate inter-rater reliability. However we attempted to overcome this by using a pre-determined, clearly specified observation check-list comprising well-defined categories to reduce any misinterpretation or likelihood of bias [29]. Second, due to the cross-sectional nature of the study we were unable to
assess whether the display of health-related material changed across different time points. However we attempted to overcome this by obtaining a varied sample of health centres across a large geographical area which attempted to capture the widest possible variation in the displays used. Third, with regard to opportunistically asking practitioners whether they distributed information leaflets to patients, whilst we acknowledge this may have the potential for selection bias, we were still able to collect data from half of the health centres involved in the study. Finally, we present a sub-sample of the total number of participant information leaflets analysed according to an existing framework for text and imagery recommendations in participant information. These were randomly selected, and having found no examples of high quality materials, we are confident this is a fair representation of the sample. However future studies should aim to conduct a more in-depth examination of information leaflets, such as examining theoretical content, or the type of advice given (e.g. practical versus generic advice).

**Recommendations for practice**

Evidence from the field of health psychology and health literacy could be used to inform the development of: (1) high quality patient materials; and (2) effective lifestyle signposting. This is particularly the case for psoriasis-related patient materials. Further research should aim to use evidence based approaches to design, layout and display behaviour change information. The practical application of evidence based approaches in the development of patient information leaflets to guide communication of health information is beginning to be recognised [35, 36]. It
is therefore necessary that improvements to lifestyle signposting must consider the empirical evidence to develop and implement theory-driven interventions.

There is strong empirical evidence that theory-based interventions can be used successfully to target key behavioural constructs in shaping behaviour [37], such as improving self-efficacy, attitudes, and beliefs [38, 39]. Restructuring the environment is also recognised as a key component of interventions designed to change behaviour [40]. Further research should explore how the environment can be used to promote healthy lifestyle beyond effective patient information displays. Whilst brief effects on behavioural change have been observed, further work is needed to establish whether such effects can be maintained [41].

6.6 Conclusions

Our study identified an urgent need to provide effective healthy lifestyle signposting for patients with psoriasis, consistent with the NICE guideline on management of psoriasis. Current practice is not utilising evidence-based approaches to the design and presentation of health information about healthy lifestyle in the clinical environment and opportunities are being missed to aid behaviour change.
6.7 References


24. Nelson PA, Keyworth C, Chisholm A, Pearce CJ, Griffiths CE, Cordingley L et al. 'In someone's clinic but not in mine' - clinicians' views of supporting lifestyle


Section Three Summary

This section aimed to examine current health risk communication strategies by focusing on both healthcare professional competences to deliver health behaviour change support, and the current level of health information signposting for patients in a key location for promoting and encouraging healthy living.

The main findings from Chapter 5 were as follows. Lifestyle as a health risk in patients with psoriasis was not well recognised, and consequently should be given more coverage in healthcare professional training competencies, particularly specialist dermatology training. Additionally, health behaviour change skills/competencies were poorly specified, with little or no reference to evidence based approaches to behaviour change. The language of ‘health promotion’ used in many health arenas is likely to be one problem as the mechanisms of how health improvements arise are often missing in ‘health promotion’ discourse, with a key assumption being that information alone is likely to lead to improvement.

Three key findings emerged from Chapter 6. First, there was little attempt to promote healthy lifestyle as an important aspect of psoriasis management in the clinic environment. Second, generic patient information identified was of poor quality (we identified just one piece of psoriasis-specific information about healthy lifestyle). Third, healthy lifestyle information failed to conform to evidence-based health information-giving strategies, such as principles related to choice architecture.

Findings from this section suggest that communication about the links between behaviour and health outcomes is under-recognised as a key aspect of psoriasis management. Information that is available to patients about healthy living does not conform to evidence based approach, both in design and delivery of information.
Section Four Introduction

The studies presented in section three suggest that health information-giving is under-recognised in both healthcare professional training competencies and in the immediate health centre environment in the context of primary and secondary care waiting areas.

To further examine health risk communication by using applied research, section four aims to examine risk communication in the context of an exemplar personally-relevant health threat for people with psoriasis, cardiovascular disease (CVD). This section is made up of two studies. Chapter seven presents a study examining how healthcare professionals communicate information about CVD risk and healthy lifestyle to patients with psoriasis, in the context of primary care CVD risk assessment consultations.

Chapter eight then presents a study examining new ways of communicating information about CVD risk using message framing theory as a theoretical framework.
Chapter 7: Communicating cardiovascular disease risk to people with psoriasis: What techniques do practitioners use?

Note. As this paper is currently under review, the formatting and layout are consistent with the requirements for the International Journal of Behavioral Medicine. For this chapter only, references will not follow APA style and will be placed at the end of the chapter rather than at the end of the thesis.
7.1 Abstract

Purpose

Psoriasis can be associated with unhealthy lifestyle behaviours such as smoking, excess alcohol use and insufficient physical activity, consequently increasing cardiovascular disease (CVD) risk. Healthcare practitioners are expected to discuss lifestyle risk factors with patients with a view to reducing health-related risk for patients. However, little is known about the techniques used to communicate information about risk to patients with psoriasis. We aimed to examine how primary care practitioners communicate risk information when conducting CVD risk assessments.

Methods

Consultations (n=44) between primary care practitioners (general practitioners and practice nurses) and patients with psoriasis across 10 practices were audio-recorded and analysed using content analysis. A coding frame was used to record specific techniques used by practitioners to communicate risk information.

Results

Most frequently used communication methods were verbal descriptors of risk factors accompanied by numerical data (n=28) rather than verbal descriptors alone (n=16). Practitioners did not use numerical risk communication methods alone. Where CVD risk factors were discussed with patients (n=156 occasions across all consultations), interpretations of this information was provided to patients on 131 (84%) occasions. However, specific advice about behaviour/risk modification was only given on 60 (38.5%) out of a possible 156 occasions.
Conclusions

Specific advice about how to change lifestyle behaviour to modify CVD risk factors was not always given by the practitioner, particularly when discussing behavioural risk factors. Developing best practice for communicating complex health risk information would ensure that people with psoriasis are empowered to make lifestyle modifications to reduce CVD risk.
7.2 Introduction

Cardiovascular disease (CVD) is one of the biggest causes of mortality globally, but individual risk of CVD can be reduced by making changes to modifiable risk factors such as smoking, obesity and excess alcohol use [1]. Public health guidelines recommend that individuals identified as being at increased risk of CVD are supported with appropriate lifestyle and pharmacological interventions to reduce their risk [2].

The ways in which CVD risk information are presented to patients by healthcare professionals is likely to influence: (1) patients’ perceptions of risk magnitude; and (2) subsequent decisions to make lifestyle modifications to reduce their CVD risk [3, 4]. However providing risk information may only lead to positive behavioural changes if healthcare professionals are able to communicate risk information clearly and effectively to patients, and check understanding [5]. Health and risk information that is difficult to understand may lead to patients making ill-informed choices [6]. Individualised health risk information must be presented in a way that increases understanding and supports individuals to make personally appropriate health decisions [5, 7]. For example, a study examining risk perceptions in patients with Type 2 diabetes, who had at least one CVD risk factor, found that only two thirds of patients could rank diabetes-related health risks, such as heart attack or stroke, based on the information presented to them by the researchers [8]. When recommended risk formats such as individualised quantitative expressions of risk (statistics) were used, patients showed a lack of understanding of their diabetes-related health risks. This suggests that more effective communication methods for encouraging understanding are needed.
Policy development related to the prevention of CVD in clinical practice, specifically concerns recommended ways of communicating about CVD risk [9]. However, whether the most effective risk communication strategies are used in practice is unknown. Whilst some research shows that numerical information (e.g. ‘your 10-year risk of cardiovascular disease is currently 5%’) facilitates understanding of risk [10], other studies have shown that percentages may be difficult for patients to process and interpret even amongst highly educated populations [11]. Conversely, studies suggest that verbal descriptors (e.g. ‘your risk of cardiovascular disease is high’) are effective communication techniques in improving patient understanding of risk and the benefits of behaviour change in reducing risk [12]. A European study examining the use of different communication formats used in primary care consultations to communicate about CVD risk found that verbal descriptors were the most common form of risk communication (used in 73% of consultations observed), whereas a combination of verbal and numerical forms of risk communication was used in just 11% of consultations[13]. The study concluded that a discrepancy exists between guidelines for communicating risk effectively which favour numerical and visual methods, and the reality of clinical practice, suggesting a need for further examination.

Given some of the contradictions in the risk communication literature, there is a clear need for further studies investigating risk communication within current healthcare interactions. A systematic review of CVD risk communication methods was largely inconclusive, based on a limited number of studies mostly using hypothetical risk scenarios (such as a hypothetical drug, or being at risk of a hypothetical disease), rather than a realistic and personally-relevant health threat [4]. Waldron et al. suggest
that increasing patient awareness of risk may lead to accurate risk perceptions and consequently decisions about treatment and risk reduction through behaviour change.

*CVD and Psoriasis*

CVD risk may be particularly important to address in people living with psoriasis. Psoriasis is a long-term inflammatory condition affecting around 2% of the population [14], which manifests predominantly on the skin. Psoriasis can be associated with a number of lifestyle-related risk factors known to increase the risk of CVD [15]. These include smoking, excess alcohol intake [15] high BMI [16], and being sedentary [17]. Recognised public health strategies in the UK emphasise the prevention of health problems at the heart of every NHS contact [18], such as using health practitioners’ contact time to communicate key health messages related to unhealthy lifestyle behaviours. Health information-giving and lifestyle behaviour change is also recognised by healthcare professionals [19] and in clinical guidelines [20] as being central to the management of psoriasis.

Whilst current evidence suggests an increased prevalence of behaviourral CVD risk factors within people with psoriasis [21-23], opportunities to discuss issues of risk and risk reduction in consultations between practitioners and patients with psoriasis may often be missed [19, 24, 25]. However, little is known about the specific methods which are used by healthcare professionals during CVD risk assessments to communicate information about risk.
This study aimed to examine how practitioners communicate information about CVD risk to patients with psoriasis. This is a nested study within the Identification and Management of Psoriasis Associated Co-Morbidity (IMPACT) Programme of research (http://www.impactpsoriasis.org.uk/) aimed at improving care for people with psoriasis [25].

In this paper we report a systematic examination of how practitioners communicate information about CVD risk when undertaking CVD risk assessments with patients with psoriasis, in the UK primary care setting.

Specific research questions are:

1. What type of information about CVD risk is communicated to patients?

2. How do practitioners communicate information about CVD risk?

7.3 Materials and Methods

Ethics Approval

Ethical approval was obtained from a regional NHS Research Committee (REC ref: 11/NW/0654).

Design and Procedure

Consultations between practitioners (general practitioners and practice nurses) and patients with psoriasis were audio-recorded as part of a CVD risk assessment study conducted in 10 general practices in North West England [26]. Practitioners were
advised to conduct the assessments in line with their regular practice for conducting CVD health checks.

**Participant recruitment**

General practices recruited into the study were responsible for identifying patients with psoriasis over 18 years of age (of any degree of psoriasis severity). Patients were invited to attend a CVD risk assessment. Before the consultation both practitioners and patients were fully informed of the nature of the study, consented to take part in the study and agreed for the consultation to be audio-recorded. One hundred and thirty risk assessment consultations were recorded.

This paper reports analysis of a sub-sample (n=44) from 130 consultations recorded as part of an overarching risk communication study [25]. These were randomly selected and sampled in order to obtain maximum variation in terms of primary care practice and the type of practitioner conducting the risk assessment. Consultations were selected from 13 practitioners (nine practice nurses, of whom two had an additional role as a research nurse, and four GPs) who participated in the study across 10 primary care practices where an audio-recorded consultation had been collected. At least three consultations from each practice, with a minimum of two consultations conducted by each practitioner, were sampled.

**Coding frame**

A pre-determined coding frame was developed to classify data collected in the audio-recorded risk assessments with the aim of answering the two key research questions: the type of information about CVD risk communicated to patients, and how this
information is communicated. Information about CVD risk factors were categorised into either: (1) **biomedical measurements** (blood pressure, waist/hip circumference, cholesterol, and Body Mass Index [BMI]); or (2) **behavioural factors** associated with increased CVD risk (alcohol, physical activity, eating patterns, and smoking).

Information was further classified in order to answer the two key research questions: (1) what **type** of information about CVD risk communicated to patients, and (2) **how** this information is communicated:

(1) Whether information was clear, specific and individualised [27].

Information was assessed on the basis of **specificity**, and categorised as either generic (**the older people get, the risk goes up**) or individualised, with reference to the patient’s own risk factor (**your main risk factor is smoking**). To further examine the type of information presented, and to address the gap in the literature relating to practitioners risk communication methods, CVD risk information was categorised according to whether numerical information (for example: **your total cholesterol is 2.5**) or verbal descriptors (for example: **your cholesterol is very high**) were used.

(2) Information was classified according to **how** different CVD risk factors were communicated. Specifically whether practitioners are providing **interpretation** of risk information to patients, and whether **specific advice** about how to modify CVD risk is offered. Interpretation was defined as providing additional statements indicating the relevance of the information provided (**those readings are on the high side**). **Specific advice** was defined as specific information or recommendations relating
to the benefits of behavioural change to reduce CVD risk (*the way to reduce your cholesterol is yes to increase your exercise and also to add things like porridge to your diet*).

The coding frame was informed by Whitlock et al.’s [27] framework for evaluating primary care behavioural counselling. The model emphasises the importance of promoting health lifestyles during every practitioner-patient consultation as a way of preventing long-term health problems. This may include the benefits of making behavioural modifications such as dietary changes or increasing the amount of exercise undertaken. This provides a useful framework for recommended practice for clinicians when communicating about CVD risk factors, particularly given the absence of a formal framework in the literature specifically used to evaluate CVD risk communication consultations.

*Data analysis*

A content analysis approach [28] was used. Instances of CVD risk communication were recorded verbatim by the principle author using the coding frame. Observations for all consultations were evaluated in terms of information content. Occurrences of discussions about CVD risk were quantified according to each category of the coding frame.

Coding was conducted by recording verbatim examples of discussion related to each risk factor directly from the audio recordings into the coding frame. The audio recordings were listened to repeatedly as a familiarisation exercise prior to the transcription and coding stage. Any identifying information from the transcriptions
was removed and participants were given a unique identification number for the purposes of illustrative quotes.

A sub-sample (approximately 10%) of the coded occurrences was checked by a member of the research team (LC) and discrepancies were discussed between two of the study authors (LC and CK) until a final consensus was reached. The final analysis was discussed and agreed upon by the study team.

### 7.4 Results

**Participant characteristics**

Patient and practitioner demographics are presented in Table 1. Patients (n=44) were aged between 23 and 77 years with a mean age of 52.4 years and were predominantly White British (n=42; 95.4%) and female (n=26; 59.1%). Clinicians (n=13) were predominantly female (n=11) and included practice nurses (n=9), and General Practitioners (n=4). The length of the consultations varied from 7m24s to 39m57s, with a mean length of 18m05s.
### Table 1. Patient and practitioner demographics

#### Patient and practitioner characteristics

<table>
<thead>
<tr>
<th>Patient characteristics (n=44)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, Mean (SD), Range</td>
<td>52.4 (13.92) 23-77</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>18 (40.9)</td>
</tr>
<tr>
<td>Female</td>
<td>26 (59.1)</td>
</tr>
<tr>
<td>Ethnicity, White British</td>
<td>42 (95.4)</td>
</tr>
<tr>
<td>Smokers</td>
<td></td>
</tr>
<tr>
<td>Ever</td>
<td>27 (61.4)</td>
</tr>
<tr>
<td>Current</td>
<td>6 (13.6)</td>
</tr>
<tr>
<td>BMI category</td>
<td></td>
</tr>
<tr>
<td>Healthy (BMI &lt;25)</td>
<td>10 (22.7)</td>
</tr>
<tr>
<td>Overweight (BMI 25-30)</td>
<td>14 (31.8)</td>
</tr>
<tr>
<td>Obese BMI&gt;30</td>
<td>20 (45.5)</td>
</tr>
<tr>
<td>Waist category</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>10 (22.7)</td>
</tr>
<tr>
<td>High</td>
<td>11 (25)</td>
</tr>
<tr>
<td>Very high</td>
<td>23 (52.3)</td>
</tr>
<tr>
<td>Raised blood pressure</td>
<td>10 (22.7)</td>
</tr>
<tr>
<td>Alcohol risk</td>
<td></td>
</tr>
<tr>
<td>None or low risk</td>
<td>36 (81.8)</td>
</tr>
<tr>
<td>At risk</td>
<td>6 (13.6)</td>
</tr>
<tr>
<td>International Physical Activity Questionnaire</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>16 (36.4)</td>
</tr>
<tr>
<td>Moderate</td>
<td>13 (29.5)</td>
</tr>
<tr>
<td>Low</td>
<td>10 (22.7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Practitioner characteristics (n=13)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Practitioner type</td>
<td></td>
</tr>
<tr>
<td>General Practitioner</td>
<td>4 (30.8)</td>
</tr>
<tr>
<td>Practice Nurse</td>
<td>9 (69.2)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2 (15.4)</td>
</tr>
<tr>
<td>Female</td>
<td>11 (84.6)</td>
</tr>
<tr>
<td>Number of risk assessments conducted</td>
<td></td>
</tr>
<tr>
<td>General Practitioners</td>
<td>14 (31.8)</td>
</tr>
<tr>
<td>Practice Nurses</td>
<td>30 (68.2)</td>
</tr>
<tr>
<td>Consultation length (minutes: seconds) – Mean (Range)</td>
<td>18.05 (07.24s – 39.57)</td>
</tr>
</tbody>
</table>

1 Categorised according public health guidelines [44] Low; males<94cm, females<80cm, High risk; males 94-102cm, females 80-88cm, Very high risk; males>102cm, females>88cm)  
2 High blood pressure categorised according to public health guidelines; systolic blood pressure>140 or diastolic blood pressure >90 [30]
Of the 44 consultations analysed, at least one biomedical measurement was discussed in every consultation. Blood pressure was discussed in every consultation (n=44), waist/hip circumference was measured and the result given to the patient in 23 (52%), BMI/weight in 22 (50%), and cholesterol in 16 (36%) of the total number of consultations. However, cholesterol was not always provided at the time of the initial consultation, due to a lack of blood test results, and instead may have been given to patients in a follow-up appointment as part of the larger study [25].

At least one self-reported lifestyle behavioural CVD risk factor was discussed with patients in 16 (36%) of the consultations. Where lifestyle was raised, alcohol was discussed on all of these occasions (n=16; 36% of the total number of consultations), exercise/physical activity was discussed in 15 (34%), diet/eating patterns in 11 (25%) of the total number of consultations. Smoking was discussed in 9 of the total number of consultations; however only six (14%) patients reported being current smokers, and 26 (59%) patients reported ever smoking. General information about CVD risk (examples given in Table 2 below) was given by the practitioner in 26 (59%) of the consultations. Results will be reported according to each research question:

1. What type of information about CVD risk is communicated to patients?

Generic versus individualised risk information

Results are presented in Figure 1. There was variation in the type of risk information communicated to patients during the CVD consultations. Generic risk information given alone was rare (n=2 consultations). Risk information mostly consisted of individualised information (n=23 consultations), or a combination of both generic
and individualised (n=19). Examples of each category are presented in Table 2, with practitioner identification numbers displayed in parentheses.

Of the consultations that included individualised risk information, 12 consisted of a blood pressure reading only, and an individualised CVD risk calculation was given in 2 (4.5%) of the total number of consultations. The tool used to calculate the CVD risk (such as Framingham or QRisk) was unclear from the audio recordings.

**Figure 1.** Use of individualised versus generic risk information by practitioners during CVD risk assessments (n=44)
Table 2. Examples of methods of risk communication used by practitioners

<table>
<thead>
<tr>
<th>Method of risk communication</th>
<th>Verbatim examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individualised CVD risk information</td>
<td>'Your blood pressure is perfectly normal, everything seems fine' (Patient ID: 35)</td>
</tr>
<tr>
<td>Generic CVD risk information</td>
<td>'A lot of these cardiovascular things are related to obesity and lack of exercise and things like smoking.' (Patient ID: 41)</td>
</tr>
<tr>
<td>Combined individualised and generic information</td>
<td>'The older you get the risk goes up, you're young and healthy...Your blood pressure is very very good’ (Patient ID: 8)</td>
</tr>
</tbody>
</table>

Numerical information versus verbal descriptors

Results are presented in Figure 2. The most common method of CVD risk communication was a combination of numerical and verbal descriptors (n=28), followed by verbal descriptors alone (n=16). There were no examples of practitioners using numerical information alone. Exemplars of each category are presented in Table 3, with practitioner and patient identification numbers displayed in parentheses.
**Figure 2.** Use of verbal versus numerical information by practitioners during CVD risk assessments

![Bar chart showing usage of verbal and numerical information by practitioners.](chart.png)

**Table 3.** Examples of types of risk communication used by practitioners

<table>
<thead>
<tr>
<th>Type of risk communication</th>
<th>Verbatim examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal descriptor</td>
<td>‘They’re emphasising these days the importance of exercise as well as diet in terms of reducing your heart disease risk.’ (Patient ID: 2)</td>
</tr>
<tr>
<td>Combined numerical and verbal descriptor</td>
<td>‘Cholesterol is excellent, really, really good. Total cholesterol is 2.5 Anything less than 4/4.5 is really healthy to prevent heart attacks and strokes. (shows patient LDL cholesterol) They're low, at really good level. Whatever you’re doing is right - it’s a very healthy cholesterol reading.’ (Patient ID: 43)</td>
</tr>
</tbody>
</table>
(2) How do practitioners communicate information about CVD risk?

The second level of analysis examined the content of CVD risk information discussed. Specifically whether interpretation of risk information was provided by the practitioner and if specific advice was offered to the patient regarding behavioural modifications needed to reduce CVD risk. Results on both these domains are categorised into biomedical and lifestyle/behavioural risk factors.

**Biomedical measurements of CVD risk**

Results are presented in Figure 3. For biomedical risk factors, across the physiological markers of CVD risk (blood pressure, waist/hip circumference, cholesterol and BMI/weight) interpretation of CVD risk factor information was given on 87 (out of a total of 105) occasions (across all risk factors discussed). Interpretation was given for every discussion about blood pressure (44 out of 44 occasions), followed by BMI/weight (17 out of 22 occasions; 77%), waist/hip circumference (13 out of 23 occasions; 57%) and cholesterol (13 out of 16 occasions; 81%).

Specific advice (both informational, such as outlining the benefits of a healthy diet for example, and instructional, such as suggesting specific foods to incorporate into a patients diet) about how to make lifestyle behavioural modifications was given in 8 of the 16 (50%) discussions about cholesterol, followed by BMI/weight (10 of 22 occasions; 46%), blood pressure (5 out of 44 occasions; 11%) and waist/hip circumference (3 out of 23 occasions; 13%).
Figure 3. Discussion of biomedical measurements related to CVD risk

Lifestyle behavioural factors

Results are presented in Figure 4. Across the lifestyle/behavioural CVD risk factors (alcohol, smoking, physical activity and diet/eating patterns) interpretation of information was provided on 44 (out of a total of 51) occasions across all risk factors discussed. This was mostly given in discussions about alcohol (15 of 16 occasions; 94%) followed by physical activity (13 of 15 occasions; 87%), diet/eating patterns (9 of 11 occasions; 82%) and smoking (7 of 9 occasions; 78%).
Specific advice about how to make lifestyle behavioural modifications was given in all discussions about diet/eating patterns (11 out of 11 occasions), followed by physical activity (12 out of 15 occasions; 80%), alcohol (9 out of 16 occasions; 82%) and smoking (2 out of 9 occasions; 22%).

Figure 4. Discussion of behavioural factors related to CVD risk

<table>
<thead>
<tr>
<th>Risk factor discussed</th>
<th>Number of consultations</th>
<th>Interpretation provided</th>
<th>Specific advice given</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>16, 9</td>
<td>15, 9</td>
<td>16</td>
</tr>
<tr>
<td>Smoking</td>
<td>9, 7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>15, 13</td>
<td>12, 13</td>
<td>11</td>
</tr>
<tr>
<td>Diet/Eating patterns</td>
<td>11, 9, 11</td>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>

7.5 Discussion

This study has systematically identified and examined communication methods currently used by healthcare professionals when discussing CVD risk with patients with psoriasis, in the context of primary care risk assessment consultations.

Three key findings emerge from this study. First, contrary to some of the current literature we found that numerical information (such as percentages) was only used
when accompanied by verbal descriptors. We found no evidence of numerical forms of risk communication only, which could suggest that used alone, practitioners believe this may not be an effective method of communicating CVD risk information. Rather, practitioners may believe that by adding verbal descriptors to numerical information, this may facilitate patient understanding.

Second, the most common way of communicating risk information was through the use of either individualised information (e.g. 'your blood pressure is perfectly normal), or a combination of individualised and generic information (e.g. 'The older you get the risk goes up, you're young and healthy...Your blood pressure is very good'), as opposed to generic information alone. However we found that occurrences were often limited to informational or instructional statements (suggesting dietary instructions or instructing patients to reduce their alcohol intake). This resulted in a one-way passage of information, rather than a structured, collaborative shared discussion about CVD risk reduction, and how patients might address the risk identified.

Third, there was a lack of emphasis on discussing lifestyle behavioural CVD risk factors (smoking, alcohol consumption, physical activity, and diet) or the link with psoriasis during the consultations. At least one LBC risk factor was discussed in just 16 (36.4%) of the 44 consultations. Physical activity was discussed in just 15 of the consultations, and diet was discussed in 11. This is particularly important given the risk profile of the patients in this study, both in terms of the number of patients who were overweight or obese, or had a waist circumference indicative of high or very high CVD risk. Indeed, linked work has demonstrated that opportunities to address
CVD risk, and to support patients to engage in risk reducing behaviours, are often missed in such consultations [25].

Addressing lifestyle behaviours is a core component of the healthcare professional general role [29] and in primary prevention strategies for CVD [30]. Additionally, in the context of psoriasis management lifestyle behaviour change support is recommended [20], but may not be happening in practice [25]. Our study extends this work by understanding the techniques used by primary care practitioners to communicate CVD risk and highlights that very little specific advice on how to modify risk factors is given to patients. Previous studies have helped us understand the methods used by healthcare professionals when communicating information about CVD risk [13], whereas the present study goes beyond this to examine the specific content of discussions about CVD risk.

However, interpretation of risk information was not always linked to specific advice about how to modify CVD through behavioural change, particularly in relation to biomedical measurements such as blood pressure (10 patients had a higher-than-normal blood pressure; specific advice relating to lowering blood pressure was given to just 5 patients). This was surprising given that national public health guidelines for the prevention of CVD emphasise lifestyle modification (such as dietary changes) as part of patient management strategies [30]. We found that such discussions were mostly absent in the consultations, which could be due to practitioners favouring pharmaceutical aids rather than behaviour change techniques. Based on our findings, we suggest that specific advice regarding risk modification should be more consistently linked with risk interpretation for all personally-relevant CVD risk
factors. This may not only facilitate patients conceptualisation of risk, but provide a way that patients can understand how to reduce CVD risk.

There was limited evidence of absolute risk being used to communicate risk to patients during CVD risk assessments; individualised CVD risk calculations such as the internationally-recognised Framingham risk equation [31] and QRisk2 [32] were given to patients in just two of the consultations (‘your 10-year risk of CVD is 10%’); although the specific tool used was unclear from the audio recordings. However, the cholesterol result was not always available at the time of the consultation, so it may not have always been possible to calculate such a risk score. However, given the recognition that risk calculators are a commonly used tool for assessing CVD risk, and recent research is focused on developing new ways of calculating absolute CVD risk [33], it was interesting to find so few of the healthcare professionals in the present study adopting this method. A recent qualitative study with Australian GPs showed that CVD risk communication strategies may depend on the GP’s perception of patient risk, and patient motivation to take preventive action [34]. It could be possible that the healthcare professionals involved in this study did not believe that a CVD risk score was necessary to convey risk information.

Traditional approaches to the primary care consultation focus on providing opportunistic health promotion where the opportunity arises [35]. Rather than the contact time being centred around the management of presenting problems and/or the management of continuing problems, more of a focus should be on promoting healthy lifestyles. Given some of the major causes of mortality worldwide can be prevented through appropriate lifestyle modifications, the health promotion aspect of the model is central to informing primary care consultations. Stott and Davis argue
that doctors may be reluctant to address lifestyle behaviour change in the absence of
disease or illness; whereas advice may be offered about diet and exercise if these can
be attributed to a diagnosed illness. This also supports the call for moving towards a
secondary prevention approach to managing risk factors associated with CVD
including the management of high blood pressure or smoking cessation [36]. The key
question being addressed in the consultation is whether it is appropriate to support
the patient in achieving lifestyle behaviour change in the context of long-term health.
This model widens the scope of every consultation and encourages the clinician to
consider the patient in a broader, practical and time efficient way. Techniques for
supporting lifestyle behaviour change are well established for example, and can be
successfully implemented with patients [37-39].

**Strengths and limitations**

This study allowed for an in-depth examination of how primary care professionals
communicate CVD risk within the context of risk assessment consultations for
people with psoriasis. Important insights have been given into current
communication techniques used by practitioners. Where previous studies have been
conducted in the context of ‘healthy’ individuals often involving hypothetical risk
scenarios [40, 41], our study has been conducted with participants whereby the risk
information holds personal relevance.

There are several limitations. We present an analysis of a sub-sample of the total
number of audio-recorded consultations (44 out of 130). However, our sampling
strategy aimed to deliberately capture the widest variation of consultations across all
practitioners who took part in the study, where an audio-recording of the consultation
was available. We were able to examine differences in methods of risk communication and provide insights into current practice in order to advance current understanding of risk communication.

Whilst we briefed healthcare professionals to conduct the consultations as a routine CVD risk assessment consultation, it may have been possible that healthcare professionals believed the primary aim of the study was to collect risk factor information only. This may be the case particularly for the two nurses who also had an additional role as a research nurse.

Future studies should examine whether attending CVD risk assessments and engaging in discussions with healthcare professionals about CVD risk can increases the likelihood of lifestyle behavioural changes in patients. This is of particular importance given the current uncertainty of the effectiveness of health checks suggested in the literature in terms of improving CVD mortality rates [42]. Research also suggests that the number of health checks conducted in the UK is not representative of people identified as being at high risk of CVD [43]. Therefore, the acceptability and feasibility of conducting such checks should be further examined, as health checks may represent an opportunity to engage in discussions about reducing health risk factors associated with CVD and other long-term conditions.

The number of discussions about lifestyle modification is not reflected in the patients’ risk profiles; increased BMI (77% of patients were overweight or obese) and waist measurements (77% of patients were categorised as high or high risk) suggest a discussion about risk reduction would be highly relevant, and we would have expected more of these discussions; physical activity was discussed in 15 and diet was discussed in 11 of the 44 consultations.
7.6 Implications and conclusions

New guidelines for communicating CVD risk information to patients [33] state that healthcare professionals should be able to effectively communicate this information to patients. This is particularly important in the context of psoriasis, which is known to be associated with a number of behavioural risk factors linked to increased CVD risk. This study has identified the techniques that healthcare professionals use when talking to patients about CVD, and has provided insights into how this is done in the context of ‘real’ consultations. Further research should identify the optimal methods of communicating complex health information in such a way that patients with psoriasis (and patients generally) are empowered to make long-term lifestyle modifications to reduce CVD risk. Additionally, research should ensure that practitioners are adopting such techniques, as is often the case opportunities to address CVD risk are not taken [25]. Consultations about CVD risk provide the ideal opportunity to discuss health risks with patients, and equipping practitioners with effective communication techniques will allow them to support patients in making positive behavioural changes.
7.7 References


40. Fagerlin A, Zikmund-Fisher BJ, Ubel PA. "If I'm better than average, then I'm ok?": Comparative information influences beliefs about risk and benefits. Patient Educ Couns. 2007;69(1-3):140-4.


Chapter 8: Does message framing affect behavioural intentions to change in patients with psoriasis? An experimental study

Note. As this paper is currently in preparation, the formatting and layout are consistent with the requirements for the British Journal of Health Psychology. For this chapter only, references will be placed at the end of the chapter rather than at the end of the thesis.
8.1 Abstract

Background

Message framing is important in health communication research. Prospect theory argues messages can emphasise either the benefits (gained-framed) of behaviour change, or costs (loss-framed) of failure to act. Research around the relative efficacy of approaches is inconclusive and mostly based on hypothetical risk scenarios. Lifestyle behaviour change (LBC) is central to psoriasis management, improving disease outcomes and reducing associated cardiovascular disease (CVD) risk. Whether people are motivated to make positive LBC through a desire to improve psoriasis or reduce CVD risk, or whether message framing is effective in psoriasis patients is unknown.

Aims

(1) To identify whether gain- or loss-framed messages more effective for prompting changes in behavioural intentions (BI); and (2) are BI driven by a desire to improve psoriasis or reduce CVD risk.

Methods

A 2 (message frame: loss vs. gain) by 2 (message focus: psoriasis symptom reduction vs. CVD risk reduction) between-participants design was used. Participants (n=217) were randomly allocated to one of four evidence-based health messages as part of an online questionnaire. BI was the independent variable.

Results

A significant frame by focus interaction was found for BI to reduce alcohol intake (p=.037); loss-framed messages were more effective for CVD risk reduction.
information, whilst gain-framed messages were more effective for psoriasis symptom reduction information. BI for increased exercise, stopping smoking and improving diet were not statistically significant.

**Conclusions**

Message frame should be considered depending on the health benefit being emphasised. Patient-tailored health messages in psoriasis populations may increase the likelihood of message effectiveness for alcohol reduction.
8.2 Background

Cardiovascular disease (CVD) has a modifiable behavioural dimension. Traditional risk factors include smoking, obesity, sedentary lifestyle and excess alcohol use (National Institute for Health and Care Excellence, 2010; Yusuf et al., 2004). Yusuf et al. (2004) found that in 90% of cases, the risk of having a first myocardial infarction was related to these behavioural issues. Identifying effective CVD risk communication methods is a key aim for health communication research. A systematic review of CVD risk communication methods concluded that patient-tailored information may be one way of improving risk perceptions and promoting more informed decisions about reducing risk through behaviour change (Waldron, van der Weijden, Ludt, Gallacher, & Elwyn, 2011). However few studies have examined risk communication in the context of a personally-relevant health threat. Instead they have used hypothetical risk scenarios alone (i.e. a hypothesised, non-personally-relevant health threat).

Psoriasis, lifestyle behaviours, and CVD risk

CVD risk communication is particularly important for patients with psoriasis, a complex, long-term, inflammatory skin condition affecting around 2% of the UK population (Parisi, Symmons, Griffiths, & Ashcroft, 2013). Psoriasis is associated with a number of physical co-morbidities such as diabetes and psoriatic arthritis, and psychological co-morbidities (Dauden et al., 2012) such as anxiety (Richards, Fortune, Griffiths, & Main, 2001), depression (Domínguez, Han, Li, Ascherio, & Qureshi, 2013) and social withdrawal (Schneider, Heuft, & Hockmann, 2013). Additionally there is increasing evidence that moderate to severe psoriasis is
associated with CVD (Tobin et al., 2010) and in 2006 major interest in the field was sparked following the publication of a paper by Gelfand and colleagues in which they argued that psoriasis is an independent risk factor for myocardial infarction (Gelfand et al., 2006). More recently, other evidence has questioned the interpretation of findings (Parisi et al., 2015). However, regardless of the presence of a direct association between psoriasis and CVD people with psoriasis are known to engage in high levels of problematic lifestyle behaviours which put them at increased risk. These include excessive alcohol intake, smoking, excessive weight gain and being sedentary (Hayes & Koo, 2010; Naldi et al., 2005; Samarasekera, Neilson, Warren, Parnham, & Smith, 2013). Unhealthy lifestyle is detrimental for people with psoriasis for two reasons: (1) it contributes to onset and/or increases psoriasis severity; and (2) it increases the risk of CVD. Recent research indicates that improving lifestyle can improve psoriasis outcomes. For example increasing physical activity can reduce psoriasis severity (Frankel, Han, Li, & Qureshi, 2012) and weight loss can improve the effectiveness of treatments for psoriasis (Gisondi, Del Giglio, Di Francesco, Zamboni, & Girolomoni, 2008), and reduce CVD risk. Informing people about the benefits of making healthy lifestyle changes in terms of improving psoriasis and reducing the risk of CVD is further reinforced by recent clinical guidelines (NICE, 2012). Healthcare professionals are advised to discuss such health risks with people who have psoriasis (of any degree of severity), and offer tailored health lifestyle information and promote behavioural change. Developing effective health messages aiming to encourage health living should therefore be a focus on health communication research.
Prospect Theory and message framing

The way that health risk information is presented can influence subsequent risk reducing behaviours such as reducing alcohol intake (Rothman & Salovey, 1997; Rothman, Salovey, Antone, Keough, & Martin, 1993). Prospect Theory (Kahneman & Tversky, 1979) states that the way the consequences of actions are framed can affect the behavioural choices people make. Two possible scenarios are proposed under the theory: 1) people are more likely to engage in risk-seeking behaviour when considering potential gains and 2) they are more likely to behave in risk-averse ways in the face of potential losses.

Based on the principles of Prospect Theory, message framing theory suggests that message effectiveness is influenced both by the type of behaviour promoted and the framing of the health message (Kahneman & Tversky, 1979; Rothman & Salovey, 1997). Messages are presented using either a gain-frame (emphasising the benefits associated with a behaviour; ‘quitting smoking lowers your risk of lung cancer’), or a loss-frame (emphasising the costs of failure to act; ‘by not quitting smoking, you increase your risk of lung cancer’). Varying the use of message frame in the presentation of factually identical health messages has been shown to have very different effects on behavioural outcomes (Rothman, Martino, Bedell, Detweiler, & Salovey, 1999). In the context of health, Prospect Theory identifies two types of behaviour: (1) prevention behaviours, ‘low risk’ behaviours such as reducing alcohol intake or increasing physical activity and (2) ‘detection’ behaviours, ‘high risk’ behaviours such as bowel cancer screening.

Message framing has been examined in a number of health-related experimental studies for a range of behaviours including sun cream use (Detweiler, Bedell,
Salovey, Pronin, & Rothman, 1999), food choice (Pavey & Churchill, 2014) and promoting vaccinations (Abhyankar, O'Connor, & Lawton, 2008). The support for the effects of message framing however has often been tentative. A meta-analysis of message framing studies showed that for encouraging disease prevention, gain framed messages were significantly more persuasive than loss-framed messages (O'Keefe & Jensen, 2007). However this was due to relatively large effect sizes in studies promoting dental hygiene behaviours. No significant differences were found in the effect of differently framed appeals for non-dental prevention behaviours. A similar analysis of 53 empirical studies found only a small advantage of loss-framed appeals over gain-framed appeals in relation to detection behaviours, which were limited to breast cancer detection. This advantage was absent in studies relating to detection of other diseases such as skin cancer, other cancers, or dental problems (O'Keefe & Jensen, 2009). A more recent meta-analysis found that gain-framed messages were more effective than loss-framed messages for encouraging prevention behaviours such as smoking cessation and physical activity (Gallagher & Updegraff, 2012). However the authors conclude that more studies are needed in each domain of prevention behaviours to make firmer conclusions.

Categorising behaviour as either detection behaviour or prevention behaviour may not on its own be sufficient to determine which message frame (gain or loss) will be most effective (Werrij, Ruiter, Riet, & De Vries, 2012). Rather, other important mechanisms may influence the effectiveness of health messages in promoting behaviour change. The consideration of immediate versus future health consequences is recognised as a central characteristic in tailored health communication messages (O'Connor, Warttig, Conner, & Lawton, 2009). This is particularly true for appearance-related health, which has been shown in the context of skin cancer
(Thomas et al., 2011). Thomas and colleagues found that the most effective skin cancer messages (for increasing perceived threat and intentions to perform prevention behaviours) focused not only on long-term health, but on the more immediate implications for physical appearance.

A further consideration when designing health communication messages is the emotional response that people may show to health information, which has important implications for decision making and subsequent behavioural outcomes (Lipkus, 2007). Emotional reactions to health messages may act as a barrier to accurate risk perception, by diverting people’s cognitive assessments and driving risky behaviours (Loewenstein & Hsee, 2001; Naqvi, Shiv, & Bechara, 2006; Quartz, 2009). Consequently, individuals’ motivation to seek appropriate behaviour change interventions and beliefs concerning the effectiveness of interventions are compromised (McBride, Koehly, Sanderson, & Kaphingst, 2010). It is therefore necessary to examine this further.

We sought to empirically test the effects of message framing using personally-relevant health information for people with psoriasis. There were three specific research questions addressed in this study:

1. Are gain- or loss-framed messages more effective for prompting changes in behavioural intentions?

2. Are behavioural intentions driven by a desire to improve psoriasis symptoms (i.e. immediate consequences; psoriasis skin flare reduction) or reduce CVD risk (i.e. reduce long-term health risks; CVD prevention)?
(3) To what extent do differently framed health messages produce emotional responses?

We hypothesised that in people with psoriasis, gain-frame messages would be more effective than loss-frame messages for increasing health behavioural-related intentions related to smoking cessation, reducing alcohol intake, increasing physical activity and making positive dietary changes.

8.3 Methods

Participants

Participants were people with psoriasis and they were recruited via advertisements placed on a patient organisation website (the Psoriasis Association), a University intranet site, in community locations (such as local supermarkets), and through the use of social networking websites (Twitter and Facebook). The study also drew upon existing community samples of people living with psoriasis obtained for a previous study (Ref 10325), where participants had previously expressed an interest in taking part in research about psoriasis. This approach was used to maximise potential for obtaining a varied sample.

Design

A 2 (message frame: loss vs. gain) by 2 (message focus: psoriasis symptom reduction vs. CVD risk reduction) between-participants design was used. Participants (n=217) were randomly allocated to read one of four evidence-based health messages (see
Appendix A of this paper) as part of an online questionnaire. Behavioural intention was the dependent measure. Using this type of design eliminated sources of error associated with using a repeated measures design, such as practice effects and familiarity effects.

**Materials**

The health messages were constructed based on both the current research evidence, the National Institute for Health and Care Excellence (NICE) guidance for prevention of CVD (NICE, 2010), and for the assessment and management of psoriasis (NICE, 2012). The messages contained information about the benefits of lifestyle behaviour change on either psoriasis symptoms or CVD risk. Messages were specifically tailored around information about modifiable CVD risk factors associated with lifestyle behaviours: smoking/tobacco use, poor diet, being sedentary, being overweight/obese, and consuming excessive amounts of alcohol (Emberson, Whincup, Morris, Walker, & Ebrahim, 2004; Yusuf et al., 2004). The health messages used in this study are presented in Appendix A of this paper, with the key manipulations to the text displayed in parentheses. Using this methodology allows for tight experimental control, allowing the researcher to specifically identify which messages are effective for prompting behavioural change, and has been used successfully in a number of studies (e.g. French et al., 2004).
**Measures**

1. Behavioural intentions consisted of three items on a 7-point scale (1 to 7; possible range of scores 3–21) in line with recommendations from the literature (Ajzen, 1991; Francis et al., 2004). Three items were used: “I expect to reduce the amount of alcohol I drink in the next month” ranging from 1 (strongly disagree) to 7 (strongly agree); “I want to reduce the amount I drink in the next month”; and “I intend to reduce the amount I drink in the next month”. Intention score was calculated using the sum of the three items.

2. Emotional response items consisted of two items on a 10-point scale (1 to 10; possible range of scores 2–20) and were adapted from items previously used (French, Sutton, Marteau, & Kinmonth, 2004; Klein, 1997). The two items were used: “How concerned are you by reading this information?” ranging from 1 (not at all disturbed) to 10 (very disturbed), and “How worried are you by this information?” ranging from 1 (not at all worried) to 7 (very worried). Emotional response score was calculated using the sum of the two items.

3. Three items were used to measure self-efficacy and were based on those previously used in the literature (Armitage & Conner, 2001; Wright, French, Weinman, & Marteau, 2006): “How confident are you that you can stop smoking in the next month?” ranging from 1 (not at all confident) to 7 (extremely confident), “I have the ability to reduce the amount of alcohol I drink in the next month” ranging from 1 (strongly disagree) to 7 (strongly agree) and “How easy will it be for you to stop smoking in the next month” ranging from 1 (not at all easy) to 7 (very easy).
In the absence of a specific measure targeting each of the specific health behaviours, items measuring behavioural intentions and self-efficacy were adapted by changing the wording of each item depending on the target behaviour (e.g. I expect to reduce the amount of alcohol I drink in the next month, I intend to increase the amount of exercise I do in the next month). Participants were given the option of responding with ‘not applicable’ if any of the questions did not relate to them (e.g. non-smokers could skip questions about smoking).

Procedure

A flow diagram of the study procedure is presented in Figure 1. Participants were invited to complete an online questionnaire generated through the online survey tool Survey monkey. The link to the questionnaire was provided on the relevant study adverts. Participants were First asked to read the participant information sheet and consent procedure. If participants agreed to take part and completed the consent procedure, they were asked to provide demographic information (including current age, sex, ethnicity, age when diagnosed with psoriasis), current and past severity of psoriasis and a short survey about their lifestyle behaviours (smoking, alcohol intake, and current levels of exercise). Baseline characteristics are presented in Table 1.

Participants were then randomly allocated (via the Survey Monkey online random assignment software) to read one of the four conditions representing the differently framed health message. Participants then answered a series of items related to behavioural intentions to change the following health behaviours: smoking, alcohol, diet, and physical activity. At the end of the questionnaire, participants were provided with an additional lay summary of the current evidence about psoriasis,
CVD and the role of lifestyle behaviours. Links to all of the research studies or government guidelines were also provided.

Figure 1. Study flow diagram

- Number of participants recruited (n=253)
- Number of participants randomised (n=217)
- Drop-outs (n=36)
- Number of participants randomised (n=217)
- Experimental conditions:
  - Gain-frame CVD risk reduction (n=56)
  - Gain-frame Psoriasis symptom reduction (n=58)
  - Loss-frame CVD risk reduction (n=50)
  - Loss-frame Psoriasis symptom reduction (n=53)
**Table 1.** Demographics of participants randomised

<table>
<thead>
<tr>
<th>Variable</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>75 (34.5)</td>
</tr>
<tr>
<td>Female</td>
<td>126 (58.1)</td>
</tr>
<tr>
<td><strong>Age</strong> M (SD), Range</td>
<td>41.23 (14.31), 15-83</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
</tr>
<tr>
<td>White British</td>
<td>178 (82)</td>
</tr>
<tr>
<td>White Irish</td>
<td>6 (2.8)</td>
</tr>
<tr>
<td>Mixed – White/Asian</td>
<td>2 (0.9)</td>
</tr>
<tr>
<td>Asian or Asian British – Pakistani</td>
<td>1 (0.5)</td>
</tr>
<tr>
<td>Asian or Asian British - Indian</td>
<td>5 (2.3)</td>
</tr>
<tr>
<td>Melanesian</td>
<td>1 (0.5)</td>
</tr>
<tr>
<td>Mixed – Hispanic European</td>
<td>1 (0.5)</td>
</tr>
<tr>
<td>White - Dutch</td>
<td>1 (0.5)</td>
</tr>
<tr>
<td>Other White</td>
<td>1 (0.5)</td>
</tr>
<tr>
<td>White European</td>
<td>2 (0.9)</td>
</tr>
<tr>
<td>Welsh</td>
<td>1 (0.5)</td>
</tr>
<tr>
<td>Chinese</td>
<td>2 (0.9)</td>
</tr>
<tr>
<td><strong>Age of Pso diagnosis</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;16</td>
<td>71 (32.7)</td>
</tr>
<tr>
<td>16-22 (early onset)</td>
<td>54 (24.9)</td>
</tr>
<tr>
<td>23-39</td>
<td>62 (28.6)</td>
</tr>
<tr>
<td>40-57</td>
<td>19 (8.8)</td>
</tr>
<tr>
<td>57&gt; (late onset)</td>
<td>5 (2.3)</td>
</tr>
<tr>
<td><strong>Self-reported Pso severity</strong></td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>83 (38.2)</td>
</tr>
<tr>
<td>Mild to moderately severe</td>
<td>64 (29.5)</td>
</tr>
<tr>
<td>Moderately severe</td>
<td>42 (19.35)</td>
</tr>
<tr>
<td>Moderately severe to severe</td>
<td>13 (6)</td>
</tr>
<tr>
<td>Severe</td>
<td>9 (4.1)</td>
</tr>
<tr>
<td>Ever</td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>18 (8.3)</td>
</tr>
<tr>
<td>Mild to moderately severe</td>
<td>24 (11.1)</td>
</tr>
<tr>
<td>Moderately severe</td>
<td>49 (22.6)</td>
</tr>
<tr>
<td>Moderately severe to severe</td>
<td>70 (32.3)</td>
</tr>
<tr>
<td>Severe</td>
<td>49 (22.6)</td>
</tr>
<tr>
<td><strong>Diagnosis of PsoA</strong></td>
<td>40 (18.4)</td>
</tr>
<tr>
<td><strong>Smoker</strong></td>
<td></td>
</tr>
<tr>
<td>Ever</td>
<td>113 (52.1)</td>
</tr>
</tbody>
</table>
Current 42 (17)

### Meeting DOH guidelines for exercise

- **Achieve this every week**: 86 (39.6)
- **Almost there, but not quite**: 54 (24.9)
- **Around half of recommended**: 33 (15.2)
- **A long way off recommended**: 41 (18.9)

### Typical month, how often do you drink alcohol?

- **Never**: 29 (13.4)
- **Once a month or less**: 43 (19.8)
- **2 to 4 times a month**: 66 (30.4)
- **2 to 3 times a week**: 49 (22.6)
- **4 or more times a week**: 28 (12.9)

### Units of alcohol on a typical day

- **1-2**: 49 (22.6)
- **3-4**: 66 (30.4)
- **5-6**: 32 (14.7)
- **7-8**: 20 (9.2)
- **9+**: 21 (9.7)

### 6 or more units on one occasion

- **Never**: 66 (30.4)
- **Less than monthly**: 73 (33.6)
- **Monthly**: 25 (11.5)
- **Weekly**: 38 (17.5)
- **Daily or almost daily**: 9 (4.1)

---

1 The Department of Health recommends adults are moderately active for 2 and a half hours or vigorously active for 75 minutes each week. For example 30 minutes on at least 5 days a week.
Questionnaire wording was developed with the aim of being clear, unambiguous and allowing respondents to successfully answer the questions being asked (Dillman, 2000). In order to meet this essential criteria the questionnaire was piloted-tested with a small convenience sample of members of an established research user group of people affected by psoriasis. The group is trained to provide specific feedback on research studies. The pilot study helped to identify key considerations in the questionnaire process such as: how long it took to complete the questionnaire, comprehension/clarity of the items, and any potential areas of ambiguity. Based on the findings of the pilot study, modifications were made to the questionnaire where necessary.

**Analysis**

A series of 2 by 2 ANOVAs were conducted to investigate the two main effects of message frame (gain-frame-versus-loss-frame), message focus (short-term psoriasis symptom reduction versus long-term CVD risk reduction) and the interaction effects. Hierarchical multiple regression analyses were then conducted to investigate the predictors of behavioural intentions.

**8.4 Results**

Two hundred and fifty three participants were recruited into the study, with two hundred and seventeen randomised to one of the four conditions. A recruitment flow diagram is presented in Figure 1, and participant baseline demographics are presented in Table 1. Descriptive statistics of mean scores for the primary outcome
measure (behavioural intentions) and secondary outcome measure (emotional response) are presented in Table 2. Due to the low numbers of smokers included across the four condition (n=42 in total) it was deemed appropriate to exclude behavioural intentions related to the smoking in the final analysis.

A series of two-way between groups analysis of variance tests (ANOVAs) were conducted to explore the impact of message frame and message focus on behavioural intentions. Results are presented in Table 3. Results will be now presented in detail according to each outcome measure.
Table 2. Descriptive statistics for all primary and secondary outcome variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Gain-Frame</th>
<th>Loss-Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
</tr>
<tr>
<td></td>
<td>Psoriasis symptom reduction</td>
<td>CVD risk reduction</td>
</tr>
<tr>
<td></td>
<td>$(n=56)$</td>
<td>$(n=56)$</td>
</tr>
<tr>
<td>Behavioural intentions</td>
<td>10.56 (6.30)</td>
<td>9.60 (5.33)</td>
</tr>
<tr>
<td>(Alcohol)</td>
<td>10.00 (5.74)</td>
<td>7.24 (4.56)</td>
</tr>
<tr>
<td></td>
<td>10.35 (5.15)</td>
<td>9.15 (5.13)</td>
</tr>
<tr>
<td>Behavioural intentions</td>
<td>13.21 (5.37)</td>
<td>13.23 (5.55)</td>
</tr>
<tr>
<td>(Diet)</td>
<td>13.22 (5.45)</td>
<td>12.63 (6.04)</td>
</tr>
<tr>
<td></td>
<td>14.22 (5.78)</td>
<td>13.53 (5.91)</td>
</tr>
<tr>
<td>Behavioural intentions</td>
<td>13.87 (5.27)</td>
<td>13.62 (5.71)</td>
</tr>
<tr>
<td>(Exercise)</td>
<td>13.73 (5.50)</td>
<td>12.97 (5.19)</td>
</tr>
<tr>
<td></td>
<td>14.43 (4.89)</td>
<td>13.80 (5.04)</td>
</tr>
<tr>
<td>Emotional response to information</td>
<td>8.13 (4.46)</td>
<td>8.47 (5.34)</td>
</tr>
<tr>
<td></td>
<td>8.32 (4.95)</td>
<td>7.00 (5.10)</td>
</tr>
<tr>
<td></td>
<td>10.16 (4.91)</td>
<td>8.76 (5.21)</td>
</tr>
</tbody>
</table>
Table 3. Results of ANOVA examining effects of message framing and message focus on behavioural intentions and emotional responses to health messages.

<table>
<thead>
<tr>
<th>Effect</th>
<th>d.f.</th>
<th>F</th>
<th>P</th>
<th>Partial n²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol intention</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Message Frame</td>
<td>1</td>
<td>2.081</td>
<td>.151</td>
<td>.013</td>
</tr>
<tr>
<td>Message Focus</td>
<td>1</td>
<td>1.453</td>
<td>.230</td>
<td>.009</td>
</tr>
<tr>
<td>Message Frame X Message focus interaction</td>
<td>1</td>
<td>5.241</td>
<td>.023*</td>
<td>.032</td>
</tr>
<tr>
<td>Diet intention</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Message Frame</td>
<td>1</td>
<td>1.960</td>
<td>.804</td>
<td>.000</td>
</tr>
<tr>
<td>Message Focus</td>
<td>1</td>
<td>.966</td>
<td>.327</td>
<td>.005</td>
</tr>
<tr>
<td>Message Frame X Message focus interaction</td>
<td>1</td>
<td>.903</td>
<td>.343</td>
<td>.005</td>
</tr>
<tr>
<td>Exercise intention</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Message Frame</td>
<td>1</td>
<td>.003</td>
<td>.956</td>
<td>.000</td>
</tr>
<tr>
<td>Message Focus</td>
<td>1</td>
<td>.619</td>
<td>.432</td>
<td>.003</td>
</tr>
<tr>
<td>Message Frame X Message focus interaction</td>
<td>1</td>
<td>1.232</td>
<td>.268</td>
<td>.006</td>
</tr>
<tr>
<td>Emotional Response</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Message Frame</td>
<td>1</td>
<td>.145</td>
<td>.704</td>
<td>.001</td>
</tr>
<tr>
<td>Message Focus</td>
<td>1</td>
<td>5.743</td>
<td>.018*</td>
<td>.029</td>
</tr>
<tr>
<td>Message Frame X Message focus interaction</td>
<td>1</td>
<td>3.752</td>
<td>.054</td>
<td>.019</td>
</tr>
</tbody>
</table>

*Significant at the p < .05 level
Alcohol behavioural intentions

There was a significant message frame by message focus interaction effect \([F(1, 159)=5.24, p=.023]\). This indicates that when presented with different messages there is a difference in reported behavioural intentions based on the message frame and focus. When presented with information about psoriasis symptom reduction reported behavioural intentions were higher in the gain-frame condition \((M = 10.56, SD = 6.30)\) compared to the loss-frame condition \((M = 7.24, SD = 4.56)\). However, when presented with information about CVD risk reduction reported behavioural intentions were higher in the loss-frame condition \((M = 10.35, SD = 5.15)\) compared to the gain-frame condition \((M = 9.60, SD = 5.33)\). However findings must be taken with caution due to the small effect size (partial eta squared= .03).

The main effects for message frame \([F(1, 159)=2.08, p=.15]\) and message focus \([F(1, 159)=1.45, p=.23]\) did not reach statistical significance.

Diet behavioural intentions

Neither of the main effects were statistically significant [message frame: F(1, 193)=.06, p=.80; message focus: F(1, 193)=.97, p=.33], nor was the interaction effect \([F(1, 193)=.90, p=.34]\).
Exercise behavioural intentions

Neither of the main effects were statistically significant [message frame: F(1, 193)=.00, p=.96; message focus: F(1, 193)=.62, p=.43], nor was the interaction effect [F(1, 193)=1.23, p=.27].

Emotional response

There was a significant main effect for message focus [F(1, 193)=5.74, p=.02]; however, the effect size was small (partial eta squared=.03). The main effect for message frame was not statistically significant [F(1, 193)=.15, p=.70], neither was the interaction effect [F(1, 193)=3.75, p=.05].

Multiple Regression analyses

To examine predictors of behavioural intentions we conducted multiple regression analyses. Results are presented in Table 4 (intentions to reduce alcohol intake), Table 5 (intentions to improve diet) and Table 6 (intentions to increase exercise). A hierarchical multiple regression was chosen in order to specify the particular order that variables were entered into the model. This was to control for the potential effects of covariates and to test the effects of predictors independent of other variables.

At step 1 demographic variables (age and sex) and self-efficacy were added. At step 2 message frame (gain vs. loss), message focus (psoriasis vs. CVD message) and the
frame x focus interaction term were added. At step 3 risk category (according to current health behaviour profile; high vs. low) was added.

_Alcohol_

At step 1 neither age, sex or self-efficacy was an independent predictor of intentions to reduce alcohol consumption. At step 2 the addition of message frame ($\beta=-6.36, p=.03$) and the frame x focus interaction ($\beta=.784, p=.04$) significantly explained an additional 3.8% of the variance. This indicates that first gain-framed messages resulted in higher behavioural intentions. Second, for messages about psoriasis symptom reduction, gain-framed messages resulted in higher behavioural intentions, and for messages about CVD risk reduction loss-framed messages resulted in higher behavioural intentions. Message focus alone did not significantly contribute to the variance. In the final regression model (step 3) the addition of risk category ($\beta=.290, p<.01$) significantly explained an additional 7.5% of the variance, indicating that participants identified as high risk (according to self-reported current alcohol intake) reported higher behavioural intentions ($M = 11.29, SD = 5.40$) to reduce alcohol compared to those identified as low risk ($M = 8.44, SD = 5.32$). Message frame ($\beta=-6.08, p=.03$) and the frame x focus interaction ($\beta=.722, p=.05$) remained significant in the final model.
<table>
<thead>
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*Significant at the <0.05 level
Table 5. Regression model for continuous (age and self-efficacy) and categorical variables on diet behavioural intentions

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*Based on n=36
**Table 6.** Regression model for continuous (age and self-efficacy) and categorical variables on *exercise* behavioural intentions

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*Significant at the <0.05 level
**Diet**

At step 1, neither age, sex or self-efficacy was an independent predictor of intentions to improve participants’ diet. At step 2, the addition of message frame, message focus and frame x focus interaction explained an additional .9% of the variance however none of the predictors was significant. At step 3, the addition of risk category (according to self-reported BMI) explained a further 7.5% of the variance however none of the predictors was significant.

**Exercise**

At step 1, both age (\(\beta=-1.77, p<.01\)) and self-efficacy (\(\beta=.587, p<.001\)) were independent predictors of intentions to increase physical activity levels and explained 39.7% of the variance, indicating that participants of lower age reported higher behavioural intentions, and those with higher self-efficacy report higher behavioural intentions. At step 2 neither the addition of message frame, message focus or frame x focus interaction significantly added to the variance. Both age (\(\beta=-1.75, p<.01\)) and self-efficacy (\(\beta=.586, p<.001\)) remained significant and a further 0.5% of the variance was significantly accounted for. In the final regression model (step 3), the addition of risk category (\(\beta=-.231, p<.001\)) significantly explained an additional 5.2% of the variance, indicating that participants identified as high risk (according to self-reported exercise levels if not meeting public health guidelines) reported higher intentions (\(M = 14.22, SD = 5.20\)) to reduce alcohol compared to those identified as low risk (\(M = 12.49, SD = 5.34\)).
8.5 Discussion

This experimental study examined the effects of message framing on reported intentions to modify health behaviours in people with psoriasis. There are three important findings from this study. First, we found that message effectiveness about the benefits of reducing alcohol intake is dependent on how the message is constructed. Messages which focused on reducing short-term psoriasis symptoms, gain-framed messages were more effective than loss-framed messages in increasing behavioural intentions. When presented with information about long-term CVD risk reduction, loss-framed messages were more effective than gain-framed messages in increasing behavioural intentions.

Second, there was a significant effect for message focus (psoriasis symptom reduction compared to CVD risk reduction) on emotional responses to information. Messages about CVD produced a higher emotional response compared to messages about psoriasis symptom reduction.

Third, risk category was a significant predictor of increased intentions for both alcohol reduction and increasing exercise. That is, people identified as high risk according to their alcohol consumption or not meeting guidelines for recommended activity reported higher intentions.

Taken together, the findings suggest that message framing can play an important role in more effective communication of messages about healthy living, specifically in relation to alcohol consumption. Targeting people with psoriasis who are at risk due current unhealthy lifestyle patterns also appears to one strategy for encouraging behaviour change.
Comparison with existing literature

Consistent with previous reviews (Gallagher & Updegraff, 2012; O'Keefe & Jensen, 2007), we found an advantage of using gain-framed (compared to loss-framed) messages for prevention behaviours, in the context of immediate health benefits (psoriasis improvement). This is also consistent with message framing theory which states that gain-framed messages are more effective than loss-frame messages for encouraging disease prevention behaviours (Rothman et al., 1999). However this was limited to behavioural intentions to reduce alcohol intake only. There was no consistent message framing effect across individuals for intentions to increase exercise or improve diet, suggesting that message framing may only be applicable for health messages aimed at people with psoriasis that focus on alcohol reduction.

Our study suggests that loss-framed messages may be effective in situations beyond detection behaviours (such as messages about breast cancer screening) as previously suggested (O'Keefe & Jensen, 2009; Rothman et al., 1999). Loss-framed messages promoting healthy living were more effective than gain-framed in the context of CVD risk reduction information.

There is a body of evidence suggesting people demonstrate emotional responses to health risk information, which may result in non-systematic decisions and drive risky behaviours (Loewenstein & Hsee, 2001; Quartz, 2009). In the present study we found evidence of a heightened emotional reaction to the health messages. Messages about CVD risk produced a higher emotional response than messages about psoriasis symptom reduction. Interestingly a loss-framed CVD message resulted in higher reported behavioural intentions to reduce alcohol, compared to a gain-framed CVD message. This suggests that for alcohol reduction, messages high in emotional
arousal when framed in a certain way can still result in increased behavioural intentions.

One hypothesis concerning the lack of significant effects observed in terms of increasing behavioural intentions beyond alcohol reduction, may be due to the perceived threatening nature of the health risk information being presented. Self-affirmation theory (Steele, 1988) states that people respond defensively to threatening information, due to a desire to maintain a sense of self-integrity. Information that disrupts this perception may therefore be ignored. Self-affirmation techniques, such as asking participants to write about their important traits (Cohen, Aronson, & Steele, 2000), have been used to target specific health behaviours such as smoking cessation (Armitage, Harris, Hepton, & Napper, 2008) and increasing physical activity (Peterson et al., 2012) by increasing message acceptance and perceived threat following the presentation of a health message. Whilst research examining the use of self-affirmation in facilitating risk information is relatively new, the evidence thus far suggests this may be a way of reducing the defensive responses often associated with threatening health risk information. However, when using self-affirmation techniques, it is important to consider the target population and use techniques that have previously been applied in such populations (Mancuso et al., 2012). Given the paucity of research in the context of health communication in people with psoriasis, future studies must extend the current work by adding self-affirmation to examine the effects on behavioural intentions.

Another possible explanation for the findings may be to do with the tools used to assess the intentions and the emotional response to the health information. The items may not have been sufficiently sensitive to identify a change in behavioural
intentions or emotional response with this psoriasis population and sample size. Psoriasis-specific measures that consider the psychological impact of living with psoriasis and how this may affect considerations around behavioural change may be one avenue for future research in this area.

**Strengths and limitations**

The strength of this study is the method of random allocation used to assign participants to read differently framed health messages, allowing us to examine message framing effects and identify the most effective messages in terms of increasing behavioural intentions. Second, this study was based on a ‘real’ health issue due to the strong evidence linking poor lifestyle to a number of poor disease outcomes, compared to the hypothetical risk scenarios in previous studies relating CVD risk communication (Waldron et al., 2011).

There are several limitations that must be considered. Special circumstances may have affected participants’ responses (such as participants being pregnant, or participants already having a healthy diet). People could also have already decided to make behavioural changes before being recruited into the study. So it is difficult to ascertain whether increased rating of behavioural intentions is due to the message presentation alone or to other influences. However the wording of the questions attempted to overcome this (e.g. ‘in a typical week/month’). Without a randomised controlled study (with a pre- and post-design) including a control condition it may be more difficult to form concrete conclusions. The cross-sectional nature of the study makes it difficult to assess whether behavioural changes occur at different times.
throughout the year (for example people may be more inclined to eat more during December, and reduce their alcohol consumption in January).

In summary, this is the first study to examine health risk communication in people with psoriasis. Our findings suggest that when developing person-tailored health messages it is important to consider both the health behaviour being targeted and the message-frame used. Future studies would benefit from further examining the effects of message framing and particularly finding ways of increasing effectiveness of messages in encouraging changes in behavioural intentions, and subsequent behaviour, beyond the effects observed for alcohol reduction in the present study. CVD represents a significant health risk for people who psoriasis who are known to engage in high levels of behaviours traditionally associated with increased CVD risk. Finding new ways of communicating this information could be a useful direction for future health communication research.
8.6 References


Appendix A: Health messages randomly assigned to participants

Scenario 1: Gain-frame / CVD risk reduction:

Research shows that risk factors for cardiovascular disease include smoking, having a poor diet, having insufficient physical activity, and drinking excessive amounts of alcohol. By making changes to your lifestyle, you [lower] your risk of cardiovascular disease.

Scenario 2: Loss-frame / CVD risk reduction:

Research shows that risk factors for cardiovascular disease include smoking, having a poor diet, having insufficient physical activity, and drinking excessive amounts of alcohol. By [not] making changes to your lifestyle, you [increase] your risk of cardiovascular disease.

Scenario 3: Gain-frame / psoriasis symptom reduction:

Research shows that living an unhealthy lifestyle such as smoking, having a poor diet, having insufficient physical activity, and drinking excessive amounts of alcohol may contribute to skin flare-ups. By making changes to your lifestyle, you [increase] the likelihood of having fewer psoriasis flare-ups and healthier looking skin.

Scenario 4: Loss-frame / psoriasis symptom reduction:

Research shows that living an unhealthy lifestyle such as smoking, having a poor diet, having insufficient physical activity, and drinking excessive amounts of alcohol may contribute to skin flare-ups. By [not] making changes to your lifestyle, you [reduce] the likelihood of having fewer psoriasis flare-up and healthier looking skin.
Section Four Summary

The studies presented in Section Four aimed to examine risk communication in the context of an exemplar health threat (cardiovascular disease) for people with psoriasis. Current methods of CVD risk communication used by healthcare professionals were examined, as well as new theory-based strategies of communicating information about risk.

Chapter seven provided insights into how information about CVD risk is given to patients. The study found that numerical information (such as percentages) and verbal descriptors are used to communicate CVD risk information. Whilst practitioners appear to be using person-specific information (rather than general information), discussion was often limited to instructional statements, rather than a collaborative discussion about how to reduce CVD risk. Importantly, there was little evidence of supportive interventions in the form of discussions about lifestyle behavioural CVD risk factors (smoking, alcohol consumption, physical activity, and diet), particularly linking CVD risk information to specific advice about risk reduction.

New ways of communicating CVD risk information was the focus of Chapter 8. This study aimed to examine the effects of message framing on reported intentions to modify health behaviours. There are three key findings. First, message effectiveness about the benefits of reducing alcohol intake is dependent on how the message is constructed. Gain- (positively) framed messages are more effective in increasing behavioural intentions following information about psoriasis, where loss- (negatively) framed messages are more effective for CVD risk information. Second, messages about CVD produced a higher emotional response compared to messages
about psoriasis symptom reduction. Third, risk category was a significant predictor of increased BIs for both alcohol reduction and increasing exercise. That is, people identified as high risk according reported higher BIs. Taken together, Chapters 4 and 5 provide important insights into how CVD risk information is currently discussed with patients, and how theory-based messages can be used to encourage behavioural change.
Section Five Introduction

This section outlines the contribution of the thesis studies to the literature. It summarises the key findings from each of studies and outlines the key strengths and limitations. It also discusses the implications of the studies’ main findings and presents recommendations for future research.
Chapter 9. Contribution of thesis studies to the literature (thesis sub-section)

The programme of research presented within this thesis aimed to examine health risk communication in the context of people with psoriasis. There were two over-arching aims. First, to investigate the current level of health risk communication relating to aspects of lifestyle behaviour change and cardiovascular disease risk communication in the context of people with psoriasis. Second, to examine new ways of communicating health risks focused on encouraging healthier living for people with psoriasis. To recap, the studies that make up this PhD are presented in Figure 1.

Figure 1. The four studies included in this programme of research.
The narrative review of the literature (Chapter 1) highlighted a body of evidence suggesting that people with psoriasis engage in a high number of problematic lifestyle behaviours associated with unhealthy living. Whether health information-giving is part of patient management strategies as part of health risk communication in the context of psoriasis could not be confirmed from the literature reviewed. Further, there is an abundance of research examining the most effective risk communication strategies which focus on modifying risk through behaviour change. This is both generally and within the context of psoriasis. The majority of research was based either on other fields (such as risks of medication side effects) or studies examining a hypothetical (non-personal) health risk. There is overwhelming evidence that unhealthy lifestyle is a health risk for people with psoriasis. Yet studies examining personally-relevant risk communication strategies aimed at people with psoriasis are currently absent in the literature and highlights a need for empirical testing.

The critique of mixed methodology (Chapter 3) presented a rationale for using mixed methods approaches to risk communication research in the context of psoriasis. A number of successful applications of mixed methods approaches from other research fields were presented. The review concluded that mixed methods studies were currently lacking in the investigation of risk communication in the context of psoriasis and could extend understanding of the area. Using this approach enabled the examination of two key areas: (1) the process of health risk communication in the context of people with psoriasis, and (2) new ways of providing health risk information in terms of encouraging disease prevention behaviour.
Four subsequent chapters presented four studies, each in the format of a journal article. The first study (Chapter 5) examined the extent to which healthcare professionals’ core training includes skills relating to lifestyle behaviour change (LBC). The second study (Chapter 6) examined the current level of LBC signposting (such as leaflets or posters about healthy living) for patients with psoriasis in key health settings. The third study (Chapter 7) examined how healthcare professionals communicate information about CVD risk and the role of LBC in reducing risk in the context of primary care risk assessments with people with psoriasis. The fourth study (Chapter 8) examined health risk communication with an experimental approach using message framing as a theoretical framework and behavioural intentions as the primary outcome.

9.1 Summary of key findings

Taken together, the results of this programme of research suggest that health risk communication, particularly issues around helping patients understand the link between lifestyle behaviour change and health outcomes, is under-recognised as part of managing psoriasis. The findings suggest new ways that methods of health risk communication can be developed, optimised and used to encourage people with psoriasis to adopt healthy lifestyles. The key findings of each study are discussed below.

The first study (Chapter 5) found that explicit competencies for skills relating to behaviour change and health information-giving were often lacking in post-qualification U.K. training curricula for healthcare professionals across General Practice and Dermatology. In addition, there was little or no reference to recognised
behaviour change techniques. Compared to an existing LBC framework (National Health Service (NHS) Yorkshire and the Humber, 2010), there was no emphasis on skills related to providing long-term support and facilitating LBC with patients. This suggests a need to develop the curricula to incorporate specific emphasis on the necessary knowledge and skills to provide appropriate support to patients in relation to LBC.

Public Health guidelines for the assessment and management of psoriasis recommend that healthcare professionals discuss CVD risk and risk reduction with patients (National Institute for Health and Care Excellence, 2012). Thus the curricula would be improved by including competencies that encompass LBC knowledge and skills that are well established in the health psychology literature (Michie, Ashford, et al., 2011; Michie et al., 2008). Interventions focusing on LBC delivered in primary care settings are particularly important for primary and secondary CVD prevention (Taylor, Shaw, Dale, & French, 2011). This study suggests that core competencies and training outcomes related to LBC, which healthcare professionals report as being too generalised and lacking specificity (Chisholm, Mann, Peters, & Hart, 2013), would benefit from being more precisely defined with clearer expectations and learning outcomes relating to the provision and facilitation of LBC support with patients with psoriasis. This would ensure that issues related to healthy living are given the appropriate recognition in the context of psoriasis management.

Three key findings emerged from the second study (Chapter 6). First, and consistent with study one, there was no evidence of attempts to promote healthy living as central to the management of psoriasis through the provision of psoriasis-specific information. Second, generic healthy living information was often of poor quality
and was poorly displayed and did not conform to existing recommendations for effective health information-giving including signposting. Finally, patient leaflets and posters failed to draw on theoretical approaches to the delivery of healthcare information, such as principles related to choice architecture. Specifically, the content of patient information must be informed by appropriate theories around behaviour change communication by targeting the factors most likely to increase change. Further, how information is displayed in the environment would benefit from embracing known principles around choice architecture.

Environmental factors are increasingly important in shaping behaviour (Kremers, Eves, & Andersen, 2012; Marteau, Ogilvie, Roland, Suhrcke, & Kelly, 2011; Michie, van Stralen, & West, 2011) and as a result becoming more prominent in public health policy concerning ways of encouraging healthy living (Behavioural Insights Team, 2010; Department of Health, 2010). Choice architecture (shaping the environment in subtle ways to encourage healthier behavioural choices) provides a theoretical basis for the effective delivery of behaviour change messages and interventions have been shown to be successful in encouraging a range of behaviours such as healthier food choices and increasing physical activity (Eves, Olander, Nicoll, Puig-Ribera, & Griffin, 2009; Rozin et al., 2011). However research conducted within the immediate healthcare environment, such as patient waiting areas, is sparse. Waiting areas are a prime location for presenting patients with information about LBC at the time when it is likely to be most salient, and providing patients with information in the waiting room can prime them for a discussion about healthy living with their healthcare professional (Kreuter, Chheda, & Bull, 2000; McPhail & Schippers, 2012). Findings from study two suggest there may be opportunities to promote and encourage LBC in an environment where patients have the time to read and assimilate information.
Using theoretical approaches in the design and delivery of behaviour change information could be a cost effective way of making information more accessible and understandable for people with psoriasis. From an information processing approach, choice architecture provides the framework to direct people’s attention to important health information.

The key findings from the third study (Chapter 7) were as follows. First, numerical information was used to communicate risk, but only when accompanied by verbal descriptors of risk (such as ‘your risk is 105, which is very high’). Second, whilst practitioners appear to be using person-specific information (such as ‘your blood pressure is high’) discussion was mostly instructional (telling the patient to make dietary changes), rather than a shared collaborative discussion about behaviour change and risk reduction. Finally, healthcare professionals rarely discussed behavioural risk factors associated with CVD or the link with psoriasis in the consultations. Interpretation of risk information (e.g. telling patients they have high blood pressure) was rarely linked to specific advice about how to modify each risk factor (e.g. reduce salt intake or increase exercise) and this constituted a missed opportunity for change during a timely ‘teachable moment’ (Cohen, Clark, Lawson, Casucci & Flocke, 2011). In order to facilitate patients’ understanding of risk and how to reduce risk, specific advice regarding risk modification should be more consistently linked with interpretations of risk.

Risk communication about CVD is a developing area of research, yet the studies that have been conducted suggest there may be a gap between clinical guidelines for communicating CVD risk and those used in practice. In an earlier study examining how primary care practitioners communicate information to patients identified as
being at CVD risk (Neuner-Jehle, Senn, Wegwarth, Rosemann, & Steurer, 2011) the authors concluded that recommendations for communicating CVD risk were not always adhered to. Guidelines encourage the use of an absolute, numerical risk score as a percentage (such as using tools as Framingham Risk Equation or QRisk). However Neuner-Jehle et al.(2011) found that practitioners used verbal descriptors more frequently than visual and numerical methods. The findings of the present research are also consistent with this finding. Provision of numerical information alone about CVD risk was absent in the risk assessments. Numerical information was used by practitioners when discussing risk factors, but was only used with accompanying verbal information (e.g. ‘your risk is 1%, which is low’). This research illustrates a gap between clinical guidelines and practice, and suggests a need to examine why practitioners are not adhering to guidelines for communicating information about CVD risk.

In the broader field of risk communication, there are a number of studies examining perceived risk of medicine side effects. These studies consistently show that verbal descriptors of risk (e.g. ‘common, ‘high’) result in patients over-estimating risk magnitude (Berry, Raynor, Knapp, & Bersellini, 2004; Knapp, Raynor, & Berry, 2004; Knapp et al., 2009). This finding is also supported by a recent systematic review which showed that verbal descriptors, rather than numerical information led to an overestimation of the probability of adverse medication effects (Buchter, Fechtelpeter, Knelangen, Ehrlich, & Waltering, 2014). Over-estimation of risk can have detrimental effects on subsequent behaviour such as reducing the likelihood of taking medicines as prescribed. Further research must aim to examine this further in the context of CVD risk communication. Applying a psychological framework to understanding risk communication methods will enable researchers to highlight
systematic biases in perception. More effective ways of communicating information about CVD risk would attempt to reduce such biases and lead to a more informed understanding of personal health threats, as well as specific ways of reducing risk through lifestyle modification.

There were several key findings from the fourth study (Chapter 8). Whilst the study found no significant effects for message frame on BIs for increasing exercise, stopping smoking and improving diet, the study revealed some important findings in relating to intentions to reduce alcohol consumption. For messages about psoriasis symptom reduction, gain-framed messages were more effective in increasing BIs for alcohol reduction. Conversely, for messages about CVD risk reduction, loss-framed messages were more effective for increasing BIs to reduce alcohol consumption. In the case of exercise levels and alcohol consumption, risk category was a significant predictor of BIs, suggesting that targeting people with psoriasis who are at risk due to lower activity levels or higher alcohol consumption could be a useful strategy for encouraging behaviour change. Message framing can therefore play an important role in more effective communication of messages about healthy living, specifically in relation to alcohol consumption.

Interestingly, there was an additional significant effect of message focus on participants’ emotional response to risk information. Messages focused on CVD risk produced a higher emotional response (relating to concern and worry as a result of reading information presented) compared to messages focused on psoriasis symptom reduction. This is an important implication to consider when designing health messages, as peoples’ perceptions and emotional responses to health messages may affect the likelihood of intention to change behaviours. The psychological burden of
psoriasis is well recognised in the literature, with people showing high levels of distress and anxiety (Singhal, Ross, Seminog, Hawton, & Goldacre, 2014; Richards, Fortune, Griffiths & Main, 2001) which may also be involved in the processing of risk information.

More generally, peoples’ emotional reactions to decision making may often divert people’s assessments of risk information and drive risky behaviours (Loewenstein & Hsee, 2001; Naqvi, Shiv, & Bechara, 2006; Quartz, 2009), resulting in unsystematic decision making (Keysar, Hayakawa, & An, 2012). This study showed that when presenting participants with information related to CVD, this produces a higher emotional response compared to messages about improving psoriasis symptoms. Adopting a psychological framework in risk communication strategies allows for a deeper understanding of how health messages are perceived. Subsequently health messages can be developed that consider such psychological responses which can lead to risk reduction through lifestyle modification. Future research must aim to build on this in order to understand more about how people react to health messages. This is important for two reasons, to improve the outcomes of the specific long-term conditions (in this case of psoriasis) or reduce risks of additional co-morbidities.

9.2 Key strengths and limitations of the studies

The body of work presented identifies the need for healthcare professionals to support patients to understand the links between lifestyle behaviours, their impact upon their symptoms, and their role in reducing risk factors for other conditions including CVD. The key strength of applying a psychological framework to this research is in both understanding how healthcare professionals can engage patients in
discussions about lifestyle behaviour change, but also to understand how people
process and understand health information.

This work has both strengths and limitations. In terms of healthcare professional
training competencies examined in study one (Chapter 5) topics around lifestyle
management may be covered in sufficient depth during undergraduate training where
students develop the skills required for clinical practice (Kalet et al., 2010). However
until further studies examine the content of undergraduate training curricula firm
conclusions cannot be made about this. Further work must also examine the
effectiveness of techniques used by practitioners to change patients’ lifestyle, even if
they are taught at undergraduate level.

In examining lifestyle behaviour change signposting using observational methods
(Chapter 6) the researcher were able to gain first-hand experience of the information
available to patients. However, due to the cross-sectional nature of the study, health
information-giving strategies across different time points were unable to be
examined. It could be possible that there was more focus on specific health
information giving strategies at different points in the year (for example alcohol
reduction in January, increasing the amount of exercise in summer months). Further,
it was only possible to opportunistically ask practitioners (GPs/nurses) about
strategies they used for health information-giving during face-to-face contact with
patients (for example provision of information leaflets or signposting to suitable
internet resources such as patient.co.uk). Future studies must therefore aim to
conduct in-depth examinations (for example though qualitative research) of how
practitioners distribute health information to patients.
Chapter 7 on risk communication techniques used by primary care practitioners in the context of CVD risk assessments with patients with psoriasis provided important insights into methods used in current practice. One of the key strengths of this study was the use of a personally-relevant health threat rather than a hypothetical scenario. Although healthcare professionals were asked to conduct the risk assessments according to routine practice, they may have perceived the aim of the research was to collect information about risk factors only. They may have consequently avoided engaging in discussions about risk reduction, and using the assessment as an opportunity to support patients in making positive behavioural changes.

Experimentally testing new ways of providing important health-related information to patients with psoriasis was the focus of study four (Chapter 8). This was the first study to investigate the effects of these variables in an experimental study of message framing for people with psoriasis. The randomised approach to this study was a key strength which allowed identification of the most effective health messages for increasing behavioural intentions related to key health behaviours in the management of psoriasis. However, as with other studies of a cross-sectional nature, the study unable to examine whether behavioural intentions change at different times throughout the year. For example people may be more inclined to eat more during December, and reduce their alcohol consumption in January. Further, people’s own circumstances may have affected their responses to the questionnaire (such as being pregnant or already having a healthy diet) and may have skewed the results. It could also be that people have already decided to make behavioural changes before being recruited into the study, making it difficult to ascertain whether increased rating of behavioural intentions is due to the message presentation alone. A randomised
controlled study (with a pre and post design) including a control condition may help to formulate more concrete conclusions.

9.3 Implications for policy and practice

Risk communication strategies aimed at people with psoriasis would benefit from several improvements. This includes developing more explicit healthcare professional training competencies that recognise health behaviour change support as a key aspect of patient management. Specifically, by ensuring that healthcare professionals responsible for managing patients with psoriasis are equipped with the necessary knowledge and skills to support patients with lifestyle changes such as weight loss, alcohol reduction, smoking cessation and increasing physical activity. Incorporating evidence-based behaviour change techniques is one way of developing training policies that include specific ways of supporting behaviour change with patients (Michie et al., 2013). This may include engaging patients in discussions about behaviour change whereby a series of small goals or an action plan is agreed with the patient (Michie et al., 2013). There is a growing evidence base around the effectiveness of these techniques which may be a way of equipping healthcare professionals with the necessarily tools to facilitate more effective discussions about behaviour change.

Information about health risks must be tailored in order to ensure relevance and salience for patients in order to give them personally-relevant advice about risk reduction. Evidence from the field of health psychology can be used to inform the development of patient information about behaviour change and risk reduction. This is particularly true for psoriasis-specific information where there is a clear need for
more information in relation to behaviour change. Where and how such information is provided to patients is an important consideration. The environment is recognised as an important determinant of behaviour both in the literature (Michie, van Stralen, et al., 2011) and in public health guidelines (Behavioural Insights Team, 2010). Yet it seems that in the health centre environment there is no attempt to incorporate such guidelines into patient information displays.

There may be a paradoxical effect in that poor displays actually downgrade the perceived message importance in the eyes of the waiting patients, making behaviour change messages even less likely to succeed. Thus, poor displays could result in worse outcomes than those areas with no information at all.

There are opportunities to provide patients with psoriasis, and indeed patients generally, with more high quality, effective information about healthy lifestyles. The patient waiting area is potentially an ideally placed location to intervene and ‘nudge’ patients to consider lifestyle changes.

Ensuring patients understand their own health risks, and how best to reduce them, should form part of collaborative, two-way discussions about behaviour change and risk reduction. Discussions during the consultation should move beyond information giving to increasing patients’ motivation to change their lifestyle (Ahmed, Naik, Willoughby, & Edwards, 2012; Waldron, van der Weijden, Ludt, Gallacher, & Elwyn, 2011). The healthcare professional-patient consultation provides the ideal opportunity to do so. The research presented in this thesis suggests that CVD risk assessments may be an ideal opportunity for healthcare professionals to engage patients in discussions about reducing health risk factors associated with CVD and
other long-term conditions. This is particularly important in the context of psoriasis, due to the known associated of the condition with CVD.

The experimental work presented in this thesis suggests that evidence-based health messages can be used to encourage behaviour change in specific groups. Targeting people with psoriasis who are at risk due to lower activity levels or higher alcohol consumption appears to one strategy for encouraging behaviour change. This results in three important stages that should inform risk communication strategies. It allows patients to understand their own health risk, what the risk means in relation to psoriasis and importantly how patients can reduce their risk.

Patient management strategies must therefore involve a multi-faceted approach. This involves not only aspects of disease management through appropriate treatments but also considering the psychological mechanisms involved in behaviour change. How people process and understand health information, as well as the drivers of behaviour change should be important considerations as part of risk communication. Clinicians have a key role to play in terms of identification of relevant health risks in patients. The key role of health psychologists is to use theoretical insights in developing risk reduction strategies.

**9.4 Future research**

Communicating complex health information to patients with psoriasis is a key part of both the healthcare professional role and for public health strategies generally. Future research should aim to build on the findings of the present PhD programme of research by identifying the most effective ways of informing people about their health risks. This would facilitate patient understanding and empower patients to
make the appropriate lifestyle modifications to reduce that risk. Based on the research conducted, there are four related areas for future research to build on.

First, research must aim to build on current understanding of the healthcare professional role and perceived responsibility in delivering and supporting patients with aspects of healthy living. Specifically this includes examining healthcare professionals’ perceptions of role responsibility relating to LBC and risk communication. This is particularly important given the lack of recognition about who is best placed to support patients in this activity. Recent work suggests that practitioners recognise the importance of healthy lifestyle in the management of psoriasis but currently fail to identify a role for themselves in supporting behaviour change (Nelson et al., 2014). Establishing clearer guidelines in term of training competencies relating to LBC may be the first step. Identifying optimal ways of transferring these skills into clinical practice is the challenge of future research.

Second, in terms of patient information around health behaviour change, future research must embrace evidence from health psychology and health literacy to inform the development of evidence-based high quality patient materials. There is a clear lack of psoriasis-specific patient information resources (such as patient information leaflets). Future research should aim to develop effective, understandable health information in the context of managing psoriasis. For example, priming patients with well designed, evidence based materials in the waiting area and then following up in clinic may be one way in which healthcare professionals can take advantage of the time patients frequently spend in waiting areas (Kreuter et al., 2000; McPhail & Schippers, 2012). Given the increasing importance of environmental factors in shaping behaviour (Behavioural Insights Team, 2010;
future research should also explore how specific environmental cues can be best used to facilitate and prompt behavioural change. This could include applying what is currently known about restructuring environments (such as the positive results in relation to consumer behaviour in supermarkets and food choice in canteens) to healthcare settings which currently have received little or no attention.

Third, the provision of information about individual health risks is important in the context of CVD risk assessment for patients with psoriasis. Future research should examine whether such discussions increase the likelihood of behavioural change. Indeed further work must examine whether healthcare professionals perceive the risk assessment as an opportunity to provide such advice. Recent CVD risk communication guidelines state that healthcare professionals should provide appropriate risk information to patients (Boon et al., 2014). However, research suggests that opportunities to support behaviour change and discuss risk reduction are sometimes missed (Nelson et al., 2015). More work in the context of medical consultations where information about CVD risk is likely to be discussed would serve to enhance the findings in the present research.

Fourth, the evidence base around communicating personally-relevant health information is currently underdeveloped, particularly regarding evidence-based health messages. Message framing (Rothman, Salovey, Antone, Keough, & Martin, 1993) may be one example whereby theoretically informed health messages about the benefits of lifestyle modification can be given to patients. However, more research is needed to examine the conditions under which these messages are the most effective (O'Keefe & Jensen, 2007, 2009). Tightly controlled experimental
studies would allow the researcher to specifically identify the most effective messages in prompting behavioural change (French, Sutton, Marteau, & Kinmonth, 2004). Providing accurate, personally-relevant and understandable information to patients with psoriasis should be a key part of patient management strategies. This increases the likelihood of more accurate risk perceptions and consequently risk reduction through behaviour change (Waldron et al., 2011).

Future research must build on the present findings in the context of people with psoriasis. Importantly more research of this nature is needed that examines effective CVD risk communication strategies beyond hypothetical (non-personal) risk scenarios (Fagerlin, Zikmund-Fisher, & Ubel, 2007; Price, Cameron, & Butow, 2007; Waldron et al., 2011) as is predominantly the case in the literature to date. Messages should focus more on personally-relevant health information and assess the extent to which this induces sustained behaviour change. This is particularly relevant to psoriasis. Positive lifestyle changes can affect both immediate psoriasis symptoms (making improvements in lifestyle can alleviate symptoms), and reduce future CVD risk. Psychologists can play a key role in understanding the drivers of behaviour change and develop more effective health messages based on how patients perceive health risks.

**9.5 Final conclusions**

The body of work presented suggests that more emphasis should be placed on helping individuals to understand and act upon the links between health behaviours and health outcomes as part of normal management of patients with psoriasis. Specific recommendations have been suggested as a way of improving risk
communication strategies. Healthcare professionals’ core training could be developed further to include key learning outcomes relating to health information-giving and LBC. This is particularly for issues such as supporting patients to change lifestyle behaviours and maintain long-term changes. There is also an opportunity to provide evidence-based health information in key locations where patients are likely to have the time to engage with information about behaviour change. These include locations such as primary and secondary patient waiting areas, which provide an ideal opportunity to ‘prime’ patients for a conversation about health behaviour change. Currently, the information provided to patients in these settings is not sufficient in either quantity or quality. In the context of psoriasis, the patient-practitioner consultation may provide the ideal opportunity to engage in discussions about health risks and healthy living. Information about health risk must be accompanied with appropriate interpretation (e.g. ‘your risk is high’) and more importantly specific advice about ways to reduce risk through positive behaviour change (e.g. increasing exercise, making dietary changes, reducing alcohol intake). New ways of communicating such messages as shown by the experimental work in this thesis show considerable promise in the research presented. Particularly for messages about alcohol reduction, message framing may be one way of encouraging positive behaviour change through appropriately worded health messages. Future research should identify and implement effective health risk communication strategies for patients with psoriasis. Psoriasis is a complex, multi-faceted long-term condition. The key message from this research is that health risk communication relating to lifestyle behaviour change and health information-giving (providing appropriate and accurate information about healthy living, enabling people to understand the link between behaviours and health risks) is under-recognised as part
of managing psoriasis. Improving the way that key health messages about psoriasis are given to patients would improve both disease outcomes and reduce the psychological burden that accompanies psoriasis.
9.6 References


Fagerlin, A., Zikmund-Fisher, B. J., & Ubel, P. A. (2007). "If I'm better than average, then I'm ok?": Comparative information influences beliefs about risk and benefits. Patient Education and Counseling, 69(1-3), 140-144. doi: 10.1016/j.pec.2007.08.008


outcomes. *Academic Medicine, 85*(5), 844-851. doi:
10.1097/ACM.0b013e3181d734a5


Appendix A. Structured observation schedule (Chapter 6)

Observation data collection form (completed by researcher)

Location ID ______________                Primary Care /Psoriasis clinic
(delete)

<table>
<thead>
<tr>
<th>Lifestyle behavioural change written materials available in clinic waiting areas for patients to take away (e.g. booklets / leaflets)</th>
<th>Target behaviour</th>
<th>Count (counts indicate number of different sources)</th>
<th>Condition of materials (good/poor)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Generic (not psoriasis specific)</strong></td>
<td>Smoking cessation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alcohol reduction</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weight loss</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exercise</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Substance misuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. Psoriasis specific</strong></td>
<td>Smoking cessation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alcohol reduction</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Weight loss</td>
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<tr>
<td></td>
<td>Exercise</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Substance misuse</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Lifestyle behavioural change written materials (including recommended websites) available for use by clinicians (to supply directly to patients)

| **3. Generic (not psoriasis specific)** | Smoking cessation |  |  |
| | Alcohol reduction |  |  |
| | Weight loss |  |  |
| | Exercise |  |  |
4. **Psoriasis specific**

<table>
<thead>
<tr>
<th>Substance misuse</th>
<th>Smoking cessation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alcohol reduction</td>
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<td>Weight loss</td>
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<td></td>
<td>Exercise</td>
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<td></td>
<td>Substance misuse</td>
</tr>
</tbody>
</table>

**Posters/ displays of available support for lifestyle behavioural change (not information alone)**

<table>
<thead>
<tr>
<th></th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>(indicate behaviour type*)</td>
<td></td>
</tr>
</tbody>
</table>

- *Smoking (S)*
- *Alcohol reduction (A)*
- *Weight loss (W)*
- *Increasing activity/exercise (E)*
- *Substance misuse (M)*

<table>
<thead>
<tr>
<th>Includes contact details enabling self-referral to service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does not include contact details enabling self-referral to service</td>
</tr>
</tbody>
</table>
**Additional comments:** (for example the person responsible for maintenance of notice boards – if available, and schematic of patient waiting area.)
Appendix B. Experimental study ethical approval letter

Mr. Keyworth
Institute of Inflammation and Repair
12th September 2013

Dear Mr. Keyworth

Research Ethics Committee 3

Keyworth, Cordingley, Bundy, Nekom: Risk framing and behavioural intentions: an experimental study (ref 13118)

I write to confirm that the Chair is now satisfied that you have addressed the concerns of the Ethics Committee of the 17th of July 2013 and has therefore given the above research project a favourable ethical opinion.

This approval is effective for a period of five years and if the project continues beyond that period it must be submitted for review. It is the Committee’s practice to warn investigators that they should not depart from the agreed protocol without seeking the approval of the Committee, as any significant deviation could invalidate the insurance arrangements and constitute research misconduct. We also ask that any information sheet should carry a University logo or other indication of where it came from, and that, in accordance with University policy, any data carrying personal identifiers must be encrypted when not held on a university computer or kept as a hard copy in a location which is accessible only to those involved with the research.

Finally, I would be grateful if you could complete and return the attached form at the end of the project or by July 2014.

We hope the research goes well.

Yours sincerely

[Signature]

Adrian Jarvis
Ethics Committee 3 Secretary
Appendix C. Experimental study advert

Do you or does someone you know have psoriasis?

We are looking for people to complete a short online questionnaire about how people understand health information.

Men and women aged 18 and over are invited.

For more information please visit our website:

www.surveymonkey.com/s/uom2013

By following this link you are not committing yourself to taking part in this study.

This work is part of a National Institute for Health Research funded psoriasis research programme and led by Professor Chris Griffiths.

If you would like to discuss the study in more detail please contact me or the supervisor of this project Dr. Lis Cordingley (lis.cordingley@manchester.ac.uk) and we will be happy to help with any questions you may have.

Thank you

Chris Keyworth
PhD student (part of the NIHR-funded IMPACT programme)

Chris.keyworth@postgrad.manchester.ac.uk

0161 306 7949
Dear (insert name),

**RE: Psoriasis study - Invitation to take part in a short internet questionnaire**

My name is Chris Keyworth and I am a PhD student from the University of Manchester. I am writing with regards to a research study I am conducting. This study will investigate how people with psoriasis understand information about health risks and how changing your lifestyle can reduce such risks. This work is part of a National Institute of Health Research psoriasis research programme.

You have been selected to receive information about this study because you have previously been involved in research at the University of Manchester, and you have given your permission to be contacted.

Please find enclosed a Participant Information Sheet which gives more information about the study. If you are interested in taking part in this study please follow the link below to our internet-based questionnaire.

To access the questionnaire please go to:

You do not have to take part in this study, and should you decide not to take part, your future medical care will not be affected. If you do decide to take part, you are free to withdraw at any point.

This is a potentially important area of research with consequences for people already living with psoriasis and those who will do so in the future. This work will help to understand what people with psoriasis think about risks to their health and how this information should be used by health professionals.

If you would like to discuss the information enclosed in more detail please feel free to give me a call on 0161 306 7047 (or email: chris.keyworth@manchester.ac.uk) and I would be happy to help with any additional questions you may have.

Thank you for your help.

Yours sincerely

Chris Keyworth
Appendix E. Experimental study participant information sheet for community participant sample

PARTICIPANT INFORMATION

TITLE OF PROJECT: ‘Risk framing and behavioural intentions: An experimental study’

I am inviting you to take part in a study looking at the best ways of presenting health information to people with psoriasis. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

WHAT IS THE PURPOSE OF THIS STUDY?

The purpose of this study is to compare different ways of presenting health information to people with psoriasis to help them stay healthy. Some research suggests that people with psoriasis may have higher cardiovascular risk factors such as higher levels of cholesterol, higher blood pressure and higher levels of obesity. However, at the moment scientists do not yet know if any increased risk is due to having psoriasis alone or is due to other causes such as unhealthy lifestyle. This study is part of the IMPACT programme of research which is investigating these associations.

Links to research studies will be provided at the end of this questionnaire if you wish to read more about the current evidence.

The purpose of our study is to investigate what are the best ways of presenting health information to people with psoriasis.

WHY HAVE I BEEN ASKED TO TAKE PART?

You have been selected to take part because you have previously expressed an interest in taking part in research about psoriasis being conducted by the University of Manchester.

DO I HAVE TO TAKE PART?

It is up to you whether or not you take part. Before you decide, we will describe the study and go through this information sheet. If you agree to take part, we will ask...
you to sign a consent form. You are free to withdraw at any time, without giving a reason.

If you decide to withdraw from the study, information already collected from the study will be kept and used in the study unless you specifically ask for it to be withdrawn. All identifiable data such as your name would have been removed from this information.

WHAT DOES TAKING PART INVOLVE?

If you decide to take part please type the internet address found at the end of this information sheet into your internet browser—this will take you to the online questionnaire. The study is all online and it will take around 10 to 15 minutes to complete.

WILL I BE PAID FOR TAKING PART?

No, you will not be paid for helping us with this study. But by taking part you will be helping us to understand more about psoriasis.

WHAT WILL I BE ASKED TO DO?

You will firstly be asked to re-read the information presented here and complete a consent form. You will then be presented with several health messages about a health risk and what can be done to reduce the risk.

When you have read the information you will be asked to complete a series of questions relating to the information you have read.

WHAT ARE THE POSSIBLE RISKS OF TAKING PART?

There are no anticipated risks of taking part.

WHAT ARE THE POSSIBLE BENEFITS OF TAKING PART?

There are no direct benefits to taking part in this study. This study may help to clarify the best ways that health professionals can give important health information to patients. By taking part you will have the chance to help answer important questions about our understanding of providing health information.

WHAT ELSE WILL I BE ASKED TO DO?

After you have completed the questionnaire there will be no additional testing, but with your consent we will hold your information so that we may inform you of any future studies that are related to this one in which you might be interested.

WHAT IF RELEVANT NEW INFORMATION BECOMES AVAILABLE?
If any relevant information such as new research findings becomes available during the running of the study you will be contacted in writing by a member of the research team.

WHAT WILL HAPPEN IF I DON’T WANT TO CARRY ON WITH THE STUDY?
You are free to withdraw from the study at any time point. Any data previously collected will be retained by the study team unless you specifically ask for it to be removed.

WILL THE INFORMATION I PROVIDE BE KEPT CONFIDENTIAL?
All information will be kept confidential and will conform to the ‘Data Protection Act of 1998’ with respect to data collection, storage and destruction. Your data and personal details will be kept separately in secure databases. Your name, or any details that could be used to identify you, will not be used in any publications resulting from this study.

WHAT WILL HAPPEN TO THE RESULTS OF THE RESEARCH STUDY?
You will be sent an update at the end of the study explaining the results found. The results of the study will be published in professional journals, presented at conferences and distributed to local and national patient groups.

WHO IS FUNDING AND SPONSORING THE STUDY?
The study is part of a PhD student project being funded by the National Institute for Health Research (NIHR) and is part of the IMPACT (Identification and Management of Psoriasis Associated Co-morbidity) study led by Professor Chris Griffiths at the University of Manchester. The University sponsors the study. A sponsor is an organisation that takes on responsibility for confirming there are proper arrangements to initiate, manage and monitor, and finance a study.

WHO HAS REVIEWED THE STUDY?
All research at the University has been authorised by the University research Ethics Committee to protect your safety, rights, wellbeing and dignity. This study has been reviewed and given favourable opinion (Ref to be added).

WHAT IF I HAVE QUESTIONS ABOUT THE STUDY?
If you have any questions relating to the study, please feel free to contact me using any of the details below.
Telephone: 0161 306 7047. Email: chris.keyworth@manchester.ac.uk

Post: Chris Keyworth, IMPACT, Suite 14, 5th Floor, Williamson Building, University of Manchester, Oxford Rd., Manchester. M13 9PL.

WHAT IF THERE IS A PROBLEM?

If you have a concern about any aspect of the study please contact a member of the research team on 0161 306 7047 who will do their best to answer your questions. If we are unable to resolve your concern or you wish to make a complaint regarding the study, please contact a member of the research sponsor’s team on 0161 206 7032.

WHAT DO I DO NOW?

If you are interested in taking part in this study please follow the link below to take you to the internet page.

https://www.surveymonkey.com/s/uom2013
Appendix F. Experimental study questionnaire

1.

Thank you for deciding to take part in this study. Please take a moment to read the information on the next page. Most people have taken between 10 and 15 minutes to complete and you can see your progress on the bar above.

To move to the next screen please click ‘next’ below.

2.

Please take your time to read the study information below. If you are happy with what you have read please click ‘next’ at the bottom of this page.

Study Information

TITLE OF PROJECT: ‘Risk framing and behavioural intentions: An experimental study’

I am inviting you to take part in a study looking at the best ways of presenting health information to people with psoriasis. Before you decide, it is important for you to understand why this research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

WHAT IS THE PURPOSE OF THIS STUDY?

The purpose of this study is to compare different ways of presenting health information to people with psoriasis to help them stay healthy. Some research suggests that people with psoriasis may have higher cardiovascular risk factors such as:

- higher levels of cholesterol,
- higher blood pressure; and
- higher levels of obesity.

However, at the moment scientists do not yet know if any increased risk is due to having psoriasis alone or is due to other causes such as unhealthy lifestyle. This study is part of the IMPACT programme of research which is investigating these associations.

Links to research studies will be provided at the end of this questionnaire if you wish to read more about the current evidence.

The purpose of our study is to investigate what are the best ways of presenting health information to people with psoriasis.

WHY HAVE I BEEN ASKED TO TAKE PART?

You have been asked to take part as we would like your views about how best to present health information related to psoriasis.

DO I HAVE TO TAKE PART?

It is up to you whether or not you take part. Before you decide, we will describe the study and go through this information sheet. If you agree to take part, we will ask you to complete a consent form. You are free to withdraw at any time, without giving a reason.

If you decide to withdraw from the study, information already collected from the study will be kept and used in the study unless you specifically ask for it to be withdrawn. All identifiable data such as your name would have been removed from this information.
WHAT DOES TAKING PART INVOLVE?

If you decide to take part at the end of this information sheet you will be taken to the online questionnaire. The study is all online and it will take around 10 to 15 minutes to complete.

Please also note that one of the questions asks about any medication you are currently taking and any ointments/creams you use. If you wish to answer this question it may be helpful to have these details to hand.

WILL I BE PAID FOR TAKING PART?

No, you will not be paid for helping us with this study. But by taking part you will be helping us to understand more about psoriasis.

WHAT WILL I BE ASKED TO DO?

You will firstly be asked to read the information presented here and complete a consent form. You will then be presented with several health messages about a health risk and what can be done to reduce the risk.

When you have read the information you will be asked to complete a series of questions relating to the information you have read.

WHAT ARE THE POSSIBLE RISKS OF TAKING PART?

There are no anticipated risks of taking part.
WHAT ARE THE POSSIBLE BENEFITS OF TAKING PART?

There are no direct benefits to taking part in this study. This study may help to clarify the best ways that health professionals can give important health information to patients. By taking part you will have the chance to help answer important questions about our understanding of providing health information.

WHAT ELSE WILL I BE ASKED TO DO?

After you have completed the questionnaire there will be no additional testing, but with your consent we will hold your information so that we may inform you of any future related studies you might be interested in.

WHAT IF RELEVANT NEW INFORMATION BECOMES AVAILABLE?

If any relevant information such as new research findings becomes available during the running of the study you will be contacted in writing by a member of the research team.

WHAT WILL HAPPEN IF I DON'T WANT TO CARRY ON WITH THE STUDY?

You are free to withdraw from the study at any time point. Any data previously collected will be retained by the study team unless you specifically ask for it to be removed.

WILL THE INFORMATION I PROVIDE BE KEPT CONFIDENTIAL?

All information will be kept confidential and will conform to the 'Data Protection Act of 1998' with respect to data collection, storage and destruction. Your data and personal details will be kept separately in secure databases. Your name, or any details that could be used to identify you, will not be used in any publications resulting from this study.

WHAT WILL HAPPEN TO THE RESULTS OF THE RESEARCH STUDY?

You will be sent an update at the end of the study explaining the results found. The results of the study will be published in professional journals, presented at conferences and distributed to local and national patient groups.

WHO IS FUNDING AND SPONSORING THE STUDY?

The study is part of a PhD project being funded by the National Institute for Health Research (NIHR) and is part of the IMPACT (Identification and Management of Prostate Associated Comorbidity) programme of research at the University of Manchester. The University sponsors the study. A sponsor is an organisation that takes responsibility for confirming there are proper arrangements to initiate, manage and monitor, and finance a study.

WHO HAS REVIEWED THE STUDY?

All research at the University has been authorised by the University’s research Ethics Committee to protect your safety, rights, wellbeing and dignity. This study has been reviewed and been given favourable opinion (Ref 131/10).

WHAT IF I HAVE QUESTIONS ABOUT THE STUDY?

If you have any questions relating to the study, please feel free to contact the main researcher using any of the details below.

Telephone: 0161 306 7047.

Email: chris.keyworth@manchester.ac.uk

Post: Chris Keyworth, IMPACT
To take part in this study, please enter your initials in the boxes against each statement below. (As in the example provided).

Thank you

* I confirm that:

I have read and understand all of the information for the above study, and I have had time

* 1. I confirm that:

I have read and understand all of the information for the above study, and I have had time to think about it.

* 2. I have had the opportunity to ask questions and all my questions have been answered to my satisfaction.

* 3. I agree to be part of this research study, to follow the study procedures, and to provide necessary information as part of this questionnaire.

* 4. I understand that I am free to withdraw at any time, without giving any reason
*5. I know how to contact the research team if I need to, and how to get information about the results of the research.

6. I am happy to be contacted in the future about further research studies related to the IMPACT Study. (OPTIONAL). If so, please provide your email address in the space provided.

4.

Thank you for completing the consent procedure. Now we would just like to ask you a few questions about you before we get started. Please complete the questions below the best you can, and when you're done click 'Next'.

7. Approximately how old were you (in years) when first diagnosed with psoriasis?

8. Have you ever used any of the following treatments for your psoriasis?

(Light therapies)
- UVE (Ultraviolet B) light therapy
- PUVA (Psoralen plus ultraviolet A) light therapy

9. Oral (tablet) therapies
- Methotrexate (sometimes by injection)
- Cologiden
- Asthemin
- Fumaric acid esters (Fumaderm)

10. Biological therapies (injection/infusion treatment)
- Cincercetp (Entreb)
- Acalimubam (Humira)
- Infliximab (Remicade)
- Ustekinumab (Stelara)
- Other (please specify):

11. Please list all the medication you are currently taking and any ointments/creams you use (if possible with the amount you take/use and how frequently you take/use it).
12. How would YOU describe your psoriasis at the moment? (In the last 2 weeks)
   - Mild
   - Mild to moderately severe
   - Moderately severe
   - Moderately severe to severe
   - Severe

13. Generally, when your psoriasis has been at its worst, how would YOU describe it:
   - Mild
   - Mild to moderately severe
   - Moderately severe
   - Moderately severe to severe
   - Severe

14. Have you ever been diagnosed with psoriatic arthritis?
   - Yes
   - No
   - Other (please specify)

5.

Thank you for completing the questions about yourself.

Now you will be asked a series of questions relating to your lifestyle. Please try and answer these as honestly as possible.

6.

15. Have you ever smoked?
   - Yes
   - No

16. Do you currently smoke
   - Yes
   - No

17. If you currently smoke, how many cigarettes do you smoke in a typical day?

7.
18. In a typical month, how often do you have a drink containing alcohol?
- Never
- Once a month or less
- 2 to 4 times a month
- 2 to 3 times a week
- 4 or more times a week

19. How many units of alcohol do you have on a typical day when you are drinking?
- 1-2
- 3-4
- 5-6
- 7-9
- 9+

What is a unit?
- Pint of beer (4%) = 2.2 units
- 330ml can of strong cider (5%) = 3 units
- 250ml glass of wine (11%) = 2.8 units
- 330ml can of lager (5%) = 1.7 units
- Single (25ml) measure of spirits (vodka, whisky etc) = 1 unit

20. How often do you have six or more units on one occasion?
- Never
- Less than Monthly
- Monthly
- Weekly
- Daily or almost daily
21. The Department of Health recommends adults are moderately active for 2 and a half hours or vigorously active for 75 minutes each week. For example 30 minutes on at least 5 days a week.

In an average week, how close are you to achieving this?
- You achieve this every week
- You’re almost there, but not quite
- You do around half of what’s recommended
- You’re a long way off doing what’s recommended

What is moderate physical activity?
Moderate activities mean you get warm and mildly out of breath. This may include lifestyle activities (such as climbing stairs, a brisk walk to work, school, or the shops, or cycling or dancing).

It can also be structured exercise or sport (such as dance classes and fitness training sessions)

Or a combination of the above

What is vigorous physical activity?
A vigorous activity is where you’re breathing hard and fast, and your heart rate has increased significantly. This may include jogging or running, swimming fast, playing sports such as tennis, football or badminton, or gymnastics.

9.

You will now be presented with some health information. When you have read the information please select next to continue.

10.

Please select next to continue.

11.
Research shows that risk factors for cardiovascular disease include smoking, having a poor diet, having insufficient physical activity, and drinking excessive amounts of alcohol. By making changes to your lifestyle, you lower your risk of cardiovascular disease.

Respondents: 35%

Research shows that risk factors for cardiovascular disease include smoking, having a poor diet, having insufficient physical activity, and drinking excessive amounts of alcohol. By not making changes to your lifestyle, you increase your risk of cardiovascular disease.

Respondents: 25%

Research shows that living an unhealthy lifestyle such as smoking, having a poor diet, having insufficient physical activity, and drinking excessive amounts of alcohol may contribute to skin flare ups. By making changes to your lifestyle, you increase the likelihood of having fewer psoriasis flare ups and healthier looking skin.

Respondents: 22%

Research shows that living an unhealthy lifestyle such as smoking, having a poor diet, having insufficient physical activity, and drinking excessive amounts of alcohol may contribute to skin flare ups. By not making changes to your lifestyle, you reduce the likelihood of having fewer psoriasis flare ups and healthier looking skin.

Respondents: 20%

---

12.

Based on what you have just read, we would now like to ask you some questions about making changes to your lifestyle. The questions relate to smoking, diet, exercise, physical activity, and alcohol intake.

If any question is not applicable or you do not wish to answer it (for example if you do not smoke) you can choose to skip it.

Please select next to continue

---

13.

The first questions relate to alcohol intake

22. If you do not drink any alcohol

☐ please click here

---

14.

23. I expect to reduce the amount of alcohol I drink in the next month (1 = strongly disagree, 7 = strongly agree)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 Strongy agree</th>
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</tbody>
</table>

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15.

24. I want to reduce the amount of alcohol I drink in the next month (1 = strongly disagree, 7 = strongly agree)

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<thead>
<tr>
<th>1</th>
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<th>3</th>
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</table>
25. I intend to reduce the amount of alcohol I drink in the next month (1 = strongly disagree, 7 = strongly agree).

<table>
<thead>
<tr>
<th>1 Strongly disagree</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 Strongly agree</th>
</tr>
</thead>
</table>

26. How confident are you that you can reduce the amount of alcohol you drink in the next month? (1 = not at all confident, 7 = extremely confident)

<table>
<thead>
<tr>
<th>1 Not at all confident</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 Extremely confident</th>
</tr>
</thead>
</table>

27. I have the ability to reduce the amount of alcohol I drink in the next month (1 = strongly disagree, 7 = strongly agree)

<table>
<thead>
<tr>
<th>1 Strongly disagree</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 Strongly agree</th>
</tr>
</thead>
</table>

28. How easy will it be for you to reduce the amount of alcohol you drink in the next month? (1 = not at all easy, 7 = very easy).

<table>
<thead>
<tr>
<th>1 Not at all easy</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 Very easy</th>
</tr>
</thead>
</table>

29. If you do not smoke

- Please click here

30. I expect to reduce the number of cigarettes I smoke in the next month (1 = strongly disagree, 7 = strongly agree)

<table>
<thead>
<tr>
<th>1 Strongly disagree</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 Strongly disagree</th>
</tr>
</thead>
</table>
31. I want to reduce the number of cigarettes I smoke in the next month (1= strongly disagree, 7= strongly agree)

<table>
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<tr>
<th>1</th>
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<tr>
<td>Strongly disagree</td>
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</tbody>
</table>

23.

32. I intend to reduce the number of cigarettes I smoke in the next month (1= strongly disagree, 7= strongly agree)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly agree |
|---|---|---|---|---|---|---|
| Strongly disagree | | | | | | |

24.

33. How confident are you that you can reduce the number of cigarettes you smoke in the next month? (1= not at all confident, 7= extremely confident)

<table>
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<th>1</th>
<th>2</th>
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<th>Extremely confident</th>
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<td>Not at all confident</td>
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</tbody>
</table>

25.

34. I have the ability to reduce the number I smoke in the next month (1= strongly disagree to 7= strongly agree)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly agree |
|---|---|---|---|---|---|---|
| Strongly disagree | | | | | | |

26.

35. How easy will it be for you to reduce the number of cigarettes you smoke in the next month? (1= not at all easy, 7= very easy)

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<th>7</th>
<th>Very easy</th>
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<tr>
<td>Not at all easy</td>
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27.

The next questions are related to diet.

28.

36. I expect to make healthy changes to my diet in the next month (1= strongly disagree, 7= strongly agree)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly agree |
|---|---|---|---|---|---|---|
| Strongly disagree | | | | | | |
29.

37. I want to make healthy changes to my diet in the next month (1 = strongly disagree, 7 = strongly agree)

<table>
<thead>
<tr>
<th>1 Strongly disagree</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 Strongly agree</th>
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30.

38. I intend to make healthy changes to my diet in the next month (1 = strongly disagree, 7 = strongly agree)

<table>
<thead>
<tr>
<th>1 Strongly disagree</th>
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31.

39. How confident are you that you can make healthy changes to your diet in the next month? (1 = not at all confident, 7 = extremely confident)

<table>
<thead>
<tr>
<th>1 Not at all confident</th>
<th>2</th>
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<th>5</th>
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32.

40. I have the ability to make healthy changes to my diet in the next month (1 = strongly disagree, 7 = strongly agree)

<table>
<thead>
<tr>
<th>1 Strongly disagree</th>
<th>2</th>
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33.

41. How easy will it be for you to make healthy changes to your diet in the next month? (1 = not at all easy, 7 = very easy)

<table>
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<th>1 Not at all easy</th>
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34.

The next questions relate to physical activity/exercise

35.
42. I expect to increase the amount of exercise I do in the next month (1 = strongly disagree, 7 = strongly agree)
   
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36.

43. I want to increase the amount of exercise I do in the next month (1 = strongly disagree, 7 = strongly agree)
   
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37.

44. I intend to increase the amount of exercise I do in the next month (1 = strongly disagree, 7 = strongly agree)
   
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38.

45. How confident are you about increasing the amount of exercise you do in the next month? (1 = not at all confident, 7 = extremely confident)
   
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39.

46. I have the ability to increase the amount of exercise I do in the next month (1 = strongly disagree, 7 = strongly agree)
   
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40.

47. How easy will it be for you to increase the amount of exercise you do in the next month?
   
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41.

The next two questions relate to the information you have read in the study.
48. How concerned are you by reading the health information at the beginning of this questionnaire? Ranging from 1 (not at all concerned) to 10 (very concerned)

1 Not at all concerned  2    3    4    5    6    7    8    9    10 Very concerned

49. How worried are you by this information? Ranging from 1 (not at all worried) to 10 (very worried)

1 Not at all worried  2    3    4    5    6    7    8    9    10 Very worried

44.

Finally we are aware that emotions play an important part in most illnesses. We would like to know how you feel.

Please read each item and select the reply which comes closest to how you have been feeling in the past week. Don’t take too long over your replies. Your immediate reaction to each item will probably be more accurate than a thought out response.

50. I feel tense or wound up:
   - Most of the time  
   - A lot of the time  
   - Time to time, occasionally  
   - Not at all

51. I still enjoy the things I used to enjoy:
   - Definitely as much  
   - Not quite as much  
   - Only a little  
   - Hardly at all

52. I get a sort of frightened feeling as if something awful is about to happen:
   - Very definitely and quite badly  
   - Yes, but not too badly  
   - A little, but it doesn’t worry me  
   - Not at all

53. I can laugh and see the funny side of things:
   - As much as I always could  
   - Not quite so much now  
   - Definitely not so much now  
   - Not at all

54. Worrying thoughts go through my mind:
   - A great deal of the time  
   - A lot of the time  
   - From time to time but not too often  
   - Only occasionally
55. I feel cheerful:
- Not at all
- Not often
- Sometimes
- Most of the time

56. I can sit at ease and feel relaxed:
- Definitely
- Usually
- Not often
- Not at all

57. I feel as if I am slowed down:
- Nearly all the time
- Very often
- Sometimes
- Not at all

58. I get a sort of frightened feeling like "butterflies" in my stomach:
- Not at all
- Occasionally
- Quite often
- Very often

59. I have lost interest in my appearance:
- Definitely
- I don't take so much care as I should
- I may not take quite as much care as ever
- I take just as much care as ever

60. I feel restless as if I have to be on the move:
- Very much indeed
- Quite a lot
- Not very much
- Not at all

61. I look forward with enjoyment to things:
- As much as I ever did
- Rather less than I used to
- Definitely less than I used to
- Hardly at all

62. I get sudden feelings of panic:
- Very often indeed
- Quite often
- Not very often
- Not at all

63. I can enjoy a good book or radio or TV programme:
- Often
- Sometimes
- Not often
- Vary seldom

45.

Thank you for completing these questions. If you feel that you do have anxiety and/or depression, we would strongly advise you to make an appointment with your GP to discuss how you are feeling. Your GP will be able to help and advise you. These feelings can be quite common and affect many people at some time in their lives.
64. What is your date of birth?

Example: 
DD / MM / YYYY

65. What is your sex?

- Female
- Male

66. Which ethnicity best describes you? (Please choose only one)

- Arab
- Asian or Asian British - Indian
- Asian or Asian British - Pakistani
- Asian or Asian British - Bangladeshi
- Chinese
- Black or Black British - Caribbean
- Black or Black British - African
- White - British
- White - Irish
- Mixed - White and Black Caribbean
- Mixed - White and Black African
- Mixed - White and Asian
- Other (please specify)

67. How did you find about this study?

Please select

Other (please specify)

68. If you would like us to send you a summary of the results of this study please provide your email address in the space below (optional)


Thank you for taking part in this questionnaire. All responses will be kept anonymous.

Here is a brief summary of the current research, and where you can go to get more information.

Psoriasis is an incurable skin condition affecting a surprisingly large number of people (2.3% of the UK population). Its effects can range from the relatively mild to the severe and extremely limiting, with both physical and psychological consequences. Psoriasis can impact upon all aspects of life including employment, personal relationships and health behaviour such as ability to undertake exercise.

Comorbidities (additional conditions) associated with psoriasis include:

- Psychological disease (such as depression and anxiety)
- Psoriatic arthritis (a type of arthritis)

Some research suggests that people with psoriasis may have higher cardiovascular risk factors such as higher levels of cholesterol, higher blood pressure and higher levels of obesity. However, at the moment scientists do not yet know if any increased risk is due to having psoriasis alone or is due to other causes such as unhealthy lifestyle. This study is part of the IMPACT programme of research which is investigating these associations.

If you wish to read more about this please see the recent review article below (a direct link is provided):


This study is part of and funded through the IMPACT (Identification and Management of Psoriasis Associated Comorbidities) programme of research based at the University of Manchester.

What is IMPACT?

The IMPACT Programme is a research collaboration between the University of Manchester, Salford Royal NHS Foundation Trust, 3 Primary Care Trusts across the North West of England and the Psoriasis Association. It is funded by the National Institute for Health Research (NIHR).

Our mission

The IMPACT Programme’s mission is to apply the best available knowledge to develop responsive services to improve the care of people with psoriasis. To find out more about the IMPACT Programme of research please see our website:

http://www.impactspsoriasis.org.uk/

For further information about psoriasis please see the Psoriasis Association website:

https://www.psoriasis-association.org.uk/

Alternatively, if you like to get in touch with us, please contact Chris Keyworth using any of the details below:

University of Manchester
6th Floor Suite 1 Williamson Building
Oxford Road, Manchester, M13 9PL
Tel: Add: (0)161 306 7610
Email: christopher.keyworth@postgrad.manchester.ac.uk

Once again, thank you for taking part.
Appendix G. Author copyright for Chapters 1, 3 and 8

Papers titles: ‘Health risk communication and psoriasis’ (Chapter 1), ‘Health risk communication research in the context of psoriasis: a call for a mixed methods approach’ (Chapter 3), ‘Does message framing affect behavioural intentions in psoriasis patients? An experimental study’ (Chapter 8)

I hereby give permission to include the above manuscripts in Christopher Keyworth’s PhD thesis titled ‘Risk communication and Lifestyle Behaviour Change in People with Psoriasis.’

Lis Cordingley

________________________

Pauline A Nelson

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Chris Bundy

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Appendix H. Copyright agreement from the British Journal of Dermatology (John Wiley and Sons) relating to Chapter 5

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Paper title: Communicating cardiovascular disease risk to people with psoriasis: What techniques do practitioners use?

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