Ministry of Health Malaysia

NATIONAL DERMATOLOGY REGISTRY (DermReg)

Annual Report of the MALAYSIAN PSORIASIS REGISTRY 2007-2014

Editors:
Azura Mohd Affandi
Nooraishah Ngah Saaya
Asmah Johar

With contribution from:
Nurakmal Baharum
Abdul Muneer Abdul Hamid

Ministry of Health Malaysia

NATIONAL DERMATOLOGY REGISTRY (DermReg)

Annual Report of the MALAYSIAN PSORIASIS REGISTRY

2007 - 2014

Editors:

Azura Mohd Affandi
Nooraishah Ngah Saaya
Asmah Johar

With contribution from:

Nurakmal Baharum
Abdul Muneer Abdul Hamid

Jointly published by:
National Dermatology Registry (DermReg), Malaysia, and
Clinical Research Centre (CRC), Ministry of Health, Malaysia

Contact:
National Dermatology Registry
Department of Dermatology
Hospital Kuala Lumpur
Jalan Pahang
50586 Kuala Lumpur

Tel: 03-2615 5225 / 03-2615 5555 Ext 5225
Fax: 03-2698 5927
Email: dermreg@acrm.org.my
Website: www.acrm.org.my/dermreg/

Suggested citation
The suggested citation for this report is as follows:
Mohd Affandi A, Ngah Saaya N, Johar A. Annual Report of the Malaysian Psoriasis Registry 2007-2014, Kuala Lumpur, Malaysia 2016.

Electronic version
Electronic version of this report can be downloaded at http://www.acrm.org.my/dermreg

ISSN 2289-1005

ACKNOWLEDGMENT

We would like to thank the Director General of Health, Malaysia for permission to publish this report.

The National Dermatology Registry would like to give its appreciation to everyone who has helped in making this report possible.

We would also like to thank the following for their contribution and support:

- All the doctors, allied health personnel and clerical staff in the participating centres
- The Ministry of Health, Malaysia
- The Dermatological Society of Malaysia
- Clinical Research Centre (CRC), Ministry of Health, Malaysia
- College of Physicians, Academy of Medicine Malaysia
- Altus Solutions Sdn Bhd

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

BB-UVB	Broad-band ultraviolet B
BMI	Body mass index
BSA	Body surface area
CDLQI	Child Dermatology Life Quality Index
CRC	Clinical Research Centre
CRF	Case report form
DermReg	National Dermatology Registry
DLQI	Dermatology Life Quality Index
eCRF	Electronic case report form
eDermReg	DermReg web application
HLA	Human leukocyte antigen
IQR	Interquartile range
MOH	Ministry of Health
MPR	Malaysian Psoriasis Registry
NA	Not available
NBUVB	Narrow-band ultraviolet B
NHMS	National Health and Morbidity Survey
PI	Principal Investigator
PUVA	Psoralen and ultraviolet A
QoL	Quality of life
RCC	Registry Coordinating Centre
SC	Site Coordinator
SD	Standard deviation
SDP	Sources data providers

ABOUT DermReg

Introduction

DermReg is an ongoing systematic collection, analysis and interpretation of data pertaining to dermatological diseases and services in Malaysia. It is a nationwide project which aims to integrate all dermatological patient registries and databases developed in Malaysia. These registries are essential in the planning, implementation and evaluation of clinical and health services as well as research in dermatology

Objectives of DermReg

General Objective

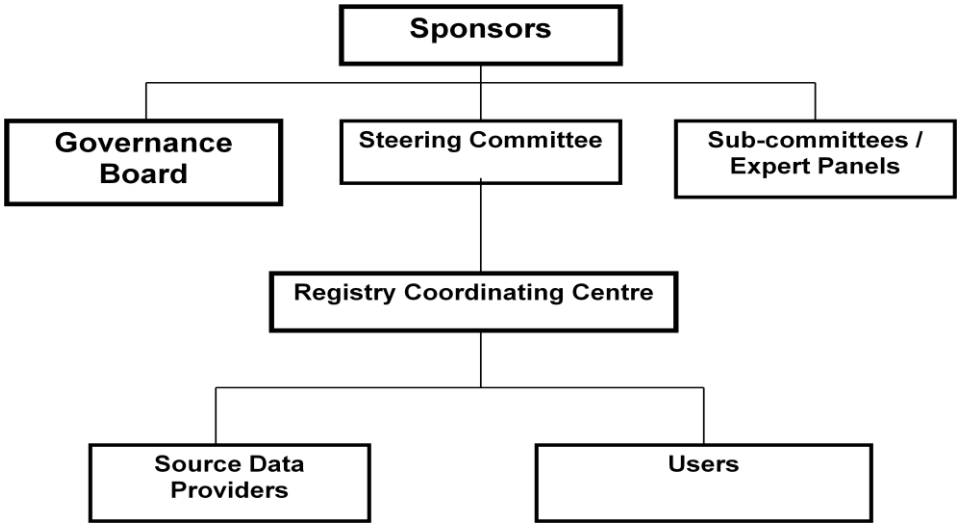
To establish a nationwide systematic prospective collection of data pertaining to skin diseases and dermatological services, in order to study the natural history, outcome and quality of life issues of skin diseases, as well as the effectiveness, safety and accessibility of various treatment modalities.

Specific Objectives:

1. Determine the socio-demographic profile of patients with skin diseases
2. Determine the burden of skin diseases in the population
3. Describe the natural history of skin diseases
4. Identify the potential causal and risk factors of skin diseases
5. Describe the clinical manifestation of skin diseases
6. Describe the effect of skin diseases on the quality of life
7. Determine the efficacy and cost effectiveness of treatment of skin diseases
8. Monitor the safety and adverse effects of products and services used in the treatment of skin diseases
9. Evaluate accessibility and quality of health services related to skin diseases
10. Stimulate and facilitate basic, clinical and epidemiological research on skin diseases

ORGANISATION OF DermReg

The organizational structure of DermReg consists of sponsors, Governance Board, Steering Committee, Sub-committees or Expert Panels, Registry Coordinating Centre, Source Data Providers (SDP) and users.



SPONSORS

The DermReg is sponsored by:

1. Ministry of Health, Malaysia
2. Clinical Research Centre, Hospital Kuala Lumpur
3. The Dermatological Society of Malaysia
4. Pharma companies – Abbvie, Leo Pharma and Janssen Malaysia

GOVERNANCE BOARD

Governance Board of DermReg is a committee established by the sponsors. Its roles are:

- to ensure that the DermReg stay focused on its objectives
- to ensure its continuing relevance and justification

1. Datuk Dr. Roshidah Baba (Chairperson)
   Head of Dermatological Services and Senior Consultant Dermatologist
   Department of Dermatology
   Hospital Melaka

2. Dr. Najeeb Ahmad Mohd Safdar
   President of the Dermatological Society of Malaysia, and
   Consultant Dermatologist
   Hospital Tuanku Jaafar, Seremban
   Negeri Sembilan

3. Dr. Steven Chow Kim Weng
   President of the College of Physicians, Academy of Medicine Malaysia, and
   Senior Consultant Dermatologist
   The Skin Centre, Kuala Lumpur

4. Dr. Goh Pik Pin
   Director of the Clinical Research Centre Network
   Ministry of Health

STEERING COMMITTEE

Steering Committee for Malaysian Psoriasis Registry (MPR)

No.	Name	Institution
1.	Dr. Azura Mohd Affandi	Hospital Kuala Lumpur
2.	Dr. Choon Siew Eng	Hospital Sultanah Aminah, Johor Bahru
3.	Dr. Pubalan Muniandy	Hospital Umum Sarawak
4.	Dr. Tang Jyh Jong	Hospital Permaisuri Bainun, Ipoh
5.	Dr. Chan Lee Chin	Hospital Pulau Pinang
6.	Dr. Najeeb Ahmad Mohd Safdar	Hospital Tuanku Jaafar, Seremban
7.	Dr. Steven Chow Kim Weng	The Skin Clinic, Kuala Lumpur
8.	Dr. Mohd Noh Idris	Klinik Kulit Md Noh, Kuala Lumpur

REGISTRY COORDINATING CENTRE

The **DermReg Registry Coordinating Centre (RCC)** is based at the Department of Dermatology, Hospital Kuala Lumpur. It coordinates the data collection among the source data providers, and collaborates with the Clinical Research Centre (CRC) that provides epidemiological and statistical support.

Registry Manager	Nooraishah Ngah Saaya

Technical Support Personnel

Epidemiology Officer	Dr. Jamaiyah Haniff Clinical Epidemiology Unit, CRC
Biostatisticians	Ms Nurakmal bt Baharum CRC
Database Administrator	Ms Lim Jie Ying Altus Solutions Sdn Bhd

SOURCE DATA PROVIDERS (SDP)

Source data providers (SDP) are centres that contribute data to the registries.

Source Data Providers for Malaysian Psoriasis Registry (MPR)

No.	Source Data Provider	Investigator
1.	Hospital Kuala Lumpur	Dr. Azura Mohd Affandi
2.	Hospital Pulau Pinang	Dr. Chan Lee Chin
3.	Hospital Sultanah Bahiyah, Alor Setar	Dr. Mani Mala a/p T. Manikam
4.	Hospital Tuanku Fauziah, Perlis	Dr. Sharifah Farihah Syed Abas
5.	Hospital Sultanah Fatimah, Muar	Dr. Noreen Md Arus
6.	Hospital Tuanku Jaafar, Seremban	Dr. Najeeb Ahmad Mohd Safdar
7.	Hospital Queen Elizabeth, Kota Kinabalu	Dr. Zaigham Mahmood
8.	Hospital Sungai Buloh	Dr. Norli Marwyne Mohd Noor
9.	Hospital Tengku Ampuan Afzan, Kuantan	Dr. Rajalingam a/l Ramalingam
10.	Hospital Permaisuri Bainun, Ipoh	Dr. Tang Jyh Jong
11.	Hospital Umum Sarawak, Kuching	Dr. Pubalan Muniandy
12.	Hospital Tengku Ampuan Rahimah, Klang	Dr. Ng Ting Guan
13.	Hospital Melaka	Dr. Sharifah Rosniza Syed Nong Chek
14.	Prince Court Medical Centre	Dr. Gangaram Hemandas
15.	Gleneagles Intan Medical Centre	Dr. Chang Choong Chor
16.	Hospital Sultanah Aminah, Johor Bahru	Dr. Choon Siew Eng
17.	Hospital Universiti Kebangsaan Malaysia	Dr. Norazirah Md Nor
18.	Pusat Perubatan Universiti Malaya	Dr. Wong Su Ming
19.	Hospital Raja Perempuan Zainab II	Dr. Zulrusydi Ismail
20.	Hospital Ampang, Selangor	Dr. Dawn Ambrose
21.	Hospital Selayang, Selangor	Dr. Hazfaneza Abdul Halim
22.	Hospital Putrajaya	Dr. Nazatul Shima Abdul Rahim
23.	Hospital Sultan Abdul Halim, Sungai Petani	Dr. Tan Wooi Chiang

OFFICIAL WEBSITE OF DermReg

http://www.acrm.org.my/dermreg/

ABOUT MALAYSIAN PSORIASIS REGISTRY (MPR)

Introduction

Psoriasis is a common skin disease, characterized by inflamed scaly patches and plaques. It runs a chronic relapsing course with variable degree of severity, and causes significant physical, psychosocial and economic impact on the patient. Being incurable, it may lead to poor patient compliance especially in treatment which will further compromise the overall management of the disease.

The Malaysian Psoriasis Registry (MPR) is a skin disease clinical registry. It is a prospective, ongoing systematic collection of data pertaining to patients who have psoriasis. The main reason for setting up a psoriasis registry is to have more accurate data on the various aspects of psoriasis in Malaysia. This would help in assessing the true magnitude of the problem in Malaysia, including the demographic data, types of psoriasis, its severity, aggravating factors, any associated joint and nail involvement and the various types of therapies commonly used. Having a psoriasis registry would also help in research work and more importantly in improving the overall management of the patients.

Preliminary work on the MPR started in 1998 by a group of dermatologists, which culminated in the First Malaysian Psoriasis Symposium on the 17th May 1998. This registry consists of information on patients with psoriasis in Malaysia and is under the umbrella of the National Dermatology Registry (DermReg). A case report form was developed and data collection started as a pilot project in March 2000. A preliminary report of the registry (March 2000 to July 2005) was published in the Malaysian Journal of Dermatology in the August 2005 issue.

In 2007, MPR was extensively revised under the guidance of CRC and with the financial support from MOH. A new case report form was introduced and a new centralised electronic database with web application was established to facilitate multi-centre data collection. Preliminary report of the newly revised MPR was published in the Medical Journal of Malaysia in September 2008. The First Annual Report of MPR 2007-2008 was published in the following year.

Objectives

The MPR has the following objectives:

- Primary objective:
  To obtain more accurate data on various aspects of psoriasis in Malaysia.

- Secondary objectives:
  1. To determine the socio-demographic profiles of patients with psoriasis.
  2. To determine the disease burden attributed to psoriasis.
  3. To provide information for planning of medical services, facilities, manpower and training related to the management of psoriasis.
  4. To stimulate and facilitate research on psoriasis and its management.

Scope of MPR

The MPR is intended to be a truly national population based disease and treatment registry. Hence it seeks the participation of all providers of dermatological services in both the public and private sectors in Malaysia.

The MPR collects:

- Demographic data
- Clinical data including patients' history and clinical examination findings
- Quality of life measure i.e. Dermatology Life Quality Index (DLQI)
- Modalities of treatment used

Outcomes of interest include:

- Course of the disease
- How the disease affects quality of life
- Disease improvement with treatment
- Association with any other diseases

Inclusion criteria:

1. All patients who are clinically diagnosed to have psoriasis by a registered dermatologist or by a medical practitioner under the supervision of a dermatologist are included. Confirmation of diagnosis by histopathologic examination is optional.

Exclusion criteria:

Patients whose diagnosis is in doubt are excluded.

EXECUTIVE SUMMARY

Stock and Flow

During the period from October 2007 to December 2014, a total of 12,615 patients with psoriasis from 23 dermatology centres (19 government hospitals, 2 private centres and 2 university hospitals) were notified to the registry.

Demographic Characteristics of Patients

In adult patients, male-to-female ratio was 1.3:1. Ethnic distribution: Malay 50.7%, Chinese 21.8%, Indian 18.2%, other ethnic groups 9.1%. Mean age at notification was 45.11 ± 16.05 years (range 18 - 97 years). Most patients (99.0%) were Malaysian citizens.

In paediatric patients, male-to-female ratio was 0.8:1. Ethnic distribution: Malay 69.6%, Chinese 7.6%, Indian 13.2%, other ethnic groups 9.3%. Mean age at notification was 12.14 ± 3.51 years (range 0 - 17 years). Almost all of the paediatric patients were Malaysian citizens.

Medical History

In adult patients, mean age of onset of psoriasis was 34.8 ± 16.1 years (range 0 – 87 years). Family history of psoriasis was present in 22.1% of the patients. Among those who had positive family history, family members affected were either of their parents in 35.8%, siblings in 32.0% and children in 10.3%.

In the child population, 19.8%, of them had at least one family member with psoriasis. Of these, 33.5% had either of their parents affected with psoriasis.

52.2% adult patients and 36.4% paediatric patients reported one or multiple factors which aggravated their psoriasis. The commonest aggravating factors were stress (46.9% in adult, 39.8% in paediatric), sunlight (23.6% in adult, 35.2% in paediatric) and infection (10.5% in adult, 15.4% in paediatric).

Comorbidities

In adult psoriasis patients aged 18 and above, 34.2% were overweight and 23.1% were obese, 26.3% had hypertension, 18.5% had hyperlipidaemia, 17.9% had diabetes mellitus, 5.6% had ischaemic heart disease and 1.5% had previous history of stroke. In children and adolescents aged below 18 years with psoriasis, the most prevalent co morbidity was overweight or obesity i.e. BMI at or above 85th centile (25.2 %), followed by bronchial asthma (1.9%).

Compared to patients without arthritis, patients with psoriatic arthritis were found to have increased co-morbidities such as diabetes mellitus, hypertension, hyperlipidaemia and obesity.

Clinical Presentation

The commonest clinical type of psoriasis in adult and paediatric patients was plaque psoriasis (85.2% and 79.2%, respectively). This was followed by guttate psoriasis (3.5% and 6.9% respectively), erythrodermic psoriasis (1.8% and 0.8% respectively), pustular psoriasis (0.5% and 1.1% respectively) and flexural psoriasis (0.4% and 1.3% respectively). In adult patients, (28.3%) had body surface area involvement of 10% or less. The pattern remains the same in child population, i.e. <5% of severity in 16.3%, followed by 5-10% of severity in 7.3% of patients.

Psoriatic arthropathy was reported in 14.0% of adult patients and only 1.5% in paediatric population. The commonest psoriatic arthropathy in adult patients was oligo/monoarthropathy (39.9%) followed by rheumatoid-like symmetrical polyarthropathy (31.0%) and distal hand joints arthropathy (30.2%).

About two-third (58.5%) of adult patients had nail changes associated with psoriasis. Among patients who had nail disease, pitting was commonest (73.3%), followed by onycholysis (47.8%), discoloration (32.4%) and subungual hyperkeratosis (14.6%). Total nail dystrophy was found in 4.7% of patients with nail disease. In paediatric cases, 62.8% of them had no nail involvement. Distribution of nail features in paediatric psoriasis patients with nail involvement reported that pitting was the commonest (91.8%) followed by onycholysis (26.8%).

Treatments received in the past 6 months

Majority of the patients (95.7% in adult, 94.8% in paediatric) were on topical treatment. Topical steroid was the commonest prescribed (82.4% in adult, 75.6% in paediatric), followed by tar preparations in 72.0% (adult) and 68.3% in paediatric, emollients in 72.3% (adult) and 63.4% (paediatric) patients. 3.5% of adult patients and 1.0% of paediatric patients received phototherapy. Of the patients who had phototherapy, narrowband UVB (NBUVB) was the commonest used (87.4% in adult, 87.5 in paediatric. Systemic therapy was given in 19.4% of adult patients and in 5.3% paediatric patients. The most frequently used systemic therapy was methotrexate (71.5% in adult, 59.5% in paediatric), followed by acitretin (19.9% in adult, 23.8% in paediatric).

Quality of Life

Measurement of quality of life using Dermatology Life Quality Index (DLQI) or child DLQI (CDLQI) was performed in 6227 adult patients (aged 17 and above) and 308 children/adolescent patients (aged 5 to 16). The mean DLQI score was 8.54 ± 6.44 for adult patients and the mean CDLQI was 7.78 ± 5.57 for children/adolescent patients.

In the adult population, 52.7% of patients reported that psoriasis had small (26.2%), moderate (27.3%) and large effect (28.0%) on their personal life. Only, 5.5% of patients reported that psoriasis had extremely large effect on their personal life.

CHAPTER 1

STOCK AND FLOW

During the period from October 2007 to December 2014, a total of 12,615 patients were notified to the registry. The number of notified patients gradually increased throughout the period (**Figure 1.1**). Of the overall population, 6.3% (n=793) patients belong to the age group < 18 years and were categorized as paediatric population, 93.7% (n=11,822) patients belong to the age group ≥ 18 years of age and were categorized as the adult population.

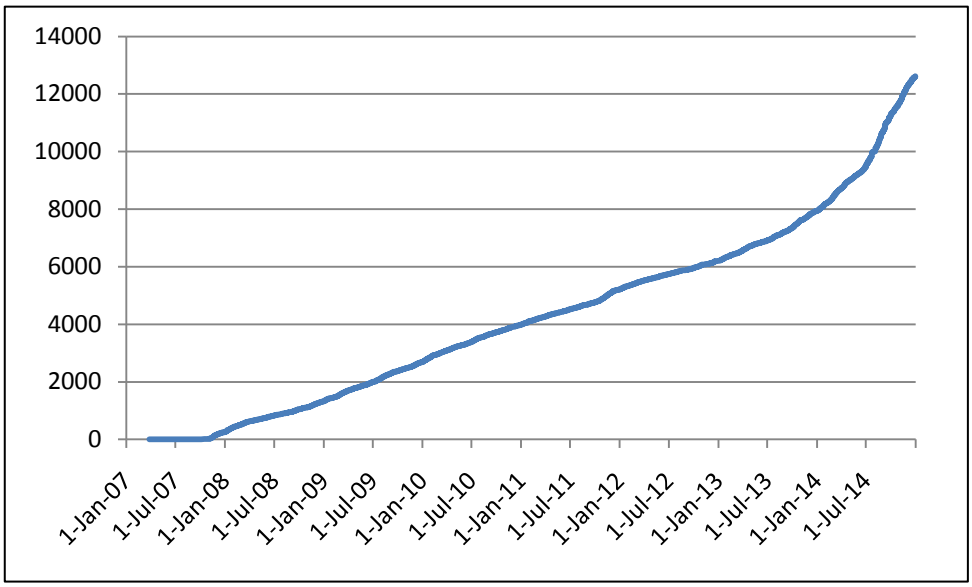


Figure 1.1 Psoriasis patients notified to the MPR

A total of 23 dermatology centres (19 government hospitals, 2 private centres and 2 university hospitals) participated in the MPR. In the adult category, Hospital Kuala Lumpur notified the highest number of patients. This was followed by Hospital Tengku Ampuan Rahimah, Klang and Hospital Pulau Pinang **(Table 1.1).** In the paediatric group, Hospital Sultanah Bahiyah notified the highest number of paediatric patients. This was followed by Hospital Tengku Ampuan Rahimah, Klang and Hospital Kuala Lumpur **(Table 1.2).**

Table 1.1 Number of adult patients with psoriasis notified from each participating centre

No		No. of adult patients notified								
		2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**Total**
1	Hospital Kuala Lumpur	51	170	191	134	69	78	297	926	1916
2	Hospital Tengku Ampuan Rahimah	0	63	144	139	90	70	88	591	1185
3	Hospital Pulau Pinang	20	81	259	129	187	15	149	183	1023
4	Hospital Melaka	0	0	80	236	188	153	139	127	923
5	Hospital Sultanah Bahiyah	19	185	77	64	53	78	84	281	912
6	Hospital Queen Elizabeth	90	95	111	121	128	86	121	216	897
7	Hospital Umum Sarawak	3	121	68	42	32	38	102	454	860
8	Hospital Sultanah Aminah	0	36	137	65	63	67	188	289	845
9	Hospital Raja Permaisuri Bainun	42	41	77	38	76	116	97	353	840
10	Hospital Tengku Ampuan Afzan	0	36	40	90	73	59	128	204	630
11	Hospital Sultanah Fatimah	2	36	25	28	32	75	13	210	421
12	Hospital Tuanku Jaafar	0	48	0	27	57	2	86	85	305
13	Hospital Selayang	0	0	0	0	0	0	1	236	237
14	Hospital Tuanku Fauziah	0	23	45	53	42	20	16	20	219
15	Hospital Raja Perempuan Zainab II	0	0	0	0	9	8	90	19	126
16	Hospital Ampang	0	0	0	0	3	3	10	97	113
17	Hospital Sultan Abdul Halim	0	0	0	0	0	0	0	101	101
18	Hospital Putrajaya	0	0	0	0	0	0	0	84	84
19	UM Medical Centre	0	0	0	0	32	25	2	0	59
20	UKM Medical Centre	0	0	0	15	0	23	4	1	43
21	Prince Court Medical Centre	0	0	6	17	3	1	4	3	34
22	Hospital Sungai Buloh	4	25	1	0	0	0	0	1	31
23	Gleneagles Medical Centre	0	12	6	0	0	0	0	0	18
	Total	231	972	1267	1198	1137	917	1619	4481	11822

Table 1.2 Number of paediatric patients with psoriasis notified from each participating centre

No		No. of paediatric patients notified								
		2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**Total**
1	Hospital Sultanah Bahiyah	8	25	11	10	8	9	17	17	105
2	Hospital Tengku Ampuan Rahimah	0	7	13	20	8	6	8	29	91
3	Hospital Kuala Lumpur	8	14	13	6	4	7	10	15	77
4	Hospital Queen Elizabeth	1	6	13	10	5	6	12	19	72
5	Hospital Umum Sarawak	1	12	11	6	2	8	5	25	70
6	Hospital Melaka	0	0	6	10	17	11	14	6	64
7	Hospital Tengku Ampuan Afzan	0	4	5	9	12	12	11	8	61
8	Hospital Sultanah Aminah	0	1	8	4	3	5	14	25	60
9	Hospital Raja Permaisuri Bainun	3	2	9	1	1	10	4	9	39
10	Hospital Pulau Pinang	0	5	8	4	2	0	3	8	30
11	Hospital Sultanah Fatimah	2	5	0	3	6	4	1	6	27
12	Hospital Tuanku Jaafar	0	5	0	5	7	0	8	2	27
13	Hospital Tuanku Fauziah	1	7	4	5	3	1	3	2	26
14	Hospital Selayang	0	0	0	0	0	0	0	12	12
15	Hospital Raja Perempuan Zainab II	0	0	0	0	0	1	4	3	8
16	Hospital Ampang	3	4	0	0	0	0	0	0	7
17	Hospital Sungai Buloh	0	0	0	0	0	0	2	5	7
18	Gleneagles Medical Centre	0	3	0	0	0	0	0	0	3
19	Hospital Putrajaya	0	0	0	0	0	0	0	2	2
20	UM Medical Centre	0	0	0	0	2	0	0	0	2
21	Prince Court Medical Centre	0	0	0	0	0	0	1	0	1
22	UKM Medical Centre	0	0	0	1	0	0	0	0	1
23	Hospital Sultan Abdul Halim	0	0	0	0	0	0	0	1	1
	Total	27	100	101	94	80	80	117	194	793

There were a total of 12,615 notifications of patients with psoriasis in the MPR with new cases and follow-up treatment. 8,163 (69.0%) of the adult patients were notified once, and 3,659 (31.0%) were notified more than once (**Table 1.3**). In paediatric population, 743 (82.5%) of the patients were notified once and 158 (17.4%) of them had more than one notifications **(Table 1.4).**

Table 1.3 Distribution of adult patients with psoriasis according to the number of notifications

Year	No.	%
Entry notification	8163	69.0
Entry and one follow-up notifications	1959	16.6
Entry and 2 follow-up notifications	870	7.4
Entry and 3 follow-up notifications	397	3.4
Entry and 4 follow-up notifications	201	1.7
Entry and 5 follow-up notifications	112	0.9
Entry and 6 follow-up notifications	64	0.5
Entry and 7 follow-up notifications	33	0.3
Entry and 8 follow-up notifications	15	0.1
Entry and 9 follow-up notifications	6	0.1
Entry and 10 follow-up notifications	2	0.0
Total	**11822**	100.0

Table 1.4 Distribution of paediatric patients with psoriasis according to the number of notifications

Year	No.	%
Entry notification	595	75.0
Entry and one follow-up notifications	120	15.1
Entry and 2 follow-up notifications	46	5.8
Entry and 3 follow-up notifications	21	2.6
Entry and 4 follow-up notifications	7	0.9
Entry and 5 follow-up notifications	2	0.3
Entry and 6 follow-up notifications	1	0.1
Entry and 7 follow-up notifications	1	0.1
Total	**793**	100.0

CHAPTER 2

CHARACTERISTICS OF PATIENTS

In adult patients with psoriasis, 98.5% of population was Malaysian. Malays comprised the majority of patients (50.7%), followed by Chinese (21.8%), Indians (18.2%), other ethnic groups (9.1%) and Orang Asli (0.1%) (**Table 2.1**). There were more males than females (56.6% and 43.4% respectively), with a male to female ratio of 1.4:1 (**Figure 2.1**).

The mean age of the adult patients was 45.11 ± 16.049 years with a range from 18 to 97 years. The majority were married (68.7%), (24.2%) were single, and the rest, either divorced or widowed (**Table 2.1**).

Almost all paediatric patients with psoriasis were Malaysian. Of the data analyzed, (69.6%) paediatric patients were Malays followed by Indian in (13.2%), Chinese in (7.6%) and (9.3%) belonging to other ethnic groups (**Table 2.2**). Majority or 452 patients of paediatric patients were females (57.0%), while 341 were males (43%) (**Figure 2.2**).

The mean age of the paediatric population was 12.14 ± 3.508 years (0-17 years) (**Table 2.2)**.

Table 2.1 Demographics of adult and paediatric patients with psoriasis

Patient characteristics		**Adult**		**Paediatric**	
		n	**%**	**n**	**%**
Nationality	Malaysian	11646	99.0	793	100
	Non Malaysian	116	1.0	0	0.0
Ethnic distribution	Malay	5998	50.7	552	69.6
	Chinese	2580	21.8	60	7.6
	Indian	2146	18.2	105	13.2
	Orang Asli	15	0.1	2	0.3
	Others	1080	9.1	74	9.3
Gender	Male	6689	56.6	341	43.0
	Female	5133	43.4	452	57.0
Marital status	Single	2864	25.2	-	-
	Married	8123	71.4	-	-
	Divorced	121	1.1	-	-
	Widowed	212	0.5	-	-
	NA	381	3.2	-	-
Age at notification (years)	Mean ± SD (Range)	45.11 ± 16.049 (18 - 97)		12.14 ± 3.508 (0-17)	

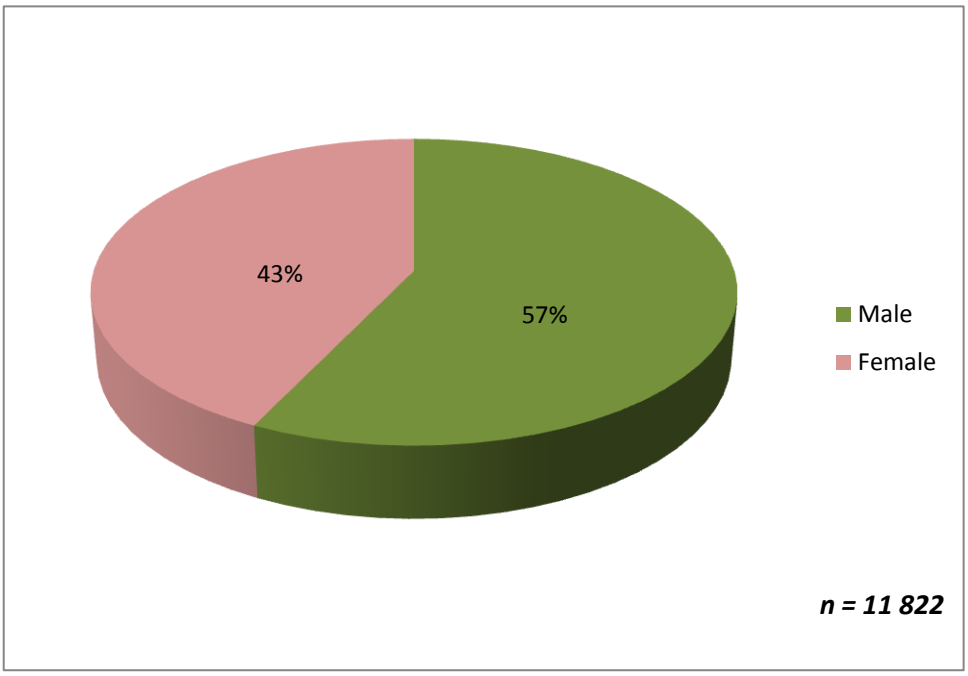


Figure 2.1 Gender distribution of adult patients with psoriasis

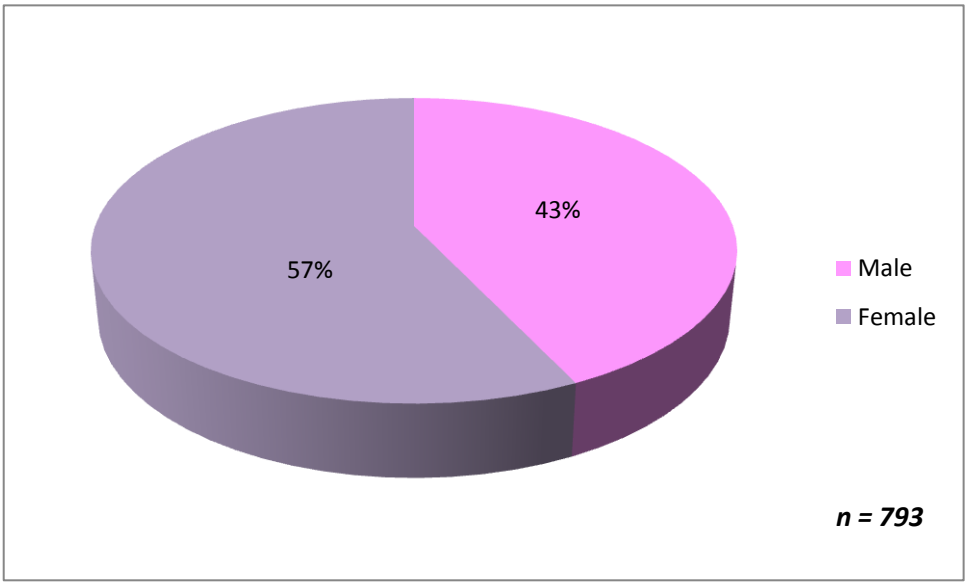


Figure 2.2 Gender distribution of paediatric patients with psoriasis

CHAPTER 3

MEDICAL HISTORY

Onset of Psoriasis

Psoriasis may first appear at any age. The mean age of onset in our cohort for adult patients was 34.8 ± 16.1 years with a wide range from 0 to 87 years. The mean age of onset was 9.3 ± 4.12 years in the paediatric population (0-17). In the adult population, the mean age at which psoriasis was first diagnosed was 37.1 ± 15.9 years. In the paediatric category, the mean age at which psoriasis was first diagnosed was 10.4 ± 3.95 years **(Table 3.1, Table 3.2).**

Looking at the age of onset of psoriasis in adult patients, 2567 patients had the onset of psoriasis between 21-30 years old, followed by 2266 patients between 31-40 years old, and 1952 between 41-50 years old **(Figure 3.1).**

In the paediatric group, 314 of patients had onset of psoriasis between 11-15 years old **(Figure 3.2).**

Table 3.1 Age of onset and age of diagnosis in adult patients with psoriasis

Age	n	Mean	Median	Std Dev	Min	Max
Age of onset	11522	34.8	33	16.1	0	87
Age of diagnosis	11488	37.1	36	15.9	0	92

Table 3.2 Age of onset and age of diagnosis in paediatric patients with psoriasis

Age	n	Mean	Median	Std Dev	Min	Max
Age of onset	775	9.32	10	4.1	0	16
Age of diagnosis	772	10.4	11	3.9	0	17

Figure 3.1 Age of onset of adult patients with psoriasis

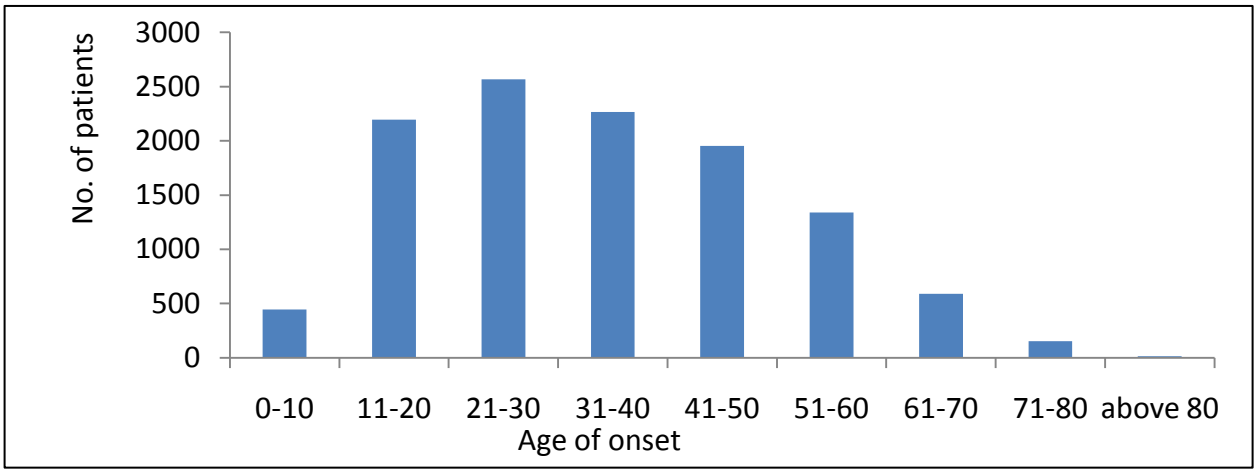
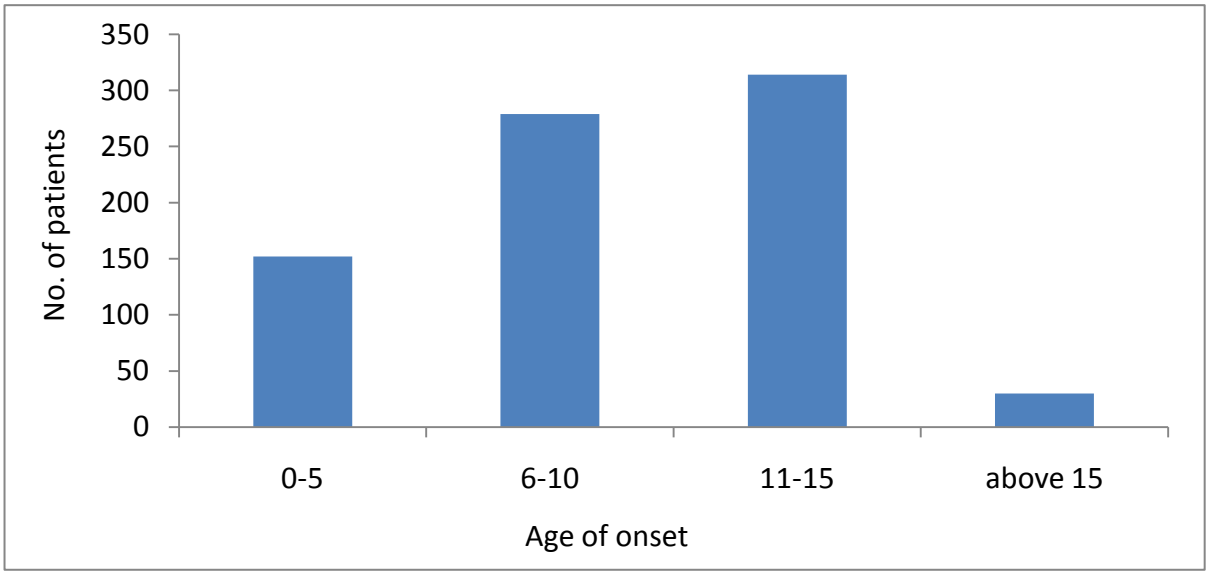


Figure 3.2 Age of onset of paediatric patients with psoriasis



Family History

Psoriasis is a skin disorder with a polygenic mode of inheritance. In our registry, about one-fifth (22.1%) of adult patients had at least one family member with psoriasis (**Table 3.3**). Of those with a positive family history, 35.8% had either of their parents affected. Siblings were affected in 32.0% and children in 10.3% **(Table 3.4, Figure 3.3)**.

In the paediatric patients with psoriasis, 157 or 19.8% of them had at least one family member with psoriasis (**Table 3.3**). Of these, 33.5% had either parents affected with psoriasis. **(Table 3.4, Figure 3.4)**

Table 3.3 Positive family history of psoriasis in adult and paediatric patients

Characteristics	Adult		Paediatric	
	n	%	n	%
Yes	2615	22.1	157	19.8
No	9002	76.1	626	78.9
Not available	205	1.7	10	1.3
Total	**11822**	**100**	**793**	**100**

Table 3.4 Family members with psoriasis in adult and paediatric patients

Family member (one or multiple)	Adult		Paediatric	
	n	%	n	%
Father	665	22.3	29	18.0
Mother	401	13.5	25	15.5
Sibling(s)	953	32.0	39	24.2
Children	306	10.3	0	0.0
Others	654	22.0	68	42.2

Figure 3.3 Distribution of family members with psoriasis in adult patients

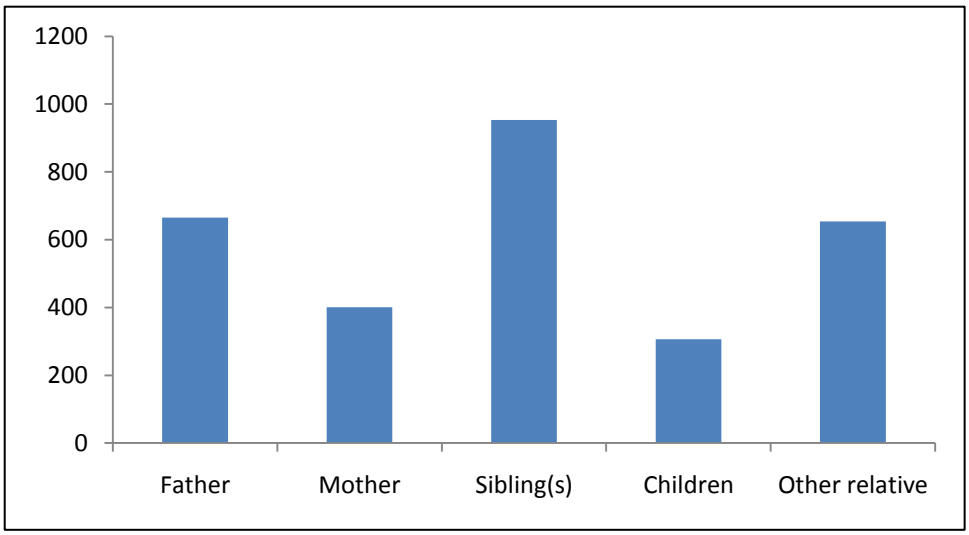
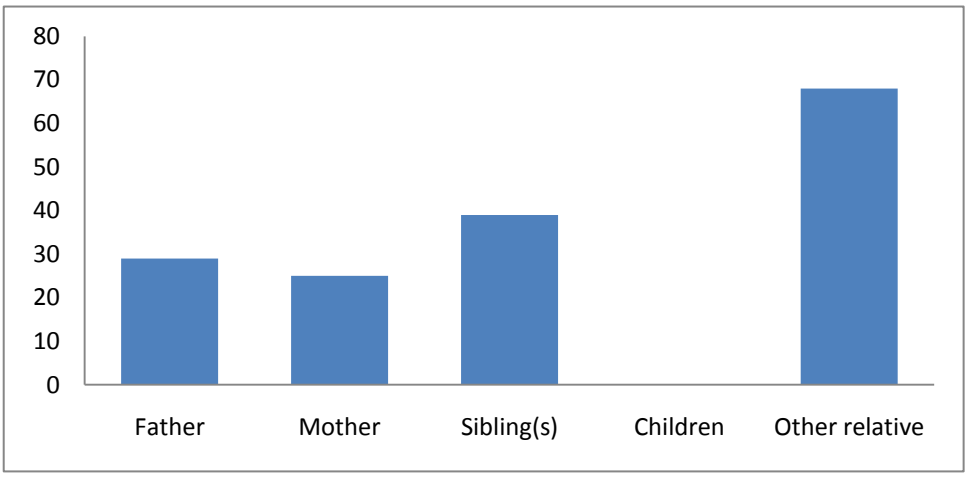


Figure 3.4 Distribution of family members with psoriasis in paediatric patients



Aggravating factors of psoriasis

More than half (52.2%) of adult patients with psoriasis reported one or multiple factors which worsened their psoriasis (**Table 3.5**). Stress was the commonest aggravating factor (46.9%), followed by sunlight (23.6%) and infection (10.5%). Other identified aggravating factors included trauma (4.8%), smoking (5.8%), drugs (3.3%), alcohol (2.3%), pregnancy (2.0%) and topical treatment (0.8%) (**Table 3.6**).

36.4% of paediatric patients, reported at least one factor that aggravated their psoriasis **(Table 3.5)**. The most common aggravating factors reported in paediatric patients were stress (39.8%), sunburn (35.2%) and infection (15.4%) (**Table 3.7**).

Analyzing the subgroup of patients who reported infection as an aggravating factor, upper respiratory tract infection (10.7% in adult; 21.4% in paediatric) appeared to be the commonest infective trigger (**Table 3.7**). Common medications found to aggravate psoriasis were beta blocker (31.0%), withdrawal of systemic steroids (20.1%), traditional medication/ homeopathy (16.7%), non-steroidal anti-inflammatory drugs (11.5%), antibiotics (8.0%) and ACE inhibitor (2.9%) (**Table 3.8**).

Table 3.5 Aggravating factors of psoriasis in adult and paediatric patients

Characteristics	Adult		Pediatric	
	n	%	n	%
Yes	6166	52.2	288	36.4
No	5295	44.8	494	62.4
Not available	361	3.0	11	1.4
Total	**11822**	**100**	**793**	**100**

Table 3.6 Proportion of aggravating factors for psoriasis in adult and paediatric patients

	Adult		Pediatric	
Aggravating factors (one or multiple)	**n**	**%**	**n**	**%**
Stress	4061	46.9	145	39.8
Sunlight	2046	23.6	128	35.2
Infection	913	10.5	56	15.4
Smoking	500	5.8	6	1.6
Trauma	413	4.8	25	6.9
Drugs	286	3.3	1	0.3
Alcohol	203	2.3	0	0.0
Pregnancy	176	2.0	0	0.0
Topical treatment	67	0.8	3	0.8

Table 3.7 Infections which aggravated psoriasis in adult patients

	Adult		Paediatric	
Infection	**n**	**%**	**n**	**%**
Upper respiratory tract infection	98	10.7	12	21.4
Fever / febrile illness	50	5.5	3	5.4
Viral infection	11	1.2	1	1.8
Dengue fever	7	0.8	1	1.8
Skin infection	5	0.5	0	0.0
HIV	5	0.5	0	0.0
Chickenpox	3	0.3	3	5.4
Hepatitis C	2	0.2	0	0.0
Pneumonia	2	0.2	0	0.0
Chikugunya	1	0.1	0	0.0
Dental Infection	1	0.1	0	0.0

Table 3.8 Drugs which aggravated psoriasis in adult and paediatric patients

	Adult		Paediatric	
Drug	**n**	**%**	**n**	**%**
Beta-blocker	54	31.0	0	0.0
Systemic steroids (withdrawal)	35	20.1	0	0.0
Traditional/ Homeopathy	29	16.7	0	0.0
NSAIDs /analgesia	20	11.5	1	33.3
Antibiotic	14	8.0	1	33.3
ACE inhibitor	5	2.9	0	0.0
Oral contraceptive pill	4	2.3	0	0.0
Antimalarial drug	2	1.1	0	0.0
Topical tar preparation	2	1.1	0	0.0
Sodium valporate	1	0.6	0	0.0
Daivobet	1	0.6	1	33.3
Biologic	1	0.6	0	0.0
HAART	1	0.6	0	0.0
Others	6	3.4	0	0.0

Disease Burden in the last 6 months:

Analysis of daily activities among adult psoriasis patients showed that 92.1% of them could perform their routine activities regularly. 7.9% of the population reportedly had to take off from work/school from anywhere between 1- 90 days due to psoriasis **(Table 3.9).** 76.3% of adult patients with psoriasis visited the clinic between 1-5 times in the past 6 months **(Table 3.9).** 2.6% of adult patients were hospitalized at least once in the last 6 months, and the majority (97.4%) did not require any hospitalization **(Table 3.10).**

Analysis of daily activities among paediatric psoriasis patients showed that, 91.1% of them could perform their routine activities regularly. 8.9% of the population reportedly had to take off from work/school from anywhere between 1- 120 days due to psoriasis **(Table 3.11).** 77.5% of paediatric patients with psoriasis visited the clinic between 1-5 times in the past 6 months **(Table 3.11).** Only 1.6% of paediatric patients were hospitalized at least once in the last 6 months, and the majority (98.4%) did not require any hospitalization **(Table 3.12).**

Table 3.9 Number of days off from work/school and clinic visits in adult patients with psoriasis

	Number of days off from work/school due to psoriasis		Number of clinic visits due to psoriasis	
	n	**%**	**n**	**%**
0	10047	92.1	2069	18.8
1-5	648	5.9	8380	76.3
6-10	122	1.1	447	4.1
>10	94	0.9	86	0.8

Table 3.10 Number of hospital admissions in adult patients with psoriasis

Number of hospital admissions due to psoriasis	n	%
0	10676	97.4
1-3	250	2.3
>3	30	0.3

Table 3.11 Number of days off from work/school and clinic visits in paediatric **patients with psoriasis**

	Number of days off to work/school due to psoriasis		Number of clinic visits due to psoriasis	
	n	**%**	**n**	**%**
0	685	91.1	138	18.3
1-5	43	5.7	585	77.5
6-10	10	1.3	28	3.7
>10	14	1.9	4	0.5

Table 3.12 Number of hospital admissions in pediatric patients with psoriasis

Number of hospital admissions due to psoriasis	n	%
0	741	98.4
1-3	11	1.5
>3	1	0.1

Smoking

Data on smoking status was only available for 6,230 (49.4%) of patients. This was because the smoking status data was not collected in the earlier version of the Case Report Form. A total of 1,199 (20.3%) adult patients with psoriasis were current smokers, while in paediatric population, it was 8 (2.4%) (**Table 3.13**).

Table 3.13 Cigarette smoking in adult and paediatric patients with psoriasis

	Adult		Paediatric	
Cigarette smoking	**n**	**%**	**n**	**%**
Never smoked	3919	66.4	322	97.3
Ex-smoker	781	13.2	1	0.3
Current smoker	1199	20.3	8	2.4
Not available	5923	-	461	-
Total	11882	100	792	100

CHAPTER 4

COMORBIDITIES

Patients with psoriasis were found to have a number of other concomitant diseases. As the spectrum of diseases differs among age groups, adult and paediatric patients were analyzed separately.

In adult psoriasis patients aged 18 and above, 34.2% were overweight and 23.1% were obese, 26.3% had hypertension, 17.9% had diabetes mellitus, 18.5% had hyperlidiemia, 5.6% had ischaemic heart disease and 1.5% had previous history of stroke (**Table 4.1**).

In children and adolescents aged below 18 years with psoriasis, the most prevalent comorbidity was overweight or obesity i.e. BMI at or above 85th centile (30.1 %), followed by bronchial asthma (1.9%), down syndrome (0.9%), hypertension (0.5%), hyperlipidaemia (0.5%), congenital heart disease (0.5%) and diabetes mellitus (0.4%). Other comorbid conditions were much less common (**Table 4.2**).

Compared to patients without arthritis, patients with psoriatic arthritis were found to have increased co-morbidities such as diabetes mellitus, hypertension, hyperlipidaemia and obesity ($p < 0.001$) (**Table 4.3**).

Table 4.1 Prevalence of co morbidities in adult patients with psoriasis

Co-morbidity	**n**	**%**
Overweight*	3527	34.2
Obesity*	2521	23.1
Hypertension	3105	26.3
Hyperlipidaemia	2184	18.5
Diabetes mellitus	2122	17.9
Ischaemic heart disease	663	5.6
Stroke	180	1.5

* BMI classification for adult Asians as stated in the Clinical Practice Guidelines on Management of Obesity 2004, Ministry of Health, Malaysia.

Table 4.2 Prevalence of comorbidities in paediatric patients with psoriasis

Comorbidity	N	%
Overweight or obesity (BMI≥85th centile)	218	30.1
Bronchial asthma	15	1.9
Down syndrome	7	0.9
Hypertension	4	0.5
Hyperlipidaemia	4	0.5
Congenital heart disease	4	0.5
Diabetes mellitus	3	0.4
Blood disorder	2	0.3
Stroke	1	0.1
Schizophrenia	1	0.1
Obstructive sleep apnoea	1	0.1
Brain tumor	1	0.1
Epilepsy	1	0.1

Table 4.3 Co-morbidities associated with psoriatic arthritis in adult patients

Co-morbidities	Arthritis Absent (*n* = 9,774)		Arthritis Present (*n* = 1,539)		Simple Logistic Regression		
	n	%	*n*	%	Crude OR	(95% CI)	*P* value
Diabetes Mellitus	1604	83.2	323	16.8	1.36	1.19, 1.56	<0.001
Hypertension	2330	82.6	492	17.4	1.51	1.34, 1.70	<0.001
Hyperlipidaemia	1615	80.8	383	19.2	1.69	1.49, 1.92	<0.001
Ischaemic heart disease	528	85.6	89	14.4	1.08	0.86, 1.36	0.520
Cerebrovascular disease	149	89.2	18	10.8	0.77	0.47, 1.25	0.288
BMI ≥ 30 (obesity WHO)	2111	83.1	429	16.9	1.40	1.24, 1.58	<0.001

[*] *Result was based on available information*

CHAPTER 5

CLINICAL PRESENTATION

Plaque psoriasis was the commonest type of psoriasis in both adult and paediatric population. In adult patients, plaque psoriasis accounted for 85.2% of patients, followed by guttate psoriasis in 3.5% of patients and erythrodermic in 1.8% of the patients. Similarly, in paediatric patients, plaque psoriasis accounted for 79.2% of patients, followed by guttate psoriasis in 6.9% of patients and flexural/inverse psoriasis in 1.3% of the patients. Other types of psoriasis were less common **(Table 5.1).**

Majority of our patients had mild to moderate body surface area involvement. In adult patients, 28.8% of our psoriatic patients had <5% and 5-10% of BSA affected, while 24.1% had 5-10% of BSA affected. Severe psoriasis with >10% BSA affected occurred in 16.1% adult patients, while 1.6% had erythrodermic psoriasis, i.e. >90% BSA involved. In paediatric patients population, 37.6% had <5% BSA involvement, 22.8% had 5-10% BSA involvement, 11.2% had 10-90% BSA and 0.5% were erythrodermic (**Table 5.2**).

Table 5.1 Distribution of psoriasis patients according to the type of psoriasis in adult and pediatric patients

BMI	Adult		Pediatric	
	n	%	n	%
Plaque	10076	85.2	627	79.1
Guttate	413	3.5	55	6.9
Pustular	60	0.5	9	1.1
Erythrodermic	212	1.8	6	0.8
Flexural/inverse	45	0.4	10	1.3
Palmoplantar non-pustular	38	0.3	3	0.4
Others	190	1.6	42	5.3
Not available	788	6.7	41	5.2
Total	**11822**	**100**	**793**	**100**

Table 5.2 Distribution of percentage of body surface area affected in adult and paediatric patients with psoriasis

Body surface area involved	Adult		Paediatric	
	n	%	n	%
<5%	3404	28.8	298	37.6
5 - 10%	2849	24.1	181	22.8
>10% to 90%	1904	16.1	89	11.2
>90%	187	1.6	4	0.5
Not available	3478	29.4	221	27.9
Total	**11822**	**100**	**793**	**100**

A composite clinical scoring system was used to evaluate the severity of psoriatic lesions in five body regions. A score of 0 to 3 was given for each body region according to the degree of erythema, thickness and scaliness of the skin lesions. The total clinical score may range from 0 to 15. Analysis on severity of lesion of adult patients with psoriasis noted that most of the moderate to severe lesions (score 2 and 3) were located on the lower limbs (35.1%), trunk (31.6%) and upper limbs (27.8%) (**Table 5.3**). Whereas in paediatric patients, moderate and severe lesions were seen mainly on the scalp region (33.7%), followed by the trunk (23.8%) **(Table 5.4).**

Almost half of the adult (48.6%) and paediatric (49.7%) psoriatic patients did not have any lesion on the face and neck. If present, lesions on face and neck were generally less severe (score 1 or 2) **(Table 5.3, Table 5.4).**

Table 5.3 Distribution of severity of body part affected in adult patients with psoriasis

Body part	Clinical score									
	0		1		2		3		NA	
	n	%	n	%	n	%	n	%	n	%
Scalp	2378	20.1	5939	50.2	2525	21.4	531	4.5	273	3.8
Face & neck	5742	48.6	4649	39.3	810	6.9	92	0.8	529	4.5
Trunk	3029	25.6	4564	38.6	3223	27.3	504	4.3	502	4.2
Upper limbs	2716	23.0	5336	45.1	2894	24.5	386	3.3	490	4.1
Lower limbs	2179	18.4	4994	42.2	3523	29.8	630	5.3	496	4.2

Table 5.4 Distribution of severity of body part affected in paediatric patients with psoriasis

Body part	Clinical score									
	0		1		2		3		NA	
	n	%	n	%	n	%	n	%	n	%
Scalp	128	16.2	372	47.0	205	25.9	62	7.8	25	3.2
Face & neck	394	49.7	303	38.3	54	6.8	6	0.8	35	4.4
Trunk	275	34.7	301	38.0	170	21.5	18	2.3	28	3.5
Upper limbs	294	37.1	321	40.5	126	15.9	21	2.7	30	3.8
Lower limbs	287	36.2	307	38.8	148	18.7	19	2.4	31	3.9

Majority of adult patients with psoriasis had nail involvement (58.5%) (**Table 5.5**). Among patients who had psoriatic nail disease, most of them had pitting (73.3%). Other common features were onycholysis (47.8%), discoloration (32.4%) and subungual hyperkeratosis (14.6%). Total nail dystrophy was found in 4.7% of patients with nail involvement (**Table 5.6**).

There were 280 (35.4%) paediatric patients with nail involvement (**Table 5.5**). Most of them had pitting (91.8%), followed by onycholysis (26.8%), discoloration (11.8%) and subungual hyperkeratosis (3.2%) and total nail dystrophy (2.1%) (**Table 5.6**).

Joint disease related to psoriasis was reported in 14.0% of the adult patients, while only 1.5% paediatric patients had joint involvement (**Table 5.7**). 309 adult patients had test for Rheumatic factor. Of these, only 2.1% was positive (**Table 5.8**).

In adult patients, the commonest type of psoriatic arthropathy was oligo-/monoarthropathy (39.9%). This was followed by rheumatoid-like symmetrical polyarthropathy (31.0%), distal hand joints arthropathy (30.2%), spondylitis/sacroilitis (8.6%) and arthritis mutilans (2.7%) (**Table 5.9**). Morning stiffness of > 30 minutes was reported in 31.4% of adult and 8.3% of paediatric patients. Enthesopathy was reported in 13.0% of adult patients and 8.3% of paediatric patients.

Table 5.5 Distribution of nail involvement in adult and paediatric patients with psoriasis

	Adult		Paediatric	
Nail involvement	**n**	**%**	**n**	**%**
Yes	6918	58.5	280	35.3
No	4630	39.2	497	62.7
NA	274	2.3	16	2.0
Total	**11822**	**100**	**793**	**100**

Table 5.6 Distribution of nail features in adult and paediatric patients with psoriasis

	Adult		Paediatric	
Nail features	**n**	**%**	**n**	**%**
Pitting	5068	73.3	257	91.8
Onycholysis	3305	47.8	75	26.8
Discoloration	2244	32.4	33	11.8
Subungual hyperkeratosis	1008	14.6	9	3.2
Total nail dystrophy	326	4.7	6	2.1

Table 5.7 Distribution of joint disease in adult and paediatric patients with psoriasis

	Adult		Paediatric	
Joint disease	**n**	**%**	**n**	**%**
Yes	1658	14.0	12	1.5
No	9877	83.5	764	96.4
Not available	287	2.4	17	2.1
Total	**11822**	**100**	**793**	**100**

Table 5.8 Rheumatoid factor in adult and paediatric patients with psoriasis

	Adult		Paediatric	
Rheumatoid factor	**n**	**%**	**n**	**%**
Positive	35	2.1	0	0.0
Negative	274	16.5	0	0.0

Table 5.9 Distribution of type of joint disease in adult and paediatric patients with psoriasis

	Adult		Paediatric	
Type of joint disease (one or multiple)	**n**	**%**	**n**	**%**
Oligo-/Monoarthropathy	661	39.9	7	58.3
Symmetrical polyarthropathy (Rheumatoid like)	514	31.0	1	8.3
Distal hand joints arthropathy	500	30.2	5	41.7
Spondylitis / Sacroiliitis	142	8.6	1	8.3
Arthritis mutilans	44	2.7	0	0.0

Most of the patients with psoriatic arthropathy experienced joint pain at time of presentation both in adult (80.7%) and pediatric (72.7%). Joint swelling was present in 32.5% adults and 27.3% of paediatric patients, while joint deformity occurred in 23.8% of adult patients and 18.2% of paediatric patients (**Table 5.10**, **Table 5.11**). The commonest type of joint deformity was swan neck deformity (18.5%). This was followed by fixed flexion deformity (14.0%), Boutonniere deformity (7.1%), Proximal interphalangeal joint deformity (5.6%), Distal hand joint deformity (4.0%), Rheumatoid arthritis-like (2.1%), Arthritis mutilans (1.9%), Subluxation (1.6%), Dactylitis (1.3%) and bamboo spine (0.8%) (**Table 5.12**).

Table 5.10 Symptoms of psoriatic arthritis in adult patients with psoriasis

	Yes		No		Not available	
Symptoms	**n**	**%**	**n**	**%**	**n**	**%**
Pain	1294	80.7	287	17.9	22	1.4
Swelling	517	32.5	1055	66.3	19	1.2
Deformity	378	23.8	1185	74.7	23	1.5

Table 5.11 Symptoms of psoriatic arthritis in paediatric patients with psoriasis

	Yes		No		Not available	
Symptoms	**n**	**%**	**n**	**%**	**n**	**%**
Pain	4	72.7	6	18.2	1	9.1
Swelling	3	27.3	7	63.6	1	9.1
Deformity	2	18.2	8	72.7	1	9.1

Table 5.12 Distribution of type of joint deformities in adult patients with psoriasis

Type of joint deformity	**n**	**%**
Swan neck deformity	70	18.5
Fixed flexion	53	14.0
Boutonniere deformity	27	7.1
Proximal interphalangeal joint deformity	21	5.6
Distal hand joint deformity	15	4.0
Rheumatoid arthritis-like	8	2.1
Arthritis mutilans	7	1.9
Subluxation	6	1.6
Dactylitis	5	1.3
Bamboo spine	3	0.8

By using multiple logistic regressions, 10 factors were found to be significantly associated with psoriatic arthritis in adults patients ($p<0.05$). These were older patients (age > 40 years), younger age of onset (<40 years), female gender, Indian ethnicity, BMI ≥ 30, patients with erythrodermic psoriasis, presence of nail involvement and DLQI > 10 (**Table 5.13**).

Table 5.13 Factors associated with psoriatic arthritis in adult patients

Variable	Absent (n=9774)		Present (n=1539)		Multiple Logistic Regression[a]		
	n	%	n	%	Adj. OR	(95% CI)	P-value
Age:							<0.001
<18 years	740	97.6	18	2.4	1.00	-	
18-40 years	3698	88.6	478	11.4	7.08	(2.23, 22.50)	
41-60 years	3602	82.2	780	17.8	11.19	(3.53, 35.54)	
>60 years	1734	86.8	263	13.2	9.67	(3.01, 31.04)	
Age of onset:							NS
≤40 years (Type 1)	6390	86.1	1031	13.9	1.00	(0.63, 1.03)	
>40 years (Type 2)	3217	87.2	474	12.8	0.81	-	
Duration of disease:							<0.001
≤5 years	4423	91.2	428	8.8	1.00	-	
>5 years	5184	82.8	1077	17.2	1.64	(1.34, 2.01)	
Gender:							<0.001
Male	5595	88.2	752	11.8	1.00	-	
Female	4179	84.2	787	15.8	1.67	(1.39, 2.00)	
Ethnicity:							<0.001
Indian	1646	81.6	372	18.4	1.71	(1.39, 2.12)	
Non-Indian	8125	87.4	1167	12.6	1.00	-	
Obesity group (WHO):							0.002
BMI <30	7663	87.3	1110	12.7	1.00	-	
BMI ≥30	2111	83.1	429	16.9	1.36	(1.12, 1.66)	
Type of psoriasis:							NS
Erythrodermic	144	77.0	43	23.0	0.92	(0.53, 1.59)	
Non-erythrodermic	9179	86.7	1407	13.3	1.00	-	
Body surface area:							0.020
≤10%	5431	87.7	760	12.3	1.00	-	
>10%	1617	83.1	372	18.7	1.28	(1.04, 1.58)	
Total skin score:							<0.001
<10	9011	87.0	1346	13.0	1.00	-	
≥10	611	81.3	164	21.2	1.87	(1.37, 2.56)	

Nail involvement:							<0.001
Absence	4279	87.0	360	7.8	1.00	(1.83, 2.76)	
Presence	5447	78.8	1154	17.5	2.25	-	
DLQI:							<0.001
≤10	3468	92.2	552	13.7	1.00	-	
>10	1586	82.5	364	18.7	1.49	(1.23, 1.80)	

(Total N = 11,520 but missing joint disease category of 207 cases)
*Result was based on available information.
Adj. OR = Adjusted odds ratio.
NS = Not significant
[a] Forward LR was applied.
Multicollinearity was checked and not found.
Hosmer-Lemeshow test (P=0.140), classification table (overall correctly classified percentage=85.0%) and area under the ROC curve (69.8%) were applied to check the model fitness.

CHAPTER 6

TREATMENTS

Types of treatment received by the patients for psoriasis in the last six months were analysed.

Most adult patients with psoriasis used some form of topical medications for psoriasis (95.7%) (**Table 6.1**). In 68.6% of the patients, topical monotherapy was the only treatment given. The most commonly used topical medication was topical steroids (82.4%). This was followed by topical tar preparation (72.0%), emollients (72.3%), keratolytics (52.5%) vitamin D analogue such as calcipotriol (20.0%) and calcipotriol with betamethasone dipropionate 11.4%. Dithranol was less favoured and used in 2.2% of patients only (**Table 6.2**).

In the paediatric patients, 94.8% of patients received topical therapy **(Table 6.1)**. The most common type of topical therapy was topical steroids (75.6%), followed by tar preparation (68.3%) and emollient (63.4%) **(Table 6.2).**

Table 6.1 Use of topical therapy in adult and paediatric patients with psoriasis

	Adult		Paediatric	
Topical therapy	**n**	**%**	**n**	**%**
Yes	11314	95.7	752	94.9
No	150	1.3	17	2.1
Not available	358	3.0	24	3.0
Total	11822	100	793	100

Table 6.2 Types of topical therapy used in adult and paediatric patients with psoriasis

	Adult		Paediatric	
Topical therapy	**n**	**%**	**n**	**%**
Topical steroids	9739	82.4	599	75.6
Tar preparation	8517	72.0	541	68.3
Emollient	8543	72.3	502	63.4
Keratolytics	6204	52.5	351	44.3
Vitamin D analogues	2359	20.0	127	16.0
Calcipotriol with betamethasone dipropionate	1352	11.4	66	8.3
Dithranol (anthralin)	261	2.2	23	2.9
Others	217	1.8	18	2.3

In the last six months prior to notification, 3.5% of adult patients and 1.0% of paediatric patients received phototherapy (**Table 6.3**).

Most of adult patients (87.4%) and paediatric patients (87.5%) were given narrowband UVB (NB-UVB) while 5.3% of adult patients with psoriasis were given broadband UVB (BB-UVB). Less popular modalities in adult patients were oral PUVA (2.9%), topical PUVA (1.7%), bath PUVA (1.5%) and excimer laser (0.2%). 12.5% of paediatric patients were given topical PUVA (**Table 6.4**).

Table 6.3 Use of phototherapy in adult and paediatric patients with psoriasis

	Adult		Paediatric	
Phototherapy	**n**	**%**	**n**	**%**
Yes	412	3.5	8	1.0
No	10846	91.7	744	93.8
Not available	564	4.8	41	5.2
Total	**11822**	**100**	**793**	**100**

Table 6.4 Types of phototherapy in adult and paediatric patients with psoriasis

	Adult		Paediatric	
Types of Phototherapy	**n**	**%**	**n**	**%**
Narrowband UVB	360	87.4	7	87.5
Broadband UVB	24	5.3	0	0.0
Oral PUVA	12	2.9	0	0.0
Topical PUVA	7	1.7	1	12.5
Bath PUVA	6	1.5	0	0.0
Excimer laser	1	0.2	0	0.0
Others	10	2.4	0	0.0

Systemic therapy was used in 19.4% of adult patients and only 5.3% in paediatric patients with psoriasis (**Table 6.5**).

In adult patients, the commonest systemic agents used were methotrexate (71.5%), followed by acitretin (19.9%) and sulphasalazine (5.7%). Other systemic agents such as cyclosporin, hydroxyurea and biologics were used less frequently in adult patients with psoriasis **(Table 6.6).**

In paediatric patients, similarly to adult patients, methotrexate was the commonest systemic agent used (59.5%). This was followed by acitretin in 23.8% of patients **(Table 6.6).**

A total of 55 adult patients received biologic treatment. The biologic therapy most frequently used was adalimumab (24 patients), ustekinumab (21 patients), etanercept (12 patients), infliximab (6 patients) and efalizumab (5 patients). The name of the biologic agent was not specified in 8 patients.

Table 6.5 Use of systemic therapy in adult and paediatric patients with psoriasis

	Adult		Paediatric	
Systemic therapy	**n**	**%**	**n**	**%**
Yes	2297	19.4	42	5.3
No	9086	76.9	713	89.9
Not available	439	3.7	38	4.8
Total	11822	100	793	100

Table 6.6 Types of systemic therapy in adult and paediatric patients with psoriasis

	Adult		Paediatric	
Types of systemic therapy	**n**	**%**	**n**	**%**
Methotrexate	1642	71.5	25	59.5
Acitretin	458	19.9	10	23.8
Sulphasalazine	131	5.7	1	2.4
Cyclosporin	94	4.1	1	2.4
Hydroxyurea	17	0.7	0	0.0
Biologics	55	2.4	0	0.0
Systemic corticosteroids	106	4.6	5	11.9
Others	65	2.8	1	2.4

CHAPTER 7

QUALITY OF LIFE

There were a total of 6,227 adult patients (aged 17 and above) and 308 paediatric patients who completed the quality of life questionnaires, namely Dermatology Life Quality Index (DLQI) and Child Dermatology Life Quality Index (CDLQI).

The mean DLQI for adult psoriasis patients was 8.54 ± 6.44, and the mean CDLQI for paediatric patients was 7.78 ± 5.57.

The responses for each question of the DLQI and CDLQI were tabulated in **Table 7.1** and **7.2** respectively. 2082 (33.4%) of adult patients reported DLQI > 10, indicating severe quality of life impairment due to psoriasis or its treatment. There were 340 adults (5.5%) who had a DLQI > 20 indicating extremely large effect on their quality of life by psoriasis. Nevertheless, 13.1% of adult patients reported no effect at all on their quality of life (**Figure 7.1**).

As shown in **Figure 7.2**, "symptoms and feelings" was the DLQI category most affected by psoriasis in adult patients. 39.2% of patients were affected very much or a lot by the itch and pain as well as embarrassment due to psoriasis. The aspect of life least affected by psoriasis was "personal relationship" in which 63.7% of the adult patients did not have or only have a little effect in this aspect.

In the paediatric group, 28.2% of patients reported a CDLQI of more than 12 indicating very large or extremely large effect on quality of life (**Figure 7.3**). There were 8 patients (2.6%) who had CDLQI of more than 19, reflecting extremely large effect of quality of life. On the other hand, 11.4% paediatric patients reported no effect at all on their quality of life.

In paediatric patients, the category of CDLQI most affected was "symptoms and feelings". 36.9% of paediatric reported that psoriasis affected very much or a lot in the symptoms and feelings domain. The aspect of life least affected by psoriasis was "personal relationship" in which 84.3% of the children did not have or only have a little effect (**Figure 7.4**). These results are similar to that of the adult patients.

Patients with psoriatic arthritis were also noted to have poorer quality of life, with a DLQI > 10. They also have more clinic visits, more days off work and more hospital admissions (**Table 7.3**).

Table 7.1 Responses for DLQI in adult patients with psoriasis (age 17 and above)

No.	DLQI Question	n (%)				
		Very much	A lot	A little	Not at all	Not relevant
1	Over the last week, how itchy, sore, painful, or stinging has your skin been?	1194 (10.4)	3217 (28.2)	5854 (51.2)	1163 (10.2)	0 (0.0)
2	Over the last week, how embarrassed or self conscious have you been because of your skin?	1721 (15.1)	2827 (24.8)	4120 (36.1)	2739 (24.0)	0.0 (0.0)
3	Over the last week, how much has your skin interfered with you going shopping or looking after your home or garden?	1022 (8.9)	2147 (18.8)	3858 (33.7)	4069 (35.6)	341 (3.0)
4	Over the last week, how much has your skin influenced the clothes you wear?	881 (7.7)	2118 (18.5)	3969 (34.7)	4119 (36.0)	341 (3.0)
5	Over the last week, how much has your skin affected any social or leisure activities?	1032 (9.0)	2225 (19.5)	3771 (33.0)	4056 (35.5)	346 (3.0)
6	Over the last week, how much has your skin made it difficult for you to do any sport?	1066 (9.4)	2040 (17.9)	3194 (28.1)	3503 (30.8)	1580 (13.9)
7	Over the last week, has your skin prevented you from working or studying?	890 (11.3)	2563 (32.4)	4448 (56.3)	0 (0.0)	0 (0.0)
8	Over the last week, how much has your skin created problems with your partner or any of your close friends or relatives?	540 (4.7)	1405 (12.3)	3428 (30.0)	5556 (48.7)	489 (4.3)
9	Over the last week, how much has your skin caused sexual difficulties?	355 (3.1)	658 (5.8)	1888 (16.6)	5462 (48.1)	2995 (26.4)
10	Over the last week, how much of a problem has the treatment for your skin been, for example by making your home messy or by taking up time?	732 (6.4)	1795 (15.7)	3921 (34.3)	4399 (38.5)	578 (5.1)

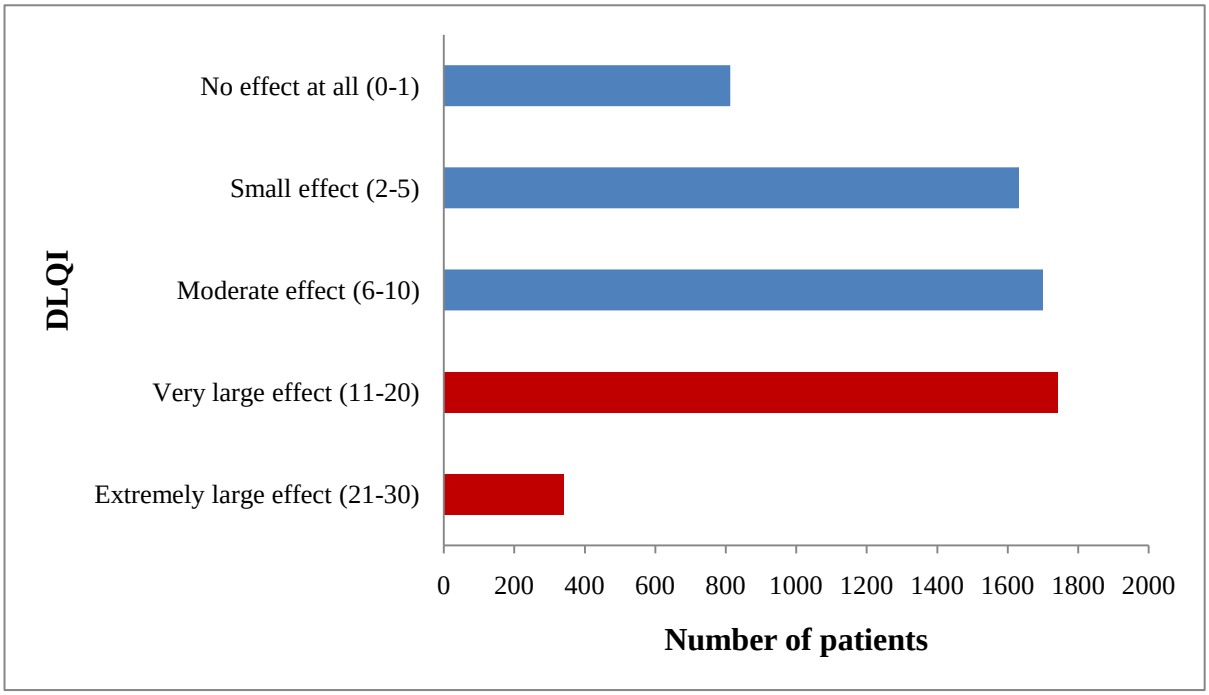


Figure 7.1 Quality of life in adult patients with psoriasis

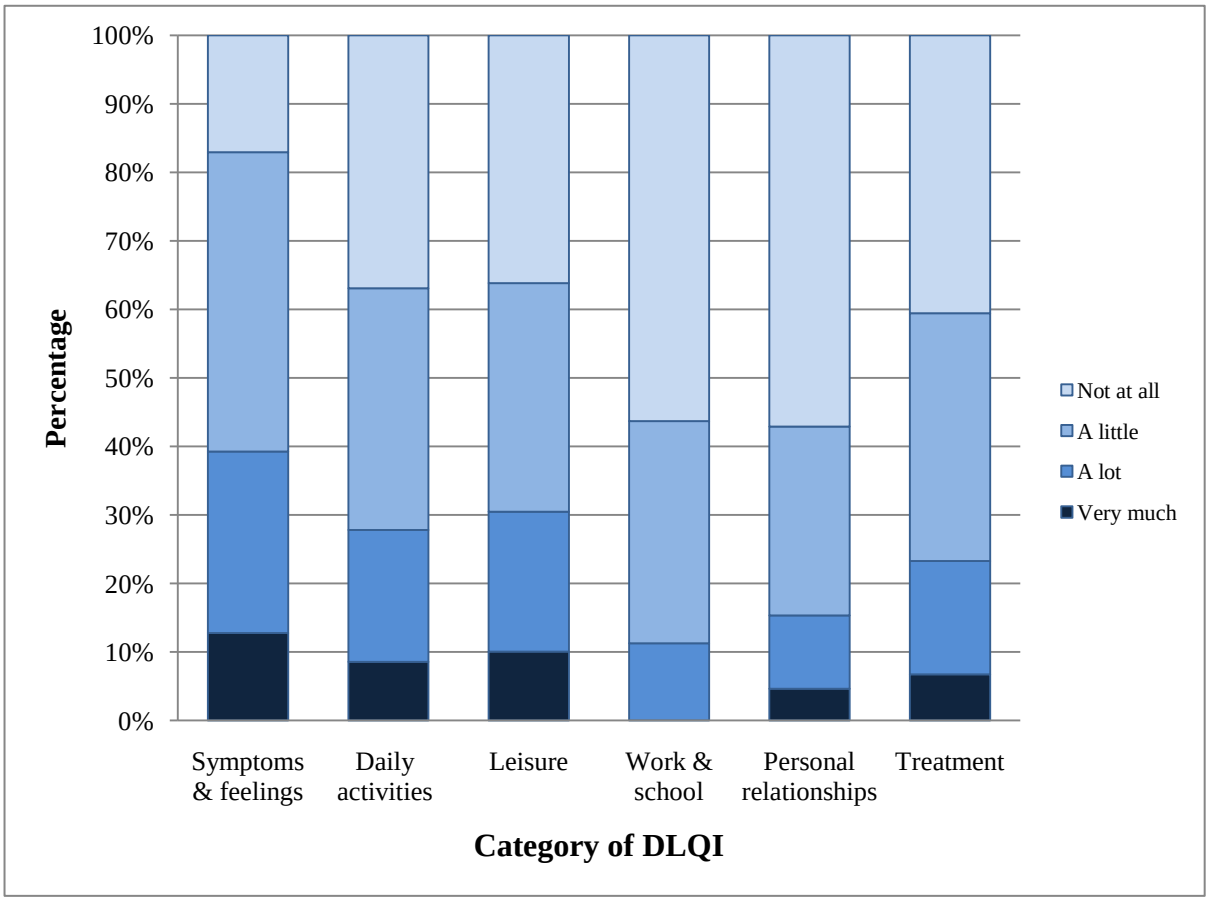


Figure 7.2 Quality of life impairment in adults psoriasis patients based on category of DLQI

Table 7.2 Responses for CDLQI in paediatric psoriasis patients (aged 5 to 16)

No.	CDLQI Question	n (%)				
		Very much	A lot	A little	Not at all	Not relevant
1	Over the last week, how itchy, "scratchy", sore, painful, or stinging has your skin been?	55 (8.4)	193 (29.6)	338 (51.8)	66 (10.1)	
2	Over the last week, how embarrassed or self conscious have you been because of your skin?	94 (14.5)	167 (25.7)	252 (38.8)	137 (21.1)	
3	Over the last week, how much has your skin affected your friendships?	24 (3.7)	95 (14.7)	190 (29.5)	336 (52.1)	
4	Over the last week, how much have you changed or worn different or special clothes/shoes because of your skin?	28 (4.3)	116 (17.9)	238 (36.8)	265 (41.0)	
5	Over the last week, how much has your skin trouble affected going out, playing, or doing hobbies?	46 (7.1)	105 (16.3)	217 (33.6)	278 (43.0)	
6	Over the last week, how much have you avoided swimming or other sports because of your skin trouble?	45 (7.0)	98 (15.2)	170 (26.3)	333 (51.5)	
7	If school time: Over the last week, how much did your skin problem affect your school work? Or If holiday time: Over the last week, has your skin problem interfered with your enjoyment of the holiday?	33 (5.1)	86 (13.4)	206 (32.0)	318 (49.5)	
8	Over the last week, how much trouble have you had because of your skin with other people calling you names, teasing, bullying, asking questions or avoiding you?	31 (4.8)	57 (8.8)	170 (26.4)	387 (60.0)	
9	Over the last week, how much has your sleep been affected by your skin problem?	38 (6.2)	85 (13.9)	200 (32.6)	290 (47.3)	
10	Over the last week, how much of a problem has the treatment for your skin been?	29 (4.5)	98 (15.2)	226 (35.0)	293 (45.4)	

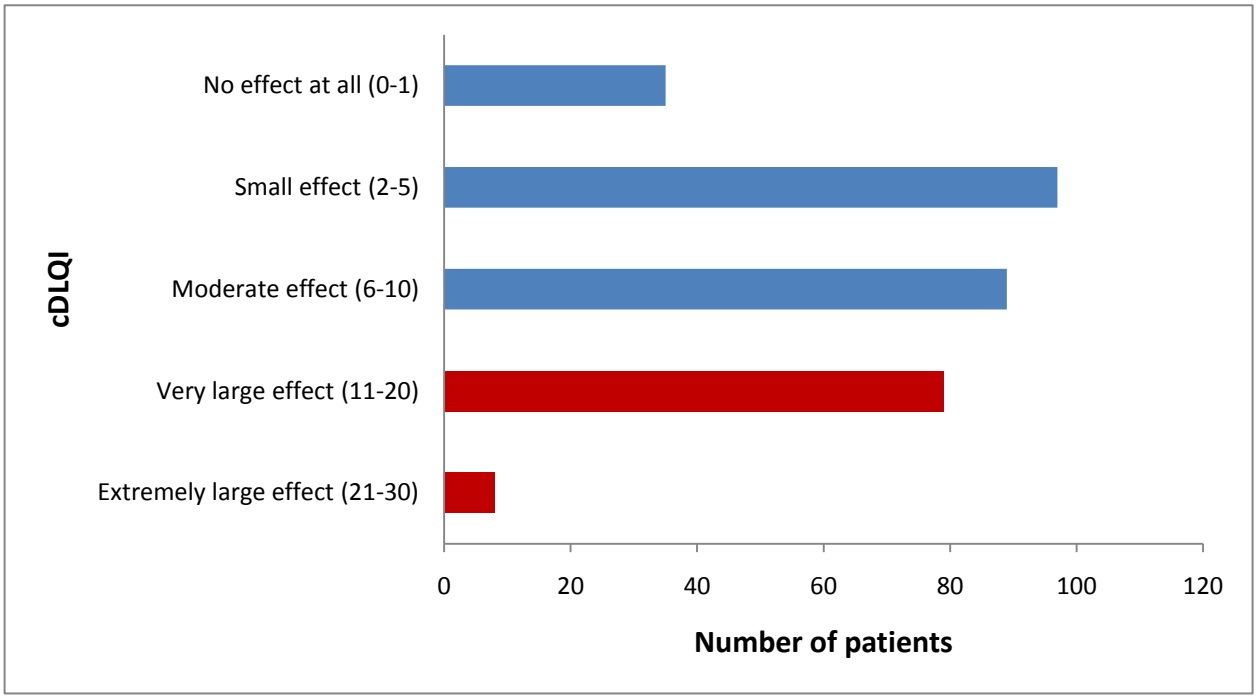


Figure 7.3 Quality of life in paediatric patients with psoriasis

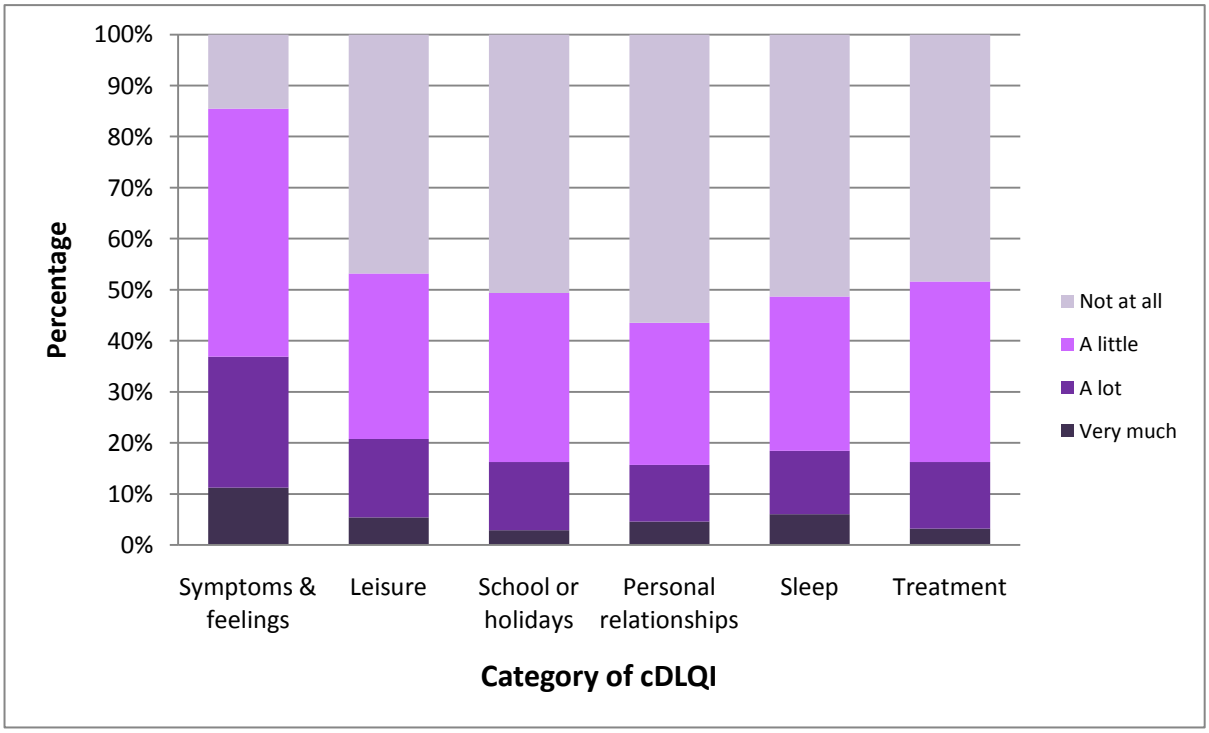


Figure 7.4 Quality of life impairment in paediatric patients with psoriasis based on category of DLQI

Table 7.3 Quality of life and productivity parameters observed in adult patients with psoriatic arthritis

Parameters	Absent (*n* = 9774)		Present (*n* = 1539)		Simple Logistic Regression		
	n	**%**	***n***	**%**	**Crude OR**	**(95% CI)**	***P* value**
DLQI, median (IQR)	7.0 (9.0)		8.0 (11.0)				<0.001
≤10	3468	86.3	552	13.7	1.00	-	
>10	1586	81.3	364	18.7	1.44	(1.25, 1.67)	
***No. of clinic visit**, median (IQR)	2.0 (1.0)		2.0 (2.0)				<0.001
0 time	1726	88.7	219	11.3	1.00	-	
1-2 times	5318	87.0	795	13.0	1.18	(1.01, 1.38)	
3-10 times	2100	83.3	422	16.7	1.58	(1.33, 1.89)	
11-48 times	63	82.9	13	17.1	1.63	(0.88, 3.00)	
***No. of days off work**, median (IQR)	0.0 (0.0)		0.0 (0.0)				<0.001
0 day	8501	87.3	1241	12.7	1.00	-	
1-3 days	462	81.8	103	18.2	1.53	(1.22, 1.91)	
4-10 days	144	71.6	57	28.4	2.71	(1.98, 3.71)	
11-90 days	58	61.7	36	38.3	4.25	(2.79, 6.47)	
***No. of hospital admissions**, median (IQR)	0.0 (0.0)		0.0 (0.0)				<0.001
0 time	9008	86.7	1384	13.3	1.00	-	
1-2 times	168	76.4	52	23.6	2.02	(1.47, 2.76)	
3-15 times	20	62.5	12	37.5	3.91	(1.91, 8.01)	

**Over a 6-month period.*
IQR = 25th – 75th percentile.
Result was based on available information.

CHAPTER 8

OUTCOMES

In this registry, follow-up data were collected approximately every 6 months. Outcomes of patients were assessed by measuring the change in several clinical parameters between the last follow-up visit and the visit at registration. Severity of psoriasis skin lesions were assessed in terms of the extent of lesions, i.e. percentage of body surface area involvement, and lesional characteristics via clinical skin scoring method for each of the five body regions. Other clinical parameters monitored include severity of joint pain on a visual analogue score (0-10), and quality of life using Dermatology Life Quality Index (DLQI).

A total of 3,826 follow-up data were available from 12,615 patients notified to the MPR. From a total of 11,822 adult patients with psoriasis registered in MPR, follow-up data were obtained in 3,659 patients. In paediatric cases, follow-up data were obtained in 158 patients. The mean duration of follow-up was 35.98 ± 25.24 months, with the longest duration of 87 months (**Table 8.1**).

Extent of Psoriasis Lesions

The extent of psoriasis lesions was assessed in terms of percentage of body surface area involvement categorised into 4 scales, i.e. <5%, 5%-10%, 10%-90%, and >90% (erythrodermic). A total of 2,286 patients were evaluated for change in the extent of lesions. Of these patients, 590 patients (25.8%) had improvement by at least one scale, among which 133 (5.8%) had improvement by two scales, and 10 patients improved from BSA>90% to BSA<2%. No improvement was found in 1,134 patients (49.6%), and 419 patients (18.3%) had worsening by at least one scale (**Figure 8.1**).

Clinical Skin Scores

Clinical skin scores measures the thickness, erythema and scaliness of the psoriasis lesions in each of the five body regions. A score of 0 to 3 is given for each body region. Total Clinical Skin Score is the total of the scores in all five body regions. 257 patients (7.0%) had the most marked improvement in skin scores by 75% or more, and 583 patients (15.9%) had improvement by 50-75%, while 621 patients (16.9%) had 25-50% improvement. 343 patients (9.3%) had modest improvement of less than 25%. No improvement of skin scores were detected in 638 patients (17.1%). Skin scores worsened in 1,232 patients (33.5%) (**Figure 8.2**).

Joint Pain

From a total of 196 patients who reported to have joint pain, 86 patients (43.9%) had improvement in joint pain as measured by the visual analogue scale. Of these patients, 25 patients (12.8%) had improvement of between 50% and 75%, 11 patients (5.6%) had improvement of more than 75%, 37 patients (18.9%) had improvement of between 25% and 50%, and 13 patients (6.6%) had improvement of less than 25%. There was no improvement of joint pain in 45 patients (22.9%), while joint pain worsened in 65 patients (33.2%) (**Figure 8.3**).

Table 8.1 Distribution of psoriasis patients according to the duration of follow-up

Duration of follow-up	n	%
0 to 6 months	347	9.1
7 to 12 months	604	15.8
13 to 18 months	431	11.3
19 to 24 months	317	8.3
25 to 30 months	265	6.9
31 to 36	250	6.5
>36	1612	42.1
	3826	**100.0**

Mean duration of follow-up: 35.98 ± 25.24 months (range 0 – 87months)

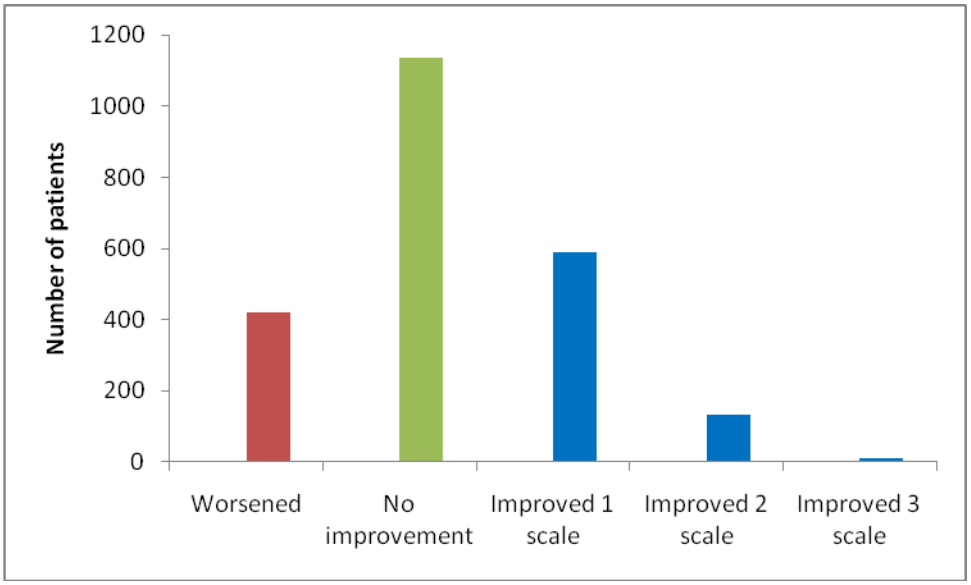


Figure 8.1 Improvement in the extent of skin lesions

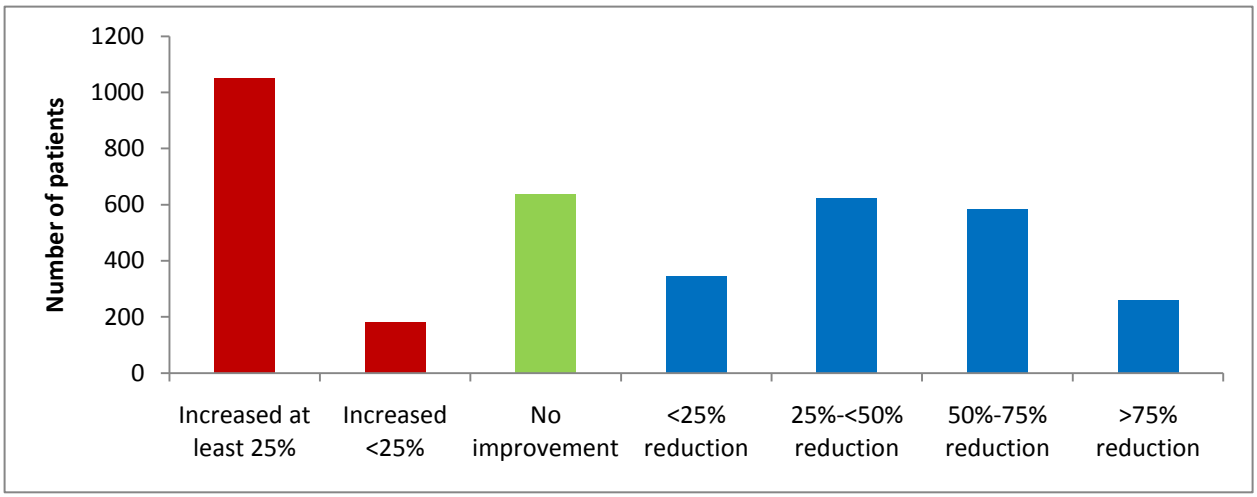


Figure 8.2 Improvement in the total clinical skin scores

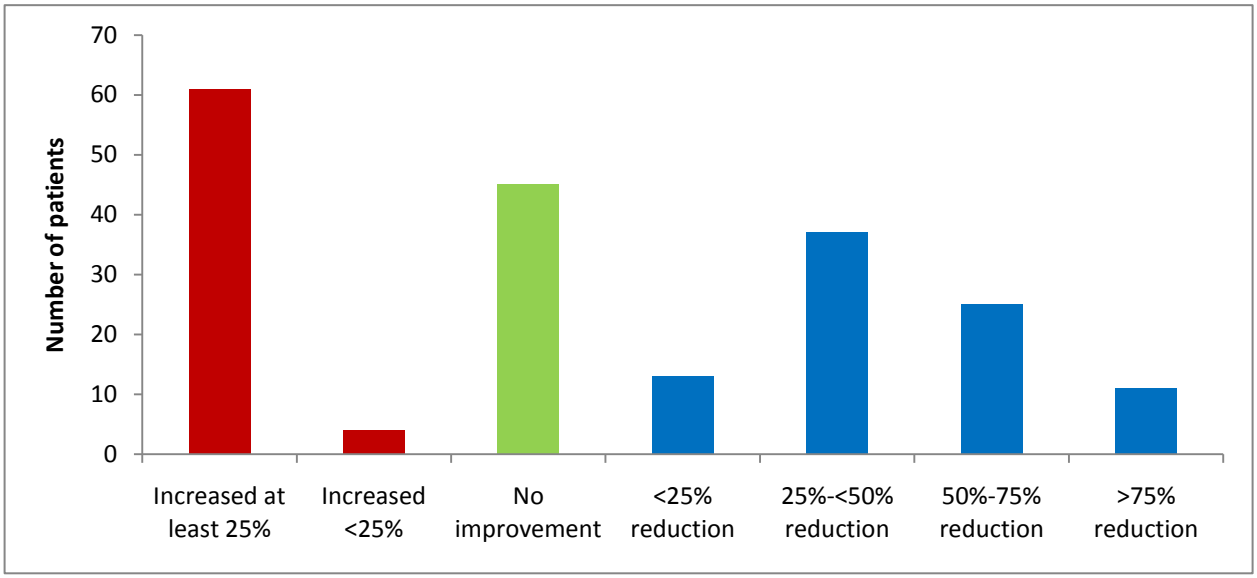


Figure 8.3 Improvement in joint pain

Change in Quality of Life

In adult patients aged 17 years and above, we noted an overall improvement in the quality of life. A total of 1,923 adult patients were evaluated for change in quality of life by DLQI. Of these patients, 481 patients (25.0%) had significant improvement with a reduction of DLQI score by at least 5, whereas 352 patients (18.3%) had significant worsening with an increase in DLQI score by at least 5 (**Figure 8.4**).

A total of 44 patients aged below 17 were evaluated for change in quality of life by DLQI. Of these patients, 10 patients (23.6%) had a significant improvement of Child DLQI score by at least 5, while 4 patients (9.1%) worsened (**Figure 8.4**).

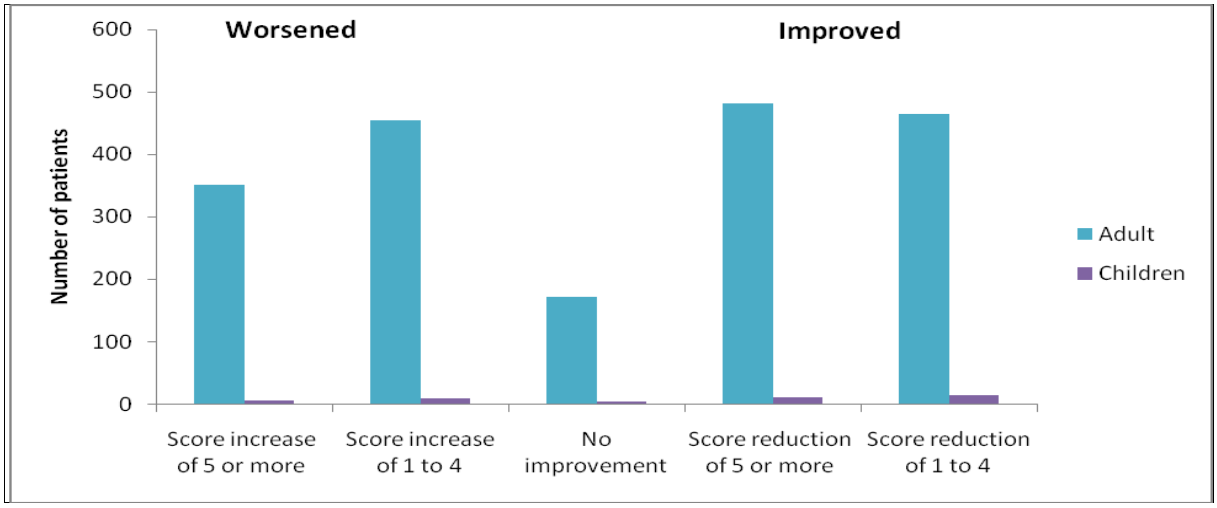


Figure 8.4 Improvement in DLQI and CDLQI

Mortality in Psoriasis

We performed a further sub-analysis to determine the causes of mortality in patients with psoriasis. All adult psoriasis patients aged 18 and above notified to the Malaysian Psoriasis Registry between July 2007 and December 2014 were cross-checked against the National Death Registry. Patients certified dead were identified and the causes of death according to the death certificate were analyzed. Simple logistic regression was performed to determine the role of cardiovascular risk factors affecting mortality while multivariate analysis using multiple logistic regression was performed to determine possible predictive factors of mortality such as age, age of onset (whether above the age of 40 years or not), gender, Body Surface Area (BSA) involvement, the use of systemic therapy and the presence of comorbidities. Missing data were not included in the analysis. Enter method was applied. Multicollinearity was checked to ensure the correlation between predictive factors were not found. Pearson Chi-squared test was used to determine whether the use of systemic therapy was associated with infections, malignancies and cardiovascular diseases causing death as well as whether the severity of disease was associated with cardiovascular causes of mortality.

A total of 11,622 adult patients (18 and above) were notified to the registry between July 2007 and December 2014, of which 551 deaths (4.95% of patients in the registry) were identified (408 males, 143 females). The mean age at demise was 59.81 ± 13.72 years.

Hypertension, diabetes mellitus, dyslipidaemia, ischaemic heart disease and cerebrovascular disease were risk factors that were significantly associated with overall mortality among psoriasis patients (p<0.001) **(Table 8.2)**. Four factors emerged as predictive factors of higher mortality in adult patients with psoriasis, namely age >40 years (age 41-60 years old Odds Ratio (OR) 3.03, 95% Confidence Interval (95%CI) 2.05, 4.50; age >60 years OR 6.74, 95%CI 4.40, 10.35), male gender (OR 1.38, 95%CI 1.39, 2.17), severe psoriasis with body surface area (BSA) >10% (OR 1.57, 95%CI 1.26, 1.96) and presence of at least one cardiovascular comorbidity (OR 1.95, 95% CI 1.55, 2.47) **(Table 8.3)**. Age of onset of psoriasis (whether 40 years old and below or more than 40 years old) had a weak association with mortality (OR 1.38, 95%CI 1.08, 1.76, p=0.009) while there was no significant association between systemic treatment and mortality.

Out of 551 deaths, 410 cases (74.4%) had reported causes of death **(Table 8.4)** in which the most common cause of death was cardiovascular causes (n=145, 35.4%), followed by infection (n=127, 31.0%), and malignancy (n=64, 15.6%). For the remaining 141 cases (25.6%), the medical causes of death could not be determined as the death certification had been done by police who had listed 'death due to natural causes'. The types of infections and malignancies among the patients who died are listed in **Table 8.5**. For lung infections, out of 68 patients, 60 had pneumonia (88.2% of lung infections) while eight patients (11.8%) had tuberculosis. Five patients with central nervous system infections, of which four (80.0%) had meningitis or meningoencephalitis while one (20.0%) had a cerebellar abscess.

Table 8.2 Cardiovascular risk factors in patients with psoriasis

Variables	Patient died (*n*= 551)		Patient alive (*n*= 11111)		Simple Logistic Regression		
	n	(%)	*n*	(%)	Crude OR	(95% CI)	P-value[a]
Diabetes Mellitus	205	0.10	1915	0.90	2.80	2.34, 3.35	<0.001
Hypertension	248	0.08	2855	0.92	2.35	1.97, 2.80	<0.001
Hyperlipidaemia	157	0.07	2024	0.93	1.78	1.47, 2.16	<0.001
Ischaemic heart disease	94	0.14	567	0.86	3.77	2.97, 4.78	<0.001
Cerebrovascular disease	29	0.16	149	0.84	4.05	2.70, 6.09	<0.001

**Result was based on available information. Percentage (%) was calculated based on number of cases over total number for each group.*

[a] Wald statistic.

Table 8.3 Predictive factors of higher mortality in patients with psoriasis

Variables	Patient died (*n*= 551)		Patient alive (*n*= 11111)		Multiple Logistic Regression[a]		
	n	**(%)**	***n***	**(%)**	**Adj. OR**	**(95% CI)**	**P-value**
1. Age:							<0.001
18-40 years	54	0.01	4556	0.99	1.00	-	
41-60 years	232	0.05	4609	0.95	3.03	2.05, 4.50	
>60 years	265	0.12	1946	0.88	6.74	4.40, 10.35	
2. Age of onset:							0.009
≤40 years (Type 1)	191	0.03	7123	0.97	1.00	-	
>40 years (Type 2)	354	0.09	3696	0.91	1.38	1.08, 1.76	
3. Gender:							<0.001
Male	408	0.06	6218	0.94	1.74	1.39, 2.17	
Female	143	0.03	4893	0.97	1.00	-	
4. BSA involved							<0.001
≤10%	300	0.05	5862	0.95	1.00	-	
>10%	136	0.07	1927	0.93	1.57	1.26, 1.96	
5. Systemic therapy							NS
Yes	121	0.05	2163	0.95	-	-	
No	418	0.05	8527	0.95	-	-	
6. Co-morbidity:							<0.001
At least one	384	0.08	4530	0.92	1.95	1.55, 2.47	
None	164	0.03	6346	0.97	1.00	-	

**Result was based on available information*

Adj. OR = Adjusted odds ratio; NS=Not significant

[a]Enter method was applied

Multicollinearity was checked and not found

Hosmer-Lemeshow test (P=0.057), classification table (overall correctly classified percentage=94.6%) and area under the ROC curve (76.8%) were applied to check the model fitness

Table 8.4 Reported cause of mortality among patients with psoriasis

Cause of mortality	Number of patients, n	%
Cardiovascular	145	35.4
Infection	127	31.0
Malignancy	64	15.6
Trauma	19	4.6
Liver	17	4.1
Lung	16	3.9
Gastrointestinal	7	1.7
Renal	7	1.7
Suicide	6	1.5
Others	2	0.5
Total	**410**	**100**

Table 8.5 Types of infections and malignancy related deaths

Types	Number, n	%
Infection		
Lung	68	56.2
Sepsis	21	17.4
Gastrointestinal	15	12.4
Urinary Tract	6	5.0
Human Immunodeficiency Virus (HIV)-related	6	5.0
Central Nervous System	5	4.0
Total	123	100
Malignancy		
Liver	13	27.1
Gastrointestinal	12	25.0
Upper Aerodisgestive Tract	8	16.7
Lung	7	14.6
Breast	6	12.5
Lymphoma and Leukaemia	5	10.4
Others	10	20.8
Total	**48**	**100**

APPENDIX A: CASE REPORT FORM

NATIONAL DERMATOLOGY REGISTRY (DermReg)
Malaysian Psoriasis Registry
Case Report Form

CONFIDENTIAL
For Office Use only:
ID: ____ / ____
Centre ____

Instruction: Where check boxes ☐ are provided, check (√) one or more boxes. Where radio buttons ◯ are provided, check (√) one button only.

Doctor's Name :	
Name of Institution :	

SECTION 1: DEMOGRAPHIC DETAILS

1. Patient visit date : (dd/mm/yyyy)	____ / ____ / ____
2. Type of visit :	◯ New Case ◯ Follow-Up
3. Name of patient :	
4. NRIC :	MyKad/ MyKid: ____ - ____ - ____ Old IC: ____
	Other ID document No: ____
	Specify document type (if others): ◯ Registration number ◯ Mother's I/C ◯ Work Permit ◯ Clinic RN ◯ Passport ◯ Father's I/C ◯ Driver's Licence ◯ Police ID Card ◯ Birth Certificate ◯ Armed Force ID ◯ Hospital RN ◯ Others
5. Address : #	Town / City: ____ State : ____
6. Contact # number :	Homephone: ____ - ____ H/P: ____ - ____
7. Gender : #	◯ Male ◯ Female
8. Date of birth : # (dd/mm/yyyy)	____ / ____ / ____ ☐ Estimated/ presumed year *If the exact date is not known, please enter 01/07/yyyy & check the estimated/presumed year box*
9. Ethnic group : #	◯ Malay ◯ Chinese ◯ Indian ◯ Orang Asli ◯ Others, specify : ____
10. Nationality : #	◯ Malaysian ◯ Non-Malaysian, specify ____
11. Marital status : #	◯ Single ◯ Married ◯ Divorced ◯ Widow ◯ Widower

SECTION 2 : MEDICAL HISTORY

1. Age when # psoriasis started :	____
2. Age when # psoriasis diagnosed :	____
3. Family # member(s) with psoriasis :	◯ No ◯ Yes → *(if YES, please tick ONE or MULTIPLE)* ☐ Father ☐ Sibling(s) ☐ Other relative, specify ____ ☐ Mother ☐ Children
4. Aggravating factors :	◯ No ◯ Yes → *(if YES, please tick ONE or MULTIPLE of the following)* ☐ Infection : ____ ☐ Drugs : ____ ☐ Topical Rx : ____ ☐ Trauma ☐ Stress ☐ Sunburn ☐ Hypocalcaemia ☐ Pregnancy ☐ Smoking ☐ Alcohol ☐ Others, specify: ____
5. Disease burden in the last 6 months :	a) No.of clinic visits due to psoriasis : ____ *(enter 0 if none)*
	b) No. of days off work / school due to psoriasis : ____ *(enter 0 if none)* ☐ Not applicable
	c) No. of hospital admissions due to psoriasis : ____ *(enter 0 if none)*
6. Other diseases :	a) Ischaemic heart disease : ◯ Yes ◯ No ◯ Unknown
	b) Cerebrovascular disease (stroke) : ◯ Yes ◯ No ◯ Unknown
	c) Diabetes mellitus : ◯ Yes ◯ No ◯ Unknown
	d) Hypertension : ◯ Yes ◯ No ◯ Unknown
	e) Hyperlipidaemia : ◯ Yes ◯ No ◯ Unknown
	f) Other diseases, specify : (e.g. HIV infection, tuberculosis, lymphoma, etc.) ◯ Yes ◯ No ◯ Unknown → ____
7. Cigarette smoking :	◯ Never smoked ◯ Ex-smoker ◯ Current smoker → ____ cigarettes per day

Items marked # above need not be entered if the patient has been previously notified to the registry

Version 2.4 Last updated 07/12/2011 *page 1 of 4*

NATIONAL DERMATOLOGY REGISTRY (DermReg)
Malaysian Psoriasis Registry
Case Report Form

CONFIDENTIAL
For Office Use only:
ID: ____ / ____
Centre ____

Instruction: Where check boxes ☐ are provided, check (√) one or more boxes. Where radio buttons ○ are provided, check (√) one button only.

SECTION 3: CLINICAL EXAMINATION

1. (a) Height : ___ (cm) (b) Weight: ___ (kg)

2. Type of psoriasis : *(Please select ONE predominant type)*
○ Plaque ○ Guttate ○ Erythrodermic ○ Flexural / Inverse ○ Others,specify: ____
○ Generalised pustular ○ Localised Pustular ○ Palmoplantar non-pustular

3. Severity : Body surface area involved : ○ <5% ○ 5 - 10% ○ > 10% ○ Erythrodermic (>90%)

Body part	Grade of severity
Scalp	○ 0 ○ 1 ○ 2 ○ 3
Face & Neck	○ 0 ○ 1 ○ 2 ○ 3
Trunk	○ 0 ○ 1 ○ 2 ○ 3
Upper Limbs	○ 0 ○ 1 ○ 2 ○ 3
Lower Limbs	○ 0 ○ 1 ○ 2 ○ 3

Key for grading
Grade 0 : Skin normal or hypo-/hyperpigmented patch only.
Grade 1 : Mild erythema,fine scales, thin plaque, with or without central clearing.
Grade 2 : Moderate erythema or scaling, moderately thick plaque.
Grade 3 : Severe erythema or scaling, very thick plaque

4. Nail involvement : ○ No ○ Yes → ☐ Pitting ☐ Discoloration ☐ Total nail dystrophy ☐ Onycholysis ☐ Subungual hyperkeratosis
(if YES, please tick ONE or MULTIPLE)

5. Joint disease : ○ No ○ Yes

a) Rheumatoid factor	○ Negative	○ Positive	○ Not Available
b) Morning stiffness > 30 minutes			○ No ○ Yes
c) Enthesopathy / Dactylitis			○ No ○ Yes
d) Type :-	1. Oligo-/ Monoarthropathy		○ No ○ Yes
	2. Distal hand joints arthropathy		○ No ○ Yes
	3. Symmetrical polyarthropathy (Rheumatoid-like)		○ No ○ Yes
	4. Spondylitis / Sacroiliitis		○ No ○ Yes
	5. Arthritis mutilans		○ No ○ Yes
e) Severity:-	1. Pain	○ No ○ Yes →	Pain Score (1-10) : ___
	2. Swelling	○ No ○ Yes	
	3. Deformity	○ No ○ Yes →	Please Specify : ____

SECTION 4 : TREATMENT RECEIVED IN THE PAST 6 MONTHS

1. Topical therapy :

a) Tar preparation	○ No	○ Yes	e) Topical steroids (other than face / flexures)	○ No ○ Yes
b) Vitamin D analogues e.g calcipotriol	○ No	○ Yes	f) Keratolytics e.g. salicylic acid	○ No ○ Yes
c) Calcipotriol with betamethasone dipropionate	○ No	○ Yes	g) Emollient	○ No ○ Yes
d) Dithranol (anthralin)	○ No	○ Yes	h) Others, specify	○ No ○ Yes → ____

2. Phototherapy : ○ No ○ Yes → ☐ BB-UVB ☐ Oral PUVA ☐ Topical PUVA ☐ Others,specify ☐ NB-UVB ☐ Bath PUVA ☐ Excimer laser .....
(if YES, please tick ONE or MULTIPLE)

3. Systemic therapy : ○ No ○ Yes

a) Methotrexate	○ No	○ Yes	f) Biologics, specify	○ No ○ Yes → ____
b) Acitretin	○ No	○ Yes		
c) Sulphasalazine	○ No	○ Yes	g) Systemic corticosteroids	○ No ○ Yes
d) Cyclosporin	○ No	○ Yes	h) Others, specify	○ No ○ Yes → ____
e) Hydroxyurea	○ No	○ Yes		

SECTION 5: QUALITY OF LIFE

1. Quality of Life : Please instruct and assist patient in completing the attached DLQI form

***Note : Please ensure that all sections of this form have been completed.*
Kindly submit to :
Malaysian Psoriasis Registry, Department of Dermatology, Hospital Kuala Lumpur, Jalan Pahang, 50586 Kuala Lumpur

Version 2.4 Last updated 07/12/2011 *page 2 of 4*

NATIONAL DERMATOLOGY REGISTRY (DermReg)
Malaysian Psoriasis Registry
Dermatology Life Quality Index (DLQI)
(For Adults of Age 17 and Above)

CONFIDENTIAL
For Office Use only:
ID: ____ / ____
Centre ____

Instruction: Where check boxes ☑ are provided, check (√) one or more boxes. Where radio buttons ◯ are provided, check (√) one button only.

Objektif kaji selidik adalah untuk memahami setakat manakah masalah kulit anda mempengaruhi kehidupan anda SEPANJANG MINGGU LALU.
The aim of this questionnaire is to measure how much your skin problem has affected your life OVER THE LAST WEEK.
这份问卷的目的是衡量上周内您的皮肤问题对您的生活造成了多大的影响.
Sila tandakan satu kotak (√) untuk setiap soalan / *Please tick "√" one box for each question* 请在每个问题后选择一项打 " √ ".

DLQI Score ☐ *Auto calculated*

Sepanjang Minggu Lalu .... *OVER THE LAST WEEK* 上周内,	Sangat Banyak *Very much* 非常多	Banyak *A lot* 许多	Sedikit *A little* 一点	Tidak Langsung *Not at all* 完全没有	Tidak Berkenaan *Not Relevant* 无关
1) Setakat manakah kulit anda berasa gatal atau sakit ? *Over the last week, how itchy, sore, painful or stinging has your skin been?* 您的皮肤感到痒、触痛、疼痛、刺痛了吗 ?	◯	◯	◯	◯	
2) Setakat manakah anda berasa malu atau segan, disebabkan oleh kulit anda? *Over the last week, how embarrassed or self conscious have you been because of your skin?* 由于您的皮肤问题，您感到尴尬或自卑吗?	◯	◯	◯	◯	
3) Setakat manakah kulit anda menganggu anda daripada pergi membeli belah atau menjaga rumah atau berkebun ? *Over the last week, how much has your skin interfered with you going shopping or looking after your home or garden?* 因为皮肤问题，对您购物、做家务、整理庭院影响程度如何?	◯	◯	◯	◯	◯
4 Setakat manakah kulit anda mempengaruhi pakaian yang anda pakai? *Over the last week, how much has your skin influenced the clothes you wear?* 皮肤问题对您穿衣服影响程度如何?	◯	◯	◯	◯	◯
5) Setakat manakah kulit anda mengganggu aktiviti - aktiviti sosial atau masa lapang anda ? *Over the last week, how much has your skin affected any social or leisure activities?* 皮肤问题对您的社交或休闲生活有多大的影响?	◯	◯	◯	◯	◯
6) Setakat manakah keadaan kulit anda menyebabkan anda tidak selesa bersukan? *Over the last week, how much has your skin made it difficult for you to do any sport?* 皮肤问题对您运动有多大妨碍?	◯	◯	◯	◯	◯
7) Adakah kulit anda menyebabkan anda tidak bekerja atau belajar? *Over the last week, has your skin prevented you from working or studying?* 皮肤问题是否让您无法上班或学习? ☐ Ya *Yes* 是 ☐ Tidak *No* 不是 → ☐ Tidak Berkenaan *Not Relevant* 无关 *Jika "tidak", setakat manakah kulit anda menjadi masalah semasa kerja atau belajar? *If "No", over the last week how much has your skin been a problem at work or studying?* 如果选择 "不是"，那么上周内您的皮肤问题对工作或 学习有多大影响呢?		◯	◯	◯	
8) Setakat manakah kulit anda menimbulkan masalah dengan teman, rakan baik atau saudara mara anda? *Over the last week, how much has your skin created problems with your partner or any of your close friends or relatives ?* 皮肤问题妨碍了您和爱人、亲密的朋友、亲戚间的交往了 吗?	◯	◯	◯	◯	◯
9) Setakat manakah kulit anda menyebabkan sebarang masalah hubungan seks ? *Over the last week, how much has your skin caused sexual difficulties?* 皮肤问题给您的性生活造成了多大影响?	◯	◯	◯	◯	◯
10) Setakat manakah rawatan kulit anda menimbulkan masalah seperti mengotori rumah anda atau mengambil masa anda? *Over the last week, how much of a problem has the treatment for your skin been, for example by making your home messy or by taking up time?* 由于治疗您皮肤的毛病，给您造成了多少麻烦，如把家 里弄得一团糟或占用了您很多时间?	◯	◯	◯	◯	◯

Sila semak sama ada SETIAP soalan telah dijawab. Terima kasih
Please check you have answered EVERY question. Thank you.
请您检查您是否已回答所有问题. 谢谢合作

NATIONAL DERMATOLOGY REGISTRY (DermReg)
Malaysian Psoriasis Registry
Children's Dermatology Life Quality Index (DLQI)
(For age 5 to 16)

CONFIDENTIAL
For Office Use only:
ID: ____ / ____
Centre ____

Instruction: Where check boxes ☐ are provided, check (√) one or more boxes. Where radio buttons ◯ are provided, check (√) one button only.

Objektif kaji selidik adalah untuk memahami setakat manakah masalah kulit anda mempengaruhi kehidupan anda SEPANJANG MINGGU LALU.
The aim of this questionnaire is to measure how much your skin problem has affected your life OVER THE LAST WEEK.
这份问卷的目的是衡量上周内您的皮肤问题对您的生活造成了多大的影响.
Sila tandakan satu kotak (√) untuk setiap soalan / *Please tick "√" one box for each question* 请在每个问题后选择一项打 "√"

DLQI Score: ____ *Auto calculated*

Sepanjang Minggu Lalu .... *OVER THE LAST WEEK* 过去一星期中	Sangat Banyak *Very much* 非常多	Banyak *A lot* 许多	Sedikit *A little* 一点	Tidak Langsung *Not at all* 完全没有
1) Setakat manakah kulit anda berasa gatal atau sakit ? *Over the last week, how itchy, "scratchy",sore or painful has your skin been?* 你皮肤发痒、搔抓、破皮或疼痛的程度是如何？	◯	◯	◯	◯
2) Setakat manakah anda berasa malu, segan, susah hati atau sedih disebabkan oleh kulit anda? *Over the last week, how embarrassed or self conscious, upset or sad have you been becsuse of your skin?* 你因为自己皮肤问题而感到难为情或害羞、苦恼或难过的程度是如何？	◯	◯	◯	◯
3) Setakat manakah kulit anda mempengaruhi persahabatan anda? *Over the last week, how much has your skin affected your friendships?* 皮肤问题对你和朋友交往的影响是如何？	◯	◯	◯	◯
4) Setakat manakah anda menukar atau memakai pakaian atau kasut kerana kulit anda? *Over the last week, how much have you changed or worn different or special clothes/shoes becsuse of your skin?* 你因为皮肤问题而改变穿著不同或特定衣鞋的影响是如何？	◯	◯	◯	◯
5) Setakat manakah masalah kulit anda mempengaruhi anda untuk keluar, bermain atau melakukan hobi anda? *Over the last week, how much has your skin trouble affected going out,playing , or doing hobbies?* 皮肤的问题对你外出、玩耍、或从事休闲嗜好的影响是如何？	◯	◯	◯	◯
6) Setakat manakah anda menjauhi diri daripada berenang atau melakukan sukan lain disebabkan oleh masalah kulit anda? *Over the last week, how much have you avoided swimming or other sports because of your skin trouble?* 你因为皮肤的问题而避免游泳或其他运动的影响程度是如何？	◯	◯	◯	◯
7).Pada minggu yang lalu, *Last week,* 过去一星期 Pada hari persekolahan, setakat manakah kulit anda mempengaruhi kerja sekolah anda? *If school time: Over the last week, how much did your skin problem affect your school work?* 如果是上课时间，皮肤问题影响你学校功课的程度是如何？ ATAU *OR* 或 *Pada hari cuti, setakat manakah kulit anda mengganggu anda menikmati cuti?* *If holiday time: Over the last week, has your skin problem interfered with your enjoyment of the holiday?* 如果是放假期间，皮肤问题干扰到你享受假期的兴致是如何？	◯	◯	◯	◯
8) Setakat manakah orang menggelar anda dengan nama yang tidak baik, mengejek, menanya soalan-soalan atau menjauhi diri disebabkan oleh kulit anda? *Over the last week, how much trouble have you had because of your skin with other people calling you names, teasing, bullying, asking questions or avoiding you?* 因为皮肤的问题使得别人骂你、嘲笑你、欺负你、问你问题或躲避你。这种困扰程度是如何？	◯	◯	◯	◯
9) Setakat manakah masa tidur anda diganggu kerana masalah kulit? *Over the last week, how much has your sleep been affected by your skin problem?* 你因皮肤的问题而影响到睡眠的程度是如何？	◯	◯	◯	◯
10) Setakat manakah rawatan kulit anda menjadi suatu masalah? *Over the last week, how much of a problem has the treatment for your skin been?* 针对皮肤所进行的治疗对你产生的困扰程度是如何？	◯	◯	◯	◯

Sila semak sama ada SETIAP soalan telah dijawab. Terima kasih
Please check you have answered EVERY question. Thank you.
请您检查您是否已回答所有问题. 谢谢合作

APPENDIX B: DATA MANAGEMENT

The National Dermatology Registry (DermReg) maintains a database that includes patient's demographic data, medical history, comorbidities, clinical presentation, treatments received in the past 6 months and quality of life. Data is stored in SQL Server due to the high volume of data accumulated throughout the years.

Data Sources

SDPs of DermReg comprise of dermatology centres or clinics with dermatologists who participate in the registry throughout Malaysia.

Data Collection

The study involves collection of data on the patient's first visit to the participating centre and thereafter every six monthly on follow-up visits.

A carefully designed Case Report Form (CRF) is employed in the data collection. This is a double-sided single-sheet CRF which consists of a clinical data form and a multilingual Dermatology Life Quality Index (DLQI) form in both adult and children versions. The clinical data form is to be completed by the doctor in-charge while the DLQI form is to be completed by the patient (parent or guardian for young patient) with guidance from trained staff if necessary. Adult DLQI form should be used for patients above 16 years old, while Children DLQI for patients aged 5 to 16. It is not required to fill the DLQI form for patients below 5 years of age.

One set of CRF is to be completed for each new patient during consultation at the first visit to the participating centre. A new set of CRF is to be completed for the same patient every 6 monthly to record the progress of the patient. The CRFs are used as part of the clinical records.

The CRF is to be completed in duplicate. The participating centre retains the duplicate copy in the patient's medical record, while the original copy is to be sent within 2 weeks to the RCC where data are analysed, interpreted and presented in regular reports to be disseminated to the users.

Participation of SDP is entirely voluntary.

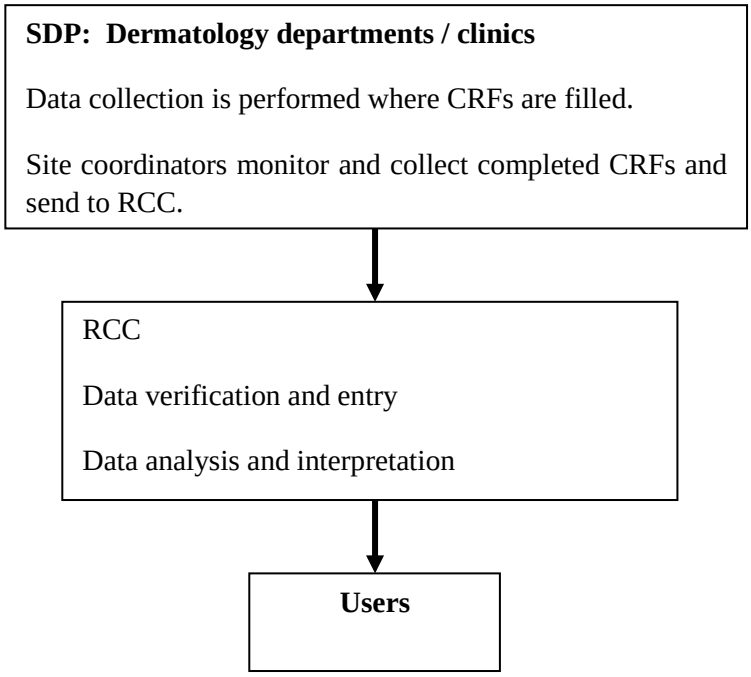
Registry ICT Infrastructure and Data Centre

The operations of the DermReg are supported by an extensive ICT infrastructure to ensure operational efficiency and effectiveness.

The network infrastructure consists of the network layout, placement of relevant hardware equipment, the general flow of data across the network, as well as the network services required for a functional and secure DermReg network infrastructure. DermReg servers are located in a data centre in Cyberjaya in order to provide DermReg with quality assured data hosting services and state-of-the-art physical and logical security features without having to invest in costly data centre setup internally. The physical security features implemented include fire suppression system, access card and biometrics authentication to gain physical access to the data centre, uninterrupted power supply, and backup devices. Logical security features implemented include firewall, antivirus, automated patching, encryption, traffic monitoring and intrusion detection system.

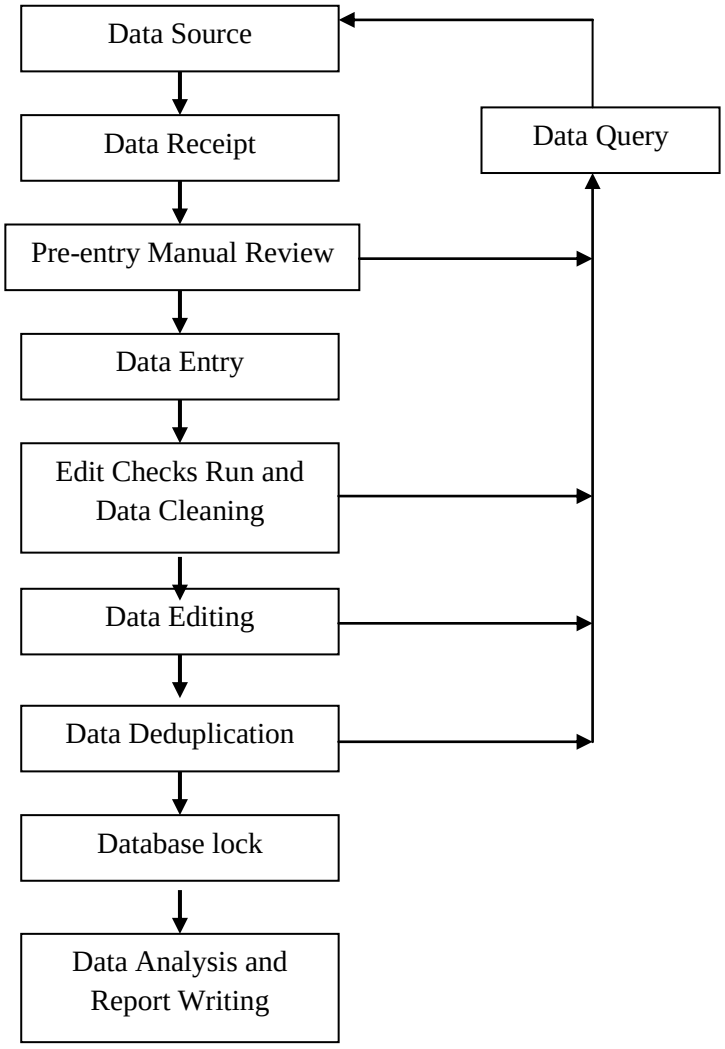
Data Flow Process

Data are collected by doctors in the dermatology departments or clinics. Completed CRFs are then sent to the RCC.



Data received by the RCC are manually reviewed and checked for completeness and error. Data without apparent problems are entered into the registry database. Edit checks are performed periodically to identify potential data errors, such as missing data, non-allowed values, out of range numeric values, inconsistent data and error with deduplication. Data queries that are resolved are then updated to the database.

To ensure complete enumeration and validity of data, a series of tasks as shown in the figure below have to be in place.



SDP Data Reporting, Data Correction and Submission Tracking

Data submitted by SDP are entered into electronic case report form (eCRF) via DermReg Web Application (eDermReg).

There are a number of data security features that are designed into eDermReg such as web owner authentication, two-level user authentication, access control, data encryption, session management to automatically log off the application, audit trail and data backup and disaster recovery plan.

Prior to registering a patient record, a verification process is done by using the search functionality to search if patient exist in the entire registry. This step is done to avoid duplicate records. For patients that exist in the database, SDP only needs to add a new notification with basic patient particulars pre-filled based on existing patient information in the database.

There are a few built-in functionalities at the data entry page that serve to improve data quality. One such function is auto calculation which reduces errors in human calculation. There is also inconsistency check functionality that disables certain fields if these fields are answered in a certain manner. When value entered is not within the specific range, user is prompted for the correct value.

Real time reports are also provided in the web application. The aggregated data reports are presented in the form of tables and graphs manner. These aggregated data reports are typically presented in two manners, one as the centre's own data report and another as registry's overall data report.

Edit checks run and Data cleaning

Edit check was performed periodically by the registry manager to identify missing compulsory data, out of range values, inconsistency data, invalid values and error with de-duplication. Data cleaning is then performed based on the results of edit checks. Data update and data checking of the dataset is performed when there is a query of certain fields when necessary. It could be due to request by user, correction of data based on checking from data query in eCRF or after receiving results from preliminary data analysis. During data standardization, missing data are handled based on derivation from existing data. For example, deriving age from IC, deriving gender from IC and name and inferring race from name. Checking inconsistency of the data also done, for example IC and name shows female but gender is male. Data de-duplication is also performed to identify duplicate records in the database that might have been missed by the SDP.

Legal Aspects and Confidentiality

Data transfer from source data producers is entirely voluntary. There is no legal provision to compel any individual or institution to report or transfer its data to the RCC. The data transferred to RCC is highly sensitive and has to be kept strictly confidential with access only to authorized individual working in the RCC. Strict data protection procedure will need to be put in place, following standard disease registration practice, and in compliance with applicable regulatory guidelines.

Data release policy

One of the primary objectives of the Registry is to make data available to the physicians, policy makers and researchers. The Registry would appreciate that users acknowledge the Registry for the use of the data. Any request for data that requires a computer run must be made in writing (by email, fax, or registered mail) accompanied with a Data Release Application Form and signed Data Release Agreement Form. These requests need prior approval by the Governance Board before data can be released.

APPENDIX C: STATISTICAL METHODS

ANALYSIS SET

This refers to the set of cases included in the analysis. Two analysis sets were defined:

1. **Patient notification between 2007 and 2014**

There were 12,615 patients in the dataset. The analysis set was use for the analysis in Chapter 1, 2, 3, 4, 5 and 6, which comprises of 291 cases in year 2007, 1,259 cases in year 2008, 1,670 cases in year 2009, 1,698 cases in year 2010, 1,577 cases in year 2011, cases in 2012, 1,736 cases in 2013 and 4,675 cases in 2014. The cases include first notification and up to five follow-up notifications.

2. **Patient outcome between 2007 and 2014**

There were 3,824 cases considered for the outcome analysis in Chapter 8.

DATA MANAGEMENT

Data Cleaning

The data from the MPR database were subjected to extensive checking prior to definitive analysis. Errors found or queries raised were checked against the database and/or CRF and corrections were made immediately.

Missing Data

Details on the missing data were issue to Project Manager to clarify the status of the information. Trackable missing information was then incorporated into the dataset but for untrackable and tolerable missing data were included in the analysis and defined as missing.

STATISTICAL METHOD

Descriptive analysis was done in presenting frequencies and percentages of distribution whereas bar and pie charts were used in presenting the figures. For continuous data, the mean, standard deviation, minimum, maximum, median and interquartile range were reported. For standardization in output table, the values of percentages and summary descriptive were limited to one decimal point only. The summaries of data presentation by chapter were described as below:

Stock and Flow

Chapter 1 explained the registry for the distribution of centres reported and distribution of patients according to number of notifications.

Characteristics of Patients

Chapter 2 explained the socio-demographic profiles such as gender, ethnicity, nationality and marital status. Descriptive summary was done for age at visit.

Medical History

Chapter 3 emphasized on the distribution of aggravating factors of psoriasis patients. Crosstabulations were concentrated on the comparison of family members with psoriasis against age of onset.

Comorbidities

Chapter 4 emphasized on the combination of distribution and descriptive summaries of age of onset, several demographic profiles and comorbidities. Figures were presented graphically using bar and stacked bar charts.

Clinical Presentation

Chapter 5 concentrated on the descriptive summaries of pain score. The distribution of psoriasis patients were further analysed on types of psoriasis, body surface area, severity, nail involvement, joint disease, rheumatoid factor, symptoms of psoriatic arthritis and types of joint disease. Crosstabulations performed with several combinations involving age of onset, types of psoriasis, demographic profiles, severities and disease involvements. The graphical presentation were pie chart, bar and stacked bar chart.

Treatment

Chapter 6 presented the distribution of patients with topical therapy, phototherapy, types of phototherapy and systematic therapy. The graphical presenteation were in pie chart, bar and stacked bar chart.

Quality of Life

Chapter 7 solely concentrated on a specific intention, which was on Dermatology Life Quality Index (DLQI). The distribution and crosstabulation figures were presented graphically using bar, stacked bar and line charts.

Outcomes

Chapter 8 explained on the distribution and descriptive summary of the outcome variables. The improvement of lesion extent, skin score, joint score and DLQI score were graphically presented using bar charts.

STATISTICAL SOFTWARE

SPSS 18.0

APPENDIX D: PARTICIPATING CENTRE DIRECTORY

Hospital Kuala Lumpur Department of Dermatology Hospital Kuala Lumpur Jalan Pahang 50586 Kuala Lumpur. Tel: 03-26151540 Fax: 03-26985927	Investigator: Dr Azura Mohd Affandi Site- coordinator: -
Hospital Sungai Buloh Dermatology Unit Hospital Sungai Buloh, Jalan Hospital, 47000 Sungai Buloh, Selangor Darul Ehsan. Tel: 03-61454333 Ext 1286 Fax: 03-61454222	Investigator: Dr. Norli Marwyne Mohd Noor Site- coordinator: Prima Dharshini
Hospital Tuanku Ja'afar, Seremban Dermatology Department, Hospital Tuanku Ja`afar, Jalan Rasah 70300 Seremban, Negeri Sembilan. Tel: 06-760 4157 Fax: 06-7625771	Investigator: Dr. Najeeb Ahmad Mohd Safdar Site- coordinator: Dr.Prakash A/L Balasubramaniam
Hospital Sultanah Fatimah, Muar Dermatology Department, Hospital Pakar Sultanah Fatimah, Jalan Salleh, 84000 Muar, Johor. Tel: 06-9521901 Fax: 06-9526003	Investigator: Dr. Noreen Md Arus Site- coordinator: Mohd Khairul bin Othman

Hospital Pulau Pinang Dermatology Department, Hospital Pulau Pinang, Jalan Residensi, 10990 Pulau Pinang, Tel: 04-222 5250 Ext 5246 Fax: 04-2281737	Investigator: Dr Chan Lee Chin Site- coordinator: Dr Yeoh Chin Aun
Hospital Sultanah Bahiyah, Alor Setar Dermatology Department, Hospital Sultanah Bahiyah, Lebuhraya Darul Aman, 05100 Alor Setar, Kedah Tel: 04-740 6233 Fax: 04-7350232	Investigator: Dr Mani Mala a/p T. Manikam Site- coordinator: Dr Azlida Che Man
Hospital Tuanku Fauziah, Kangar Dermatology Department, Hospital Tuanku Fauziah, Jalan Kolam,01000 Kangar, Perlis. Tel: 04-973 8000 Fax: 04-9767237	Investigator: Dr Sharifah Farihah Syed Abas, Dr. Hassanin Hussaini Hilmi Mohd Khalid Site- coordinator: Wan Suhardi Wan Abdul Rahman
Hospital Queen Elizabeth, Kota Kinabalu Dermatology Department, Hospital Queen Elizabeth, Karung Berkunci no 2029 , 88586 Kota Kinabalu, Sabah. Tel: 088-517555 Fax: 088-211999	Investigator: Dr Zaigham Mahmood Dr Mervin George Matthew Site- coordinator: Ampong Anggarak

Hospital Tengku Ampuan Afzan, Kuantan Dermatology Department, Hospital Tengku Ampuan Afzan, Jalan Tanah Putih, 25100 Kuantan, Pahang. Tel: 09-5133333 Fax: 09-5142712	Investigator: Dr. Rajalingam a/l Ramalingam Site- coordinator: Mus Azlina Mustafa
Hospital Raja Permaisuri Bainun, Ipoh Dermatology Department, Jabatan Dermatologi, Hospital Ipoh, Jalan Hospital 30990 Ipoh, Perak. Tel: 05-208 5072 Fax: 05-2531541	Investigator: Dr. Tang Jyh Jong Site- coordinator: Dr. Gurcharan Jit Singh
Sarawak General Hospital Dermatology Department, Hospital Umum Sarawak, Jln Tun Ahmad Zaidi Adruce, 93586 Kuching, Sarawak. Tel: 082-27 6666 Ext 5117 Fax: 082-242751	Investigator: Dr Pubalan Muniandy Site- coordinator: Dr Ling Hee Ninh
Hospital Tengku Ampuan Rahimah, Klang Dermatology Department, Hospital Tengku Ampuan Rahimah, 41200 Klang, Selangor. Tel: 03-3375 7000 Ext 6266 Fax: 03-3374 9557	Investigator: Dr. Ng Ting Guan Site-coordinator: Dr Norasma bt Roslan, Dr Balachandran a/l Manoharan

Hospital Sultanah Aminah, Johor Bahru Jabatan Dermatologi, Hospital Sultanah Aminah Johor Bahru, Jalan Abu Bakar, 80100, Johor Bahru, Johor Tel: 07-223 1806 Fax: 07-2242694	Investigator: Dr Choon Siew Eng Site- coordinator: Hasnal Azahare
Gleneagles Intan Medical Centre Hope Skin and Laser Centre, Gleneagles Intan Medical Centre, 282 & 286 Jalan Ampang, 50450 Kuala Lumpur. Tel: 03-4251 6233 Fax: 03-4257 9233	Investigator: Dr. Chang Choong Chor Site- coordinator: -
Hospital Melaka Dermatology Department, Hospital Melaka, Jalan Mufti Hj. Khalil, 75400 Melaka. Tel: 06-2892690 Fax: 06-2841590	Investigator: Dr. Sharifah Rosniza Syed Nong Chek Site- coordinator: Dr Koot Chiew Teen, Dr. Nor Afalailah Mohd Aris
Prince Court Medical Centre Prince Court Medical Centre, 39, Jalan Kia Peng, 50450 Kuala Lumpur. Tel: 03- 26100000 Ext 2955 Fax: 03-2160 0010	Investigator: Dr. Gangaram Hemandas Belani Site- coordinator: -

Universiti Malaya Medical Centre Department of Medicine, University of Malaya Medical Centre, Faculty of Medicine, University of Malaya, 59100 Kuala Lumpur. Tel: 03-79492429 Fax: 03-7956 2253	Investigator: Dr. Wong Su Ming Site- coordinator: Dr. Kwan Zhen Li
Universiti Kebangsaan Malaysia Medical Centre Dermatology Department, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Kuala Lumpur Tel: 03-9145 6075 03-9145 6640	Investigator: Dr. Norazirah Md Nor Site- coordinator: -
Hospital Raja Perempuan Zainab II, Kota Bharu Dermatology Department, Hospital Raja Perempuan Zainab II, 15586 Kota Bharu, Kelantan Darul Naim Tel: 09-7452000 Ext 2384 Fax: 09-7486951	Investigator: Dr. Zulrusydi Ismail Site- coordinator: Muhd. Al-Amin Mat Zin
Hospital Selayang Dermatology Department, Hospital Selayang, Lebuhraya Selayang-Kepong, 68100 Batu Caves, Selangor Darul Ehsan. Tel: 03-6126 3333 Fax: 03-6137 7097	Investigator: Dr. Hazfaneza Abdul Halim Site- coordinator:

Hospital Putrajaya Dermatology Department, Hospital Putrajaya, Pusat Pentadbiran Kerajaan Persekutuan, Presint 7, 62250 Putrajaya, Putrajaya. Tel: 03-8312 4200 Fax: 03 -8888 0137	Investigator: Dr. Nazatul Shima Abdul Rahim, Site- coordinator:
Hospital Sultan Abdul Halim, Sungai Petani Dermatology Department, Jalan Lencongan Timur, Bandar Aman Jaya, 08000 Sungai Petani, Kedah Darul Aman. Tel: 04-4457 333	Investigator: Dr. Tan Wooi Chiang Site- coordinator: