Research title:

A CROSS-SECTIONAL STUDY OF THE PRACTICE, KNOWLEDGE AND PERCEPTION OF SUNCREEN USE AMONG DERMATOLOGY PATIENTS AT UNIVERSITAS ACADEMIC HOSPITAL.

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Declaration:
"Submitted in fulfillment of the requirements in respect of the Master's Degree MMED in the Department of Dermatology at the University of the Free State."

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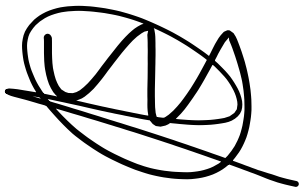
Declaration of authorship:

"I, Dr JR Maepa, declare that the coursework Master's Degree mini-dissertation that I herewith submit in a publishable manuscript format for the Master's Degree MMED at the University of the Free State is my independent work, and that I have not previously submitted it for a qualification at another institution of higher education."



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ABSTRACT

Background: Sunscreens are produced to protect the skin from cutaneous acute and chronic adverse effects of ultraviolet radiation. Their correct use is pivotal in determining their efficacy.

Objectives: To assess the practice, knowledge, and perception or understanding with regards to sunscreen use in dermatology patients visiting Universitas dermatology clinic in Bloemfontein, Free State province; by comparing patients with personal skin cancer history and/or risk factors and the group of patients that do not have skin cancer history or risk factors.

Methods: Using a questionnaire as a data collection tool, a cross-sectional study was carried out on the days of adult clinic over a period of three weeks. All new and old patients attending the Universitas Academic hospital dermatology clinic, aged 18 years and older, and agreeing to participate, were included in the study. Different parameters were used to measure the practice, knowledge, and perception regarding sunscreen use and its benefits.

Results: 131 out of 150 completed questionnaires qualified to be included in the data analysis. Majority of the respondents were female (64. 6%) and >60 years of age (46.9%). Risk factors for developing skin cancer were used to classify the high risk group which had a total number of 74 respondents (56.5%). The high risk group was compared with the low-risk group when analysing response data for the practice, knowledge, and perception of sunscreen use. The study revealed that 46 respondents (62.2%) from the high risk group wear sunscreen in comparison with 19 respondents (45.2%) in the low risk group. A significant number of respondents from both groups (21% from the high risk group versus 14.1% from the low risk group) do not use sunscreen correctly. Assessment of the knowledge about sunscreen use demonstrated that 46.7% of the high risk group had slightly more knowledge on proper use of sunscreen as compared to 30% of the low risk group. Although both groups had differing opinions on whether sunscreen is a an over-the-counter drug or merely a cosmetic product, they both acknowledged its protective benefits to the skin.

Conclusion: Assessment on the practice and knowledge of sunscreen use highlighted the suboptimal and inappropriate use of sunscreen by dermatology patients, as well as inadequate knowledge about correct use of sunscreen in contrast to having a good perception regarding the protective role of sunscreen against skin cancer.
There is a dire need for more education or counselling of all dermatology patients on regular and correct use of sunscreen, particularly for the reduction of skin cancer in high risk individuals.

KEYWORDS

Dermatology patients
Practice
Knowledge
Perception
Sunscreen
Skin cancer
Risk factors
Photoaging
Photoprotection
Ultraviolet radiation (UVR)
Fitzpatrick skin phototype

LIST OF ABBREVIATIONS

UVR – Ultraviolet radiation
UVA – Ultraviolet A
UVB – Ultraviolet B
UVC – Ultraviolet C
BCC – Basal Cell Carcinoma
SCC – Squamous Cell Carcinoma
SPF – Sun Protective Factor
UAH – Universitas Academic Hospital
NMSC – Non-Melanoma Skin Cancer

LIST OF APPENDICES

CHAPTER 1: Literature Review

The prevalence of skin cancers seen in dermatology is alarming and raises the question on what the general population, particularly dermatology patients, think of the use of sunscreen. The aim of this study was to find out the practice, knowledge, and perception or understanding with regards to sunscreen use in dermatology patients visiting Universitas dermatology clinic in Bloemfontein, Free State province. Patients that visit the Dermatology clinic at Universitas Academic hospital in Bloemfontein are referred and drain from all different parts of the Free State province and the small neighbouring country of Lesotho. The study was prompted by the high rate of skin cancer and photo-damage observed at the skin cancer clinic conducted every Fridays in the Dermatology clinic.

The objective was to compare patients with skin cancer history or risk factors and the group of patients that do not have skin cancer history or risk factors. These risk factors were reflected in the data collection tool (questionnaire). They include Fitzpatrick skin phototype, occupation (giving an idea of the duration of sun exposure), having more than ten atypical nevi (moles), family history of skin cancer, as well as personal history of skin cancer.

This study is important in determining and identifying gaps and factors that influence the use of sunscreen in the dermatology population group. It can further aid in formulating intense awareness strategies or other necessary interventions to alter photo-protective behaviour of patients and promote prevention of skin cancer. Guidelines on sunscreen use in South Africa need to be implemented to educate the general population and guide clinicians when counselling susceptible patients on proper sunscreen use. The benefits of sunscreen have to also be laid-out and emphasized to dermatology patients, particularly those patients with skin cancer history or with a high risk for developing skin cancers.

The author's hypothesis based on the population sample taken, was that the practice, knowledge and perception of dermatology patients concerning sunscreen use is not very different from that of the general population. It was also hypothesized that patients who fall into the category of "high risk" patients do not necessarily exercise more strict measures of skin cancer prevention, including photoprotection.

Ultraviolet radiation and effects on the skin

The sun produces Ultraviolet radiation, which is divided into UVA, UVB, and UVC with different wavelengths. UVC does not reach the earth's surface as it is absorbed by the ozone layer. UVB has greater effects than UVA and its intensity peaks around midday, while the intensity of UVA remains consistent throughout the day[1]. Solar Ultraviolet radiation exposure causes acute, subacute and chronic cutaneous effects. The acute and subacute effects include erythema (sunburn), pigmentary changes (skin darkening and tanning), epidermal hyperplasia, immunologic changes (innate immunity induction and acquired immunity suppression), and Vitamin D3 synthesis. Photoaging and photocarcinogenesis are chronic effects or UVR. Solar UVR causes these effects via DNA damage, generation of reactive oxygen species, gene and protein expression, melanogenesis, langerhans cell depletion and apoptosis[1].

UVA can cause nuclear and mitochondrial DNA damage, gene mutations with skin cancer, enzymatic chain reactions dysregulation, immunosuppression, lipid peroxidation, as well as photoallergic and phototoxic effects; while UVB can cause pigment changes, sunburn, immune suppression and photo-carcinogenesis[2]. UVA and UVB can both cause sunburn, photoaging, and inflammation[2].

Some of the signs of photoaging in fair-skinned patients are solar elastosis, solar lentigo, Favre-Racouchot syndrome, ephelides, poikiloderma of civatte, colloid milium, and erosive pustular dermatosis; and in patients with skin of colour these include melasma, dyspigmentation, fine wrinkling and small seborrheic keratosis.

Although predominantly UVB, both UVB and UVA contribute to the development of precancerous cutaneous lesions such as solar lentigines and actinic keratosis, and skin cancers such as Melanoma and Keratinocyte cancers (Basal Cell Carcinoma and Squamous Cell Carcinoma). Basal cell carcinoma is the most common skin cancer, while Squamous Cancer is the second common, and the third common skin cancer is Melanoma. Keratinocyte cancers represent about 95% of all malignant skin cancers, with a worldwide annual incidence ranging from 3-8% due to increased exposure to the sun among the human population[3]. Melanoma represents only 10% of malignant cutaneous cancers, but is responsible for more than 90% of deaths due to these skin cancers[4].

Photodermatoses are skin disorders due to abnormal responses to ultraviolet radiation (particularly UVA), that affect only certain individuals. They are classified into different subgroups based on their pathogenesis: immunologically mediated photodermatoses, chemical- and drug-induced photosensitivity, photoaggravated dermatoses, and inherited disorders with defective DNA or with chromosomal instability[5]. They can also be divided into primary (idiopathic or with known photosensitizers) and secondary photodermatoses[6].

Risk factors for skin cancer

There are numerous risk factors that may predispose to development of skin cancer. These include endogenous factors (i.e. skin phototype, colour of eyes, the number of melanocytic nevi or dysplastic nevi, and personal or family history of skin cancer); as well as exogenous/environmental factors (i.e. type and degree of cumulative UVR exposure, sunburn history, and photoprotective behaviour)[7]. Additional risk factors include male gender, genetic factors, childhood sunburn, chemical carcinogens, and immunosuppression[8]. Ultraviolet radiation is the most common cause of non-melanoma skin cancers (NMSC) and melanoma. Endogenous risk factors render an individual more susceptible to UVR-related skin damage, resulting in cutaneous malignancies. Out of all the risk factors studied, “not using sun-protective preparations for the skin” and “burdened family history of the first degree relative” were found to have more influence on the development of skin cancer[8].

Specific risk factors for Basal Cell Carcinoma are intermittent intense UVR exposures and UVR exposures during childhood[7], fair skin, UVA and UVB exposure from tanning beds, immunosuppression, radiation exposure, and previous personal or family history of BCC[9]. Risk factors for cutaneous Squamous Cell Carcinoma include cumulative chronic UVR from

sun exposure or from tanning bed exposure, ionizing radiation exposure, childhood sunburns, male gender, fair skin, older age of above 60 years, smoking, living at lower latitudes and higher altitudes, Human Papilloma Virus exposure, chronic inflammation (from non-healing ulcers, burns, scars, sinus tracts and inflammatory dermatoses), chronic arsenic exposure, chronic immunosuppression, and genetic disorders such as xeroderma pigmentosa, albinism, epidermodysplasia verruciformis, etc.[9,10]. Multiple benign nevi or atypical nevi plus personal or family history of malignant melanoma are the strongest risk factor for melanoma[9]. Individuals with phenotypic markers of UVR susceptibility such as freckles and fair complexion, red or blonde hair colour, light coloured eyes (blue, green, or gray), and sun sensitivity (the tendency to burn in the sun and inability to tan) are also at an increased risk of developing melanoma[7]. Research has also shown a high association of melanoma risk with sun-related behaviour such as occupational exposure (outdoor or partially outdoor profession and frequent sunburns[4].

Fitzpatrick skin phototyping is a widely used helpful tool for predicting the risk of photodamage and skin cancer in patients, and is based on the skin's response to sun exposure, i.e. the tendency to burn and ability to tan[11]. This skin cancer phototyping initially had only four groups (skin phototypes I-IV) based on the responses to the questions on ability to tan and tendency to burn, and their phenotypic characteristics; but skin phototypes V (brown skin) and VI (black skin) were later added, based on the skin colour rather than the sun reactivity, to modify Fitzpatrick skin phototyping classification as we know it today[12] (see Table 1).

Table 1: Fitzpatrick skin phototype classification[12]

Phototype	***Skin colour***	***Skin reaction***
Type I	White skin	Always burns, never tans
Type II	White skin	Always burns, minimal tan
Type III	White skin	Burns minimally, tans moderately and gradually
Type IV	Light brown skin	Burns minimally, tans well
Type V	Brown skin	Rarely burns, tans deeply
Type VI	Dark brown/black skin	Never burns, tans deeply

The incidence rate of skin cancer in people of colour is lower, and with slightly different risk factors compared to those in white persons because of the photoprotective effect of eumelanin in the former group. Risk factors for melanoma in darkly pigmented patients include burn scars, radiation therapy, trauma, immunosuppression and pre-existing moles; while for the development of SCC include chronic scarring and chronic skin inflammation; and UVR for BCC[13].

Photoprotection

There are few measures that can be used to protect the skin from solar-induced skin damage and prevent unnecessary cutaneous malignancies. Reducing many acute and chronic cutaneous adverse effects of UVR can be achieved by use of UVB and UVA-blocking glass, wearing sun protective clothing, and regular sunscreen application[14]. Measures such as sun protective clothing, sunglasses, hats, umbrella, shade and possible avoidance of

sunlight are popular options[15], but clinical studies evaluating and confirming their effectiveness and safety are still lacking[3].

Sunscreens were produced in the early 1900s to try to block the harmful effects of Ultraviolet radiation, thereby protecting the human skin[16]. An ideal sunscreen must protect against both UVB and UVA, be resistant to water and sweat, have a high SPF of 30 or higher, be easy to apply, safe, chemically inert, non-irritating, nontoxic, photostable, have low risk of contact allergy and be cosmetically acceptable when applied[2,16]. In addition, it should not block beneficial UVR effects such as Vitamin D synthesis, photo-adaption, or reduction in blood pressure by UVA[1].

Sunscreens offer broad-spectrum protection and are classified based on their mechanism of action into: soluble organic/ chemical sunscreens that act by absorbing UVR by converting it into heat energy, therefore reducing its harmful effects and preventing it from penetrating deep into the skin; and insoluble inorganic/ physical/ mineral-based sunscreens (also referred to as sunblocks) that scatter and reflect UVR away from the skin, and provide a coating that blocks solar rays from penetrating through the skin[17].

Organic sunscreens usually contain a combination of synthetic chemicals such as cinnamates (UVB)[17], salicytes/ dibenzoylmethanes (UVB), octinoxate (UVB), and benzophenones (UVA); while inorganic sunscreens include zinc oxide and titanium dioxide, which leave a white residue after application to the skin, stain clothing and are comedogenic[16]. The development of smaller nanoparticles in inorganic sunscreens has led to improvement in cosmesis and ease of application of these sunscreens while maintaining photo-protective qualities[16,18].

The efficacy of a sunscreen is measured by Sun protection factor (SPF), persistent pigment darkening protection factor (PPD), and immunoprotection factor among others[2,17]. COLIPA guideline is a new standardized, reproducible, and in-vitro method, also used to determine efficacy of sunscreens by measuring UVA protection offered by sunscreens[2]. SPF is the factor by which the UVR dose can be increased before skin erythema develops and it is an important laboratory measure of the effectiveness of sunscreen[19]. It has been demonstrated that the higher SPF, the more beneficial is a sunscreen in preventing sunburn[20]. It is recommended that an SPF of at least 30 should be applied, and a higher SPF sunscreens may be used to compensate for common under-application of sunscreen[18].

There are differing Regulatory standards for sunscreens globally: in the US sunscreens are considered as over-the-counter drugs; in Canada they are regarded as drugs, but considered as “natural health products” if they contain only titanium oxide, zinc oxide, or para-aminobenzoic acid; in Australia most sunscreens are considered as ‘therapeutic goods”; and in other countries such as the European Union[17] they are regarded as cosmetics by differing criteria[1] .

Sunscreen has multiple benefits to the skin through protection from UVR damage. If used appropriately, it can help to decrease the risk of skin cancers, prevent sunburn, reduce photo-ageing and control photosensitive dermatoses[21]. It has proven to increase skin’s tolerability to UV rays and provide significant protection against epidermal antigen

presenting cell activity induced by high UVA dose[2]. Sunscreen use also provides long-term effects. In a study by Van der Pols et al[22], there was a tendency for a decreased incidence of BCC with sunscreen use 5 years after stopping sunscreen; and a reduced number of skin SCC in the long term with regular sunscreen use, up to 8 years after stopping it.

There are a number of controversies and concerns regarding the safety of sunscreens, as well as their effect on Vitamin D synthesis, and this potentially influences the use of sunscreen and compliance. Although research has proven some systemic absorption of sunscreen's active ingredients, the clinical significance of this finding has not been determined[23]. Study has also shown that the likelihood of harm from the use of nanoparticles-containing sunscreens is low[16]. Based on research from field trials and observational studies suggesting the low risk of sunscreen affecting Vitamin D, there is little evidence that sunscreen reduces Vitamin D concentration when used in real-life settings[24]. It has also been shown that sunscreens applied at sufficient thickness to prevent sunburn during a week-long holiday with a very high UV index still allowed significant improvement of Vit D synthesis and its serum concentration[25,26]. Some persons with sensitivity to certain ingredients in sunscreens may potentially develop irritation or contact dermatitis as a side effect. However, it is important to note that the benefits of sunscreens far outweigh the potential risks of chronic use in the long run.

Patient behaviour, attitude and knowledge regarding sunscreen

Several studies have been done to assess the photo-protective behaviour including sunscreen use, and the attitude and knowledge about sunscreen among the general population and dermatology patients respectively. It has been observed that patient knowledge, behaviours, and attitudes regarding sun protection vary among the general population because of group differences in self-efficacy, perceived susceptibility, and the level of skin cancer awareness, which then influence their sun protection behaviours and beliefs[27]. A study done in Durban Kwazulu-Natal (South Africa) showed that the general level of knowledge on skin cancer prevention and sunscreen use was poor in the studied general population of patients that presented to the outpatient department[28]. Dey V also reported on the lack of knowledge of the risks and adverse effects of sun exposure by dermatology patients in their study population[29]. In this same study, participants who were young, female, urban, with higher education and socioeconomic status, had better attitude and knowledge of sun exposure and sun protection[29]. As deduced from several studies, the rate of sunscreen use among the general population has been found to be generally low and the knowledge on sunscreen use is also suboptimal[30]. Mallett et al observed that there is a significant number of dermatology patients that expose their skin to high amounts of UVR (as assessed by the frequency of sunburn) than the general population; and were also found to not use sun protection despite having awareness about the risks of unprotected sun exposure[31].

There are numerous factors that influence photoprotective behaviour (including sunscreen use), attitude, and knowledge on sunscreen use. These include gender, education level, socio-economic status and affordability, misconceptions regarding skin cancer risks, lack of awareness, stickiness and high cost of sunscreen[27,29,30,32]. Other factors such as socio-demographics, cultural values, and psychosocial and peer concepts also affect involvement

in photoprotective behaviours[33]. Cosmetic elegance and sunscreen product performance are positively associated with sunscreen use[21]. Female gender, high socioeconomic status, previous history of sunburn, and use of tanning beds are also some of the factors that positively affect the use of sunscreen[34].

Education and counselling on sunscreen use

Patients need to be equipped with the knowledge and importance of photoprotection, particularly sunscreen use. A study aimed at clarifying the frequency and nature of sunscreen recommendations by dermatologists showed that dermatologists in the US discuss sunscreen with their patients at 58% visits[35]. In a study by Vasicek B, more than half of the dermatology patients evaluated had never received sunscreen counselling by a clinician; and skin cancer patients were the ones that were more likely to receive sunscreen counselling than non-skin cancer patients[14]. There is lack of data revealing the frequency of education and counselling from clinicians (including dermatology specialists) in developing countries. However, in South Africa there are few health campaigns that do promote awareness on skin cancer prevention such as The Cancer Association of South Africa, the Skin Cancer Foundation of South Africa, and the Albinism Society for South Africa which advocates sun protection for persons with OCA in South Africa[36]. Implementation of Australia's SunSmart program, which is a multi-component community-wide skin cancer prevention program in the world, contributed to an improvement in the sun protective behaviour of the population in Melbourne, as proven by a decline in melanoma rates over a 20 year period[37].

Counselling on sunscreen should begin with children and young adults to get maximum benefits because most damaging sun exposure is seen during childhood and young adulthood, which then places these individuals at risk of developing skin cancer at a later stage in life[14]. The US Preventive Services Task Force (USPSTF) also made a recommendation about counselling young adults, adolescents, children, and parents of young children with fair skin, on reducing sun exposure from the age of 6 months to 24 years to reduce their risk of skin cancer in the future[38]. Appearance-based video education was found to be more effective as compared with health-based video education in circulating knowledge to promote photoprotective behaviour (such as the use of sunscreen) in the adolescent group[39].

Patients can be counselled on the following general guidelines pertaining to photoprotection: to apply a generous amount of broad-spectrum, water-resistant sunscreen with an SPF of 30 or higher; to seek shade when necessary; to wear appropriate sun protective gear including long-sleeve clothing, a wide-brimmed hat, and sunglasses[40]. When possible, sun exposure should be avoided between 10 am and 3 pm since is it the peak period of UVR[2].
A recent position statement for Australia and New Zealand made the following recommendations[41]:

- For everyday activities, when the UV index is forecast to reach 3 or above, it is recommended that sunscreen be applied routinely in the mornings to sun-exposed areas.

- For planned or prolonged outdoor activities: sunscreen should be used together with other sun protection measures; outdoor activities should be avoided in the midday; sunscreen should be applied to sun-exposed areas when the UV index is forecast to reach 3 or above; sunscreen should be re-applied every 2 hours or more frequently if swimming, sweating or towel drying.

The World Health Organization (WHO) also recommends application of sunscreen 20minutes before sun exposure and reapplication every 2hours, as well as repeat application after swimming or bathing.

Education on proper use of sunscreen is imperative for its efficacy to be maintained, as incorrect use and suboptimal application may still predispose to acute and chronic UVR effects. The FDA recommends applying 2mg/cm2 (about 5ml for each body part) of sunscreen for its maximum benefits to be achieved . Since people do not apply sufficient or the recommended amount of sunscreen, Petersen B and Wulf H recommend applying sunscreen before sun exposure and reapplying it once within 1hour; and using very high SPF (70–100) sunscreen to compensate for inadequate application thickness[42].

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Chapter 2: Publishable manuscript for IJD (International Journal of Dermatology)

A CROSS-SECTIONAL STUDY OF THE PRACTICE, KNOWLEDGE AND PERCEPTION OF SUNSCREEN USE AMONG DERMATOLOGY PATIENTS AT UNIVERSITAS ACADEMIC HOSPITAL.

Maepa JR

Abstract:

Background Sunscreens are produced to protect the skin from cutaneous acute and chronic adverse effects of ultraviolet radiation. Their correct use is pivotal in determining their efficacy.

Materials and Methods Using a questionnaire as a data collection tool, a cross-sectional study was carried out on the days of adult clinic, over a period of three weeks. Different parameters were used to measure the practice, knowledge, and perception regarding sunscreen use.

Results 131 out of 150 completed questionnaires qualified to be included in the data analysis. Majority of the respondents were female (64. 6%) and >60 years of age (46.9%). The study revealed that 46 respondents (62.2%) from the high risk group wear sunscreen in comparison with 19 respondents (45.2%) in the low risk group. A significant number of respondents from both groups (21% from the high risk group versus 14.1% from the low risk group) do not use sunscreen correctly. Assessment of the knowledge about sunscreen use demonstrated that 46.7% of the high risk group had slightly more knowledge on sunscreen use as compared to 30% of the low risk group. Although both groups had differing opinions on whether sunscreen is a an over-the-counter drug or merely a cosmetic product, they both acknowledged its protective benefits to the skin.

Conclusion There is suboptimal and inappropriate use of sunscreen by dermatology patients, as well as inadequate knowledge about correct use of sunscreen in contrast to having a good perception regarding its protective role against skin cancer.

Introduction

Sunscreens are produced to protect the skin from cutaneous acute, subacute and chronic adverse effects of ultraviolet radiation exposure. The acute and subacute effects include erythema (sunburn), pigmentary changes (skin darkening and tanning), epidermal hyperplasia, and immunologic changes. Photoaging and photocarcinogenesis are chronic effects or UVR. Basal cell carcinoma is the most common skin cancer, while Squamous Cancer is the second common, and the third common skin cancer is Melanoma.

There are numerous risk factors that may predispose to development of skin cancer. These include endogenous factors (i.e. skin phototype, colour of eyes, the number of melanocytic nevi or dysplastic nevi, and personal or family history of skin cancer); as well as exogenous/environmental factors (i.e. type and degree of cumulative UVR exposure, sunburn history, and photoprotective behaviour)[1]. Ultraviolet radiation is the most common cause of non-melanoma skin cancers (NMSC) and melanoma. Research has also shown a

high association of melanoma risk with sun-related behaviour such as occupational exposure (outdoor or partially outdoor profession and frequent sunburns[2]. Out of all the risk factors studied, “not using sun-protective preparations for the skin” and “burdened family history of the first degree relative” were found to have more influence on the development of skin cancer[3].

Use of UVB and UVA-blocking glass, wearing sun protective clothing, and regular sunscreen application can help to reduce cutaneous adverse effects of UVR[4]. Measures such as sun protective clothing, sunglasses, hats, umbrella, shade and possible avoidance of sunlight are popular options[5], but clinical studies evaluating and confirming their effectiveness and safety are still lacking[6]. Sunscreen has multiple benefits to the skin through protection from UVR damage. If used appropriately, it can help to decrease the risk of skin cancers, prevent sunburn, reduce photo-ageing and control photosensitive dermatoses[7]. SPF is the factor by which the UVR dose can be increased before skin erythema develops and it is an important laboratory measure of the effectiveness of sunscreen[8].It has been demonstrated that the higher SPF (from 30 upwards), the more beneficial is a sunscreen in preventing sunburn[9].

Several studies have been done to assess the photo-protective behaviour including sunscreen use, and the attitude and knowledge about sunscreen among the general population and dermatology patients. However, studies are lacking in South Africa, particularly on the knowledge and use of sunscreen in dermatology patients. The aim of this study was to find out the practice, knowledge, and perception or understanding with regards to sunscreen use in dermatology patients visiting Universitas dermatology clinic in Bloemfontein, Free State (South Africa). Patients that visit the Dermatology clinic at Universitas Academic hospital in Bloemfontein are referred and drain from all different parts of Free State and the small neighbouring country of Lesotho. The study was prompted by the high rate of skin cancer and photo-damage observed at the skin cancer clinic. The objective was to compare patients with skin cancer history or risk factors and the group of patients that do not have skin cancer history or risk factors. The author’s hypothesis was that the attitude and knowledge of dermatology patients concerning sunscreen use is not very different from that of the general population. It was also hypothesized that patients who fall into the category of “high risk” patients do not necessarily exercise more strict measures of skin cancer prevention, including photoprotection.

Materials and Methods

The study design was a descriptive-quantitative, cross-sectional study. It was conducted at a tertiary care dermatology clinic at Universitas Academic hospital in Bloemfontein Free State province (South Africa), over a period of three weeks (in a total of nine days of adult dermatology clinic). The Study population was all patients, new and old, visiting the dermatology clinic at Universitas Academic hospital during the survey period. The study was conducted only on days allocated for adult dermatology (Monday, Thursday, and Friday). The inclusion criteria was all patients aged 18 years and older, and those volunteering to participate. Patients that had already completed the survey on previous visits were in the exclusion criteria. The target sample size expected was 150-200 participants within the nine-days duration, based on the reduced average number of 35-40 patients (and 25 on Fridays) seen per day at the dermatology clinic of Universitas Academic hospital; as well the fact that

not all patients visiting the clinic on those particular days would agree to participate in the study.

Data were collected by means of a structured four-page questionnaire distributed to all dermatology patients that visited the dermatology clinic during the survey duration.
The questionnaire had 25 multiple choice questions (closed questions) and was made available in English, Sotho, and Afrikaans (the main languages spoken in Free State).
The questionnaire began with patient demographics; including whether the respondent was a new or old (known) patient to the Universitas dermatology clinic, gender, age, highest level of education, employment. The next questions from 6-10 measured the clinical characteristics which were: participant's Fitzpatrick skin phototype, any skin sensitivity to the sun (itchy or burning sensation to skin, or worsening skin condition on exposure to the sun), any atypical (unusual) moles more than 10 in number, family history of skin cancer, and respondent's history of any skin cancer. This was followed by questions 11-16 assessing the practice of sunscreen use by the participant by asking whether the participant gets prescribed sunscreen, if the participant wears sunscreen, how often it is used, where it is applied, the number of SPF used, and how often the sunscreen is reapplied. The next parameter (questions 17-21) measured the knowledge of the respondent on sunscreen usage. These include whether the patient has been counselled on sunscreen use before, how often one should wear sunscreen, the minimum amount of time it should be applied before sun exposure, how often it should be reapplied, and if it protects the skin from skin cancers. The last set of questions from 22-25 assessed the perception of the respondent regarding sunscreen use. In this parameter, the participant was asked what he/she thinks sunscreen is, whether the participant thought it protects the skin from photo-ageing, if it protects the skin from sunburn, and lastly, whether the participant thought a person needs to wear sunscreen if he/she uses or practises other sun protective measures such as umbrella, hat, and staying indoors or under shades.

Results

131 out of 150 completed questionnaires qualified to be included in the data analysis. 19 completed questionnaires were excluded on the following basis: did not meet the inclusion criterion for age group (were <18 years of age), answers did not correlate with one another, and some questionnaires were filled to <50% capacity. Regarding demographics, 98 respondents (74.8%) were old/known patients to Universitas Academic hospital, with majority of the total respondents being female (64. 6%) and >60 years of age (46.9%) (*Table 1).* The highest level of education for nearly half of the respondents (45.7%) was high school, but not matriculated. 77.3% of participants were unemployed; and of those employed (22.7%), only 4 respondents (15.4%) had outdoor occupation (Gardener, General worker, Parking attendant, and Crane operator).

Table 1: Respondents' age group

Age group	Frequency	Percent	Cumulative Frequency	Cumulative Percent
18-25	16	12.31	16	12.31
26-35	18	13.85	34	26.15
36-45	13	10.00	47	36.15
46-60	22	16.92	69	53.08
>60	61	46.92	130	100.00
Frequency Missing = 1				

Concerning clinical characteristics, a total of 58 respondents (49.2%) had Fitzpatrick skin phototype I-III, and 60 respondents (50.9%) had skin phototype IV-VI. 63% of participants reported to having photosensitivity. 61 respondents (49.6%) also reported to have more than 10 atypical moles in comparison to 27 (22%) who did not have. A significant number of participants (85.6%) had no family history of skin cancer. 26 respondents (20.8%) had personal history of skin cancer at rates of 36.4% for Basal Cell Carcinoma (BCC), 36.4% for Melanoma, and 27.3% for Squamous Cell Carcinoma. Risk factors for developing skin cancer were used to classify the high risk group. The risk factors included outdoor occupation, Fitzpatrick skin phototype I-III, having more than 10 atypical moles, family history of skin cancer, and personal history of skin cancer. A total number of 74 participants (56.5%) fell into this group. The high risk group was compared with the low-risk group when analysing response data for the practice, knowledge, and perception of sunscreen use.

Findings on the practice of sunscreen use revealed the following: within the high risk group, only 36 respondents (48.7%) get prescribed sunscreen as compared to 38 (51.3%) that do not get sunscreen prescription. A significant proportion of respondents (n=46 ; 62.2%) in the high risk group wear sunscreen in comparison with 19 (45.3%) in the low risk group. The survey has shown that majority of subjects who apply sunscreen (22.2% in high risk group versus 12.8% in low risk group), only apply it on days anticipating prolonged sun exposure. Only a total of 18 respondents (18.1% high risk group, 12.8% low risk group) apply it every day, all year round. The highest proportion of participants (33.8%) in the high risk group practise wearing sunscreen on all sun-exposed areas. Most respondents (28.7%) use SPF30-50, while 23.8% do not know the SPF number they use. Reapplication of sunscreen is not a common practice among both groups, as demonstrated by 21 respondents (20.6%) that never reapply. (*Table 2*)

Only 17.6% of the high risk group reported to have received counselling on sunscreen use by a dermatologist, with 73.5% of them never receiving any form of counselling. As compared to the low risk group, a significant proportion of subjects (44.1%) in the high risk group knew that sunscreen should be applied every day all year round. Both groups were not well knowledgeable concerning the minimum amount of time one should apply sunscreen before sun exposure; as demonstrated by only 23.3% of the high risk group and 27.2% of the low risk group that gave a correct response. 72.7% of the high risk group chose the correct answer on reapplication of sunscreen every 2 hours, while 56.8% of the low risk group indicated that reapplication of sunscreen was not necessary. Highest proportion of all respondents (80.7%) had knowledge on the protective function of sunscreen on skin cancer prevention. (*Table 2*)

Respondents in the high risk group (40.6%) perceive sunscreen as an over-the-counter drug, but the low risk group (46%) consider it as a cosmetic beauty product. Majority of respondents from both groups concur that sunscreen protects the skin from photo-aging (74.3% of the high risk group and 66.7% in the low risk group), and also from sunburn (95.8% of the high risk group and 94.7% of the low risk group). 53 Participants (73.6%) from the high risk group and 26 (66.3%) from the low risk group responded that a person still needs to wear sunscreen even if they practise other sun-protective measures such as wearing an umbrella or hat, or staying indoors or under the shade. (*Table 2*)

Table 2: Different variables measured by data responses of respondents.

Variable :	**High risk group**	**Low risk group**	**Frequency missing**
Practice			
Receive sunscreen prescription.	n=74 36 (48.7%)	n=41 9 (22%)	16
Wear sunscreen.	n=74 46 (62.2%)	n=42 19 (45.2%)	15
Wear sunscreen every day, all year round.	n=72 13 (18.1%)	n=40 5 (12.5%)	19
Apply sunscreen on all sun-exposed areas.	n=68 23 (33.8%)	n=41 8 (19.5%)	22
Use SPF 30+ or 50+.	n=69 27(39.1%)	n=40 5 (12.5%)	22
Reapply sunscreen after 1-2hours.	n=64 7(10.9%)	n=39 4 (10.3%)	28
Knowledge			
Receive counselling from a: ▪ Dermatologist ▪ General Practitioner ▪ Nurse	n=68 12 (17.7%) 4 (5.9%) 2 (2.9%)	n=39 3 (7.7%) 0 (0%) 1 (2.6%)	24
Knowledge that one is supposed to wear sunscreen every day, all year round.	n=68 30 (44.1%)	n=39 8 (20.5%)	24
Knowledge on application of sunscreen 20-30minutes before sun exposure.	n=60 14 (23.3%)	n=33 9 (27.3%)	38
Knowledge about reapplying sunscreen every 2 hours.	n=66 48 (72.7%)	n=38 16 (42.1%)	27
Awareness that sunscreen protects the skin from skin cancers.	n=70 57 (81.4%)	n=36 29 (80.6%)	25
Perception			
Perceive sunscreen as an over-the-counter drug.	n=64 26 (40.6%)	n=38 10 (26.3%)	29
Do think sunscreen protects the skin from photoaging.	n=70 52 (74.3%)	n=40 26 (65.0%)	21
Do think sunscreen protects the skin from sunburn.	n=71 68 (95.8%)	n=39 37 (94.9%)	21

Do agree that one still needs to wear sunscreen even if they use other sun-protective measures.	n=72 53 (73.6%)	n=39 26 (66.7%)	20

Discussion

The role of sunscreen can often be undermined as evident in several studies conducted previously. Studies are lacking in South Africa to demonstrate the frequency and pattern of sunscreen use in the country, particularly among dermatology patients.

The study revealed that only half of all respondents do use sunscreen, while almost two-thirds of the respondents from the high risk group wear sunscreen in comparison with just less than half of respondents in the low risk group. Mallett et al observed that there is a significant number of dermatology patients that do not use sun protection despite having awareness about the risks of unprotected sun exposure[10]. It is worth noting that from the 65 respondents that do wear sunscreen in our study, only 18 respondents apply it on a daily basis. Gupta M also observed that 52% of the respondents from a study sample of dermatology patients were using sunscreen; out of which only 20.3% used sunscreen on a regular basis[11]. In our survey, higher rate of sunscreen use in high risk respondents than in low risk group may probably be attributed to previous skin cancer history and the observation that the high risk group receives sunscreen prescription more than the low risk group. In a study by Al Robaee A, the reason reported for sunscreen use was mainly to avoid skin darkening, while the reason for "non-use" of sunscreen was due to "not having" sunscreen[12]. Our study also demonstrated a significantly low rate of correct use of sunscreen from both groups. It has been found that only 30% of women and less than 15% of men regularly use sunscreen on both the face and other exposed skin[13].

The level of knowledge on sunscreen use in our studied population group did not correlate with the decreased rate of regular sunscreen use. A study by Gupta M also observed inadequate use of sunscreen despite adequate knowledge of the benefits of sunscreen among dermatology participants[11]. This is in contrast with a study by Dlova et al, that observed a significantly higher knowledge of sunscreen use in patients with previous skin cancer history than lower risk patients, as well as a significant association of that knowledge with likelihood of practising sun protective behaviour[14]. Majority of respondents in our survey were aware of the role of sunscreen in skin cancer prevention irrespective of the very low rate of counselling about sunscreen from Dermatologists, General Practitioners, and Nurses reported. It has been found that skin cancer patients are more likely to report receiving sunscreen counselling than non-skin cancer patients, most commonly from Dermatologists[4].

Although both groups had differing opinions on whether sunscreen is a an over-the-counter drug or merely a cosmetic product, they both acknowledged its protective benefits to the skin. Overall, respondents from both groups had a good perception of sunscreen and its benefits. More than 80% of the volunteers in a study by Agarwal et al also agreed on the protective benefits of sunscreen against UVR, photodamage, and skin tanning[15].

Conclusion

Assessment of the practice and knowledge of sunscreen use highlighted the suboptimal and inappropriate use of sunscreen by dermatology patients, as well as inadequate knowledge about correct use of sunscreen in contrast to having a good perception regarding the protective role of sunscreen against skin cancer.

There is a dire need for more education or counselling of all dermatology patients on sunscreen use, with particular emphasis on the need for regular and proper sunscreen use for maximum efficacy. Implementation of a SunSmart program in Australia increased photo-protection behaviour within ten years of its commencement[16].

Study limitations included the risk of errors and subjective data due to the study depending on self-reporting from the respondents, as well as potential for bias as a result of missing frequencies.

Acknowledgements

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Author's biostatistician: Prof Gina Joubert
Funding sources: self-funded research.
Conflict of interest: None

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A.

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA

UFS·UV
HEALTH SCIENCES
GESONDHEIDSWETENSKAPPE

Health Sciences Research Ethics Committee

05-Mar-2019

Dear **Dr Jeannett Maepa**

Ethics Clearance: **A CROSS-SECTIONAL STUDY OF THE PRACTICE, KNOWLEDGE AND PERCEPTION OF SUNSCREEN USE AMONG DERMATOLOGY PATIENTS AT UNIVERSITAS HOSPITAL**

Principal Investigator: **Dr Jeannett Maepa**

Department: **Dermatology Department (Bloemfontein Campus)**

APPLICATION APPROVED

Please ensure that you read the whole document

With reference to your application for ethical clearance with the Faculty of Health Sciences, I am pleased to inform you on behalf of the Health Sciences Research Ethics Committee that you have been granted ethical clearance for your project.

Your ethical clearance number, to be used in all correspondence is:**UFS-HSD2018/1140/2603**
The ethical clearance number is valid for research conducted for one year from issuance. Should you require more time to

complete this research, please apply for an extension.

We request that any changes that may take place during the course of your research project be submitted to the HSREC for approval to ensure we are kept up to date with your progress and any ethical implications that may arise. This includes any serious adverse events and/or termination of the study.

A progress report should be submitted within one year of approval, and annually for long term studies. A final report should be submitted at the completion of the study.

The HSREC functions in compliance with, but not limited to, the following documents and guidelines: The SA National Health Act. No. 61 of 2003; Ethics in Health Research: Principles, Structures and Processes (2015); SA GCP(2006); Declaration of Helsinki; The Belmont Report; The US Office of Human Research Protections 45 CFR 461 (for non-exempt research with human participants conducted or supported by the US Department of Health and Human Services- (HHS), 21 CFR 50, 21 CFR 56; CIOMS; ICH-GCP-E6 Sections 1-4; The International Conference on Harmonization and Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH Tripartite), Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines, Constitution of the HSREC of the Faculty of Health Sciences.

For any questions or concerns, please feel free to contact HSREC Administration: 051-4017794/5 or email EthicsFHS@ufs.ac.za. Thank you for submitting this proposal for ethical clearance and we wish you every success with your research.

Yours Sincerely

Dr. SM Le Grange
Chair : Health Sciences Research Ethics Committee

Health Sciences Research Ethics Committee
Office of the Dean: Health Sciences
T: +27 (0)51 401 7795/7794 | E: ethicsfhs@ufs.ac.za
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B.

health
Department of Health
FREE STATE PROVINCE

11 February 2019

Dr J Maepa
Dept. of Dermatology
UFS

Dear Dr J Maepa

Subject: A cross-sectional study of the practice, knowledge and perception among Dermatology patients at Universitas Academic Hospital

- Please ensure that you read the whole document. Permission is hereby granted for the above – mentioned research on the following conditions:
- Participation in the study must be voluntary.
- A written consent by each participant must be obtained.
- Serious Adverse events to be reported to the Free State department of health and/ or termination of the study
- Ascertain that your data collection exercise neither interferes with the day to day running of Universitas Hospital nor the performance of duties by the respondents or health care workers.
- Confidentiality of information will be ensured and please do not obtain information regarding the identity of the participants.
- **Research results and a complete report should be made available to the Free State Department of Health on completion of the study (a hard copy plus a soft copy).**
- Progress report must be presented not later than one year after approval of the project to the Ethics Committee of The University of Free State and to Free State Department of Health.
- Any amendments, extension or other modifications to the protocol or investigators must be submitted to the Ethics Committee of The University of Free State and to Free State Department of Health.
- **Conditions stated in your Ethical Approval letter should be adhered to and a final copy of the Ethics Clearance Certificate should be submitted to** lithekom@fshealth.gov.za /sebeelats@fshealth.gov.za **before you commence with the study**
- No financial liability will be placed on the Free State Department of Health
- **Please discuss your study with Universitas Hospital CEO: Dr M Molokomme on 051 405 3557/3634 or email:** molokommm@universitas.fs.gov.za /vanwyksa@universitas.fs.gov.za **on commencement for logistical arrangements**
- Department of Health to be fully indemnified from any harm that participants and staff experiences in the study
- Researchers will be required to enter in to a formal agreement with the Free State department of health regulating and formalizing the research relationship (document will follow)
- You are encouraged to present your study findings/results at the Free State Provincial health research day

Trust you find the above in order.
Kind Regards

Dr D Motau
HEAD: HEALTH
Date: 13/02/19

Head : Health
PO Box 227, Bloemfotein, 9300
4th Floor, Executive Suite, Bophelo House, cnr Maitland and, Harvey Road, Bloemfotein
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health
Department of Health
FREE STATE PROVINCE

11 February 2019

Dr. J Maepa
Dept. of Dermatology
UFS

Dear Dr. J Maepa

Subject: A cross-sectional study of the practice, knowledge and perception among Dermatology patients at Universitas Academic Hospital

Please find below the contact details of Universitas Hospital CEO for logistical arrangements.

Universitas Hospital

Name: Dr M Molokomme
Email: molokommm@universitas.fs.gov.za
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Trust you find the above in order.

Kind Regards

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C.

DEPARTMENT: DERMATOLOGY

This is to certify that the Departmental Evaluation Committee approved of the following MMed/MPhil research protocol:

CANDIDATE: Dr JR. MAEPA

SUPERVISOR(S): Dr F. MARUMA

DATE OF THE MEETING: 15/10/2018

TITLE OF THE RESEARCH PROJECT:

A CROSS-SECTIONAL STUDY OF THE PRACTICE, KNOWLEDGE AND PERCEPTION OF SUNSCREEN USE AMONG DERMATOLOGY PATIENTS AT UNIVERSITAS HOSPITAL

Dr JR. MAEPA — 15/10/2018

RESEARCH CHAMPION — DATE

DR. FRANS MARUMA — 2018.10.15.

SUPERVISOR(S) — DATE

18/10/2018

HEAD OF THE DEPARTMENT — DATE

D.

UNIVERSTIY OF FREE STATE
FACULTY OF HEALTH SCIENCES
SCHOOL OF MEDICINE

Title: **A CROSS-SECTIONAL STUDY OF THE PRACTICE, KNOWLEDGE AND PERCEPTION OF SUNSCREEN USE AMONG DERMATOLOGY PATIENTS AT UNIVERSITAS ACADEMIC HOSPITAL.**

Degree: MMED DERMATOLOGY

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Date of submission to HSREC: October 2018

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

Background: Sunscreens are produced to protect the skin from cutaneous adverse effects of ultraviolet radiation exposure. However there are different perceptions about their relevance and use due to the level of knowledge and understanding about them.
Relevance and rationale: Although there is increasing awareness of the damaging effects of sun exposure, the importance and role of sunscreens is ignored by the general population (including dermatology patients) as evident by no significant degree of change in behaviour. They are generally viewed as merely cosmetic products more than photo-protective measures or over-the-counter drugs. This means more education on the harmful ultraviolet radiation effects on the skin is required; and emphasis on the need for regular sunscreen use by every individual, particularly dermatology patients, is also needed.
Aim and objectives: The aim of the study is to find out the practice, knowledge, and perception of sunscreen use among the dermatology patients at Universitas Academic hospital. This survey will help identify any gaps that require further or intense awareness and education to alter photo-protective behaviour of patients and reduce the risk of photo-damage and skin cancers.
Methods: Using a questionnaire for data collection, a cross-sectional study will be carried out from 04-15 February 2019, in a total of 2 weeks of the dermatology clinic. All new and old patients attending the Universitas Academic hospital dermatology clinic, aged 18 years and older, and giving consent, will be included in the study.
Study setting: The study will be conducted from the dermatology clinic at Universitas Academic hospital in Bloemfontein, Free State province.
Data analysis: The results will be summarised by frequencies and percentages.
Ethical considerations: The protocol will be submitted to Health Sciences Research Ethics committee for approval, and hospital/ provincial health research committee for permission to commence the study. Participants will be issued a Participant information leaflet prior to participating in the survey, and illiterate participants will sign a consent form before participation.

2. LITERATURE REVIEW

The sun produces Ultraviolet radiation, which is divided into UVA, UVB, and UVC with different wavelengths. UVC does not reach the earth's surface as it is absorbed by the ozone layer. UVB has greater effects than UVA and its intensity peaks around midday, while the intensity of UVA remains consistent throughout the day (*Young et al, 2016*). UVB causes sunburn and DNA damage, which results in development of non-melanoma skin cancers (*McSweeney , 2016*). Erythema, hyperpigmentation, innate immunity induction, and acquired immunity suppression are some of the acute effects of Ultraviolet radiation; while chronic effects include carcinogenesis and photo-ageing (*Young et al, 2016*). Both UVB and UVA contribute to skin photo-aging; precancerous cutaneous lesions such as solar lentigines and solar keratosis; and skin cancers such as Basal cell carcinoma, Squamous cell carcinoma and Melanoma (*Guitera , 2017*).

Avoiding exposure to UVR can be effective in reducing many acute and chronic adverse cutaneous effects. This can be achieved by use of UVB and UVA-blocking glass, wearing sun protective clothing, and regular sunscreen application (*Vasicek et al, 2018*). Other recommended means of sun protection include hats, sunglasses, shade, umbrella, and avoiding prolonged outdoor exposure during the middle of the day (*Donglikar and Deore , 2016*). However, patient knowledge, behaviours, and attitudes regarding sun protection vary among the general population because of group differences in self-efficacy, perceived susceptibility, and skin cancer awareness, which then influence their sun protection behaviours and beliefs(*Kamimura et al, 2015*). The general level of knowledge on skin cancer prevention and sunscreen use is poor in South Africa (*Dlova, et al, 2018*).Research findings also suggest that there is significant number of dermatology patients that continue to expose their skin to high amounts of UVR than the general population (*Mallet et al, 2015).*

Sunscreens were produced in the early 1900s to try to block the harmful effects of Ultraviolet radiation, thereby protecting the human skin (*McSweeney , 2016*). The initial sunscreens only contained mainly UVB-absorbing agents as they were primarily meant to protect from sunburn/erythema (*Bolognia et al, 2018*). An ideal sunscreen must protect against both UVB and UVA, be resistant to water and sweat, have a high SPF, be easy to apply, have low risk of contact allergy and be cosmetically acceptable when applied (*McSweeney, 2016*). In addition, it should not block beneficial UVR effects such as Vitamin D synthesis, photo-adaption, or reduction in blood pressure by UVA (*Young et al, 2016*).

Current sunscreens offer broad-spectrum protection and are classified according to their active ingredients into: i) soluble organic/ chemical sunscreens that act by absorbing UVR preventing it from reaching the skin cells; and ii) insoluble inorganic/ physical sunscreens with metal-oxide filters that absorb and scatter or reflect UVR away from the skin (*Bolognia et al, 2018*). Chemical sunscreens usually contain a combination of synthetic chemicals such as cinnamates, dibenzoylmethanes (salicytes) and benzophenones; while physical sunscreens include zinc oxide and titanium dioxide, which leave a white residue after application to the skin (*Guitera, 2017*). SPF is the factor by which the sun exposure dose (UVR dose) can be increased before skin erythema develops (minimal erythema dose); therefore measures the protection offered by a sunscreen (*Peterson and Wulf, 2014*).

There are differing Regulatory standards for sunscreens globally: in the US sunscreens are considered as over-the-counter drugs; in Canada they are regarded as drugs, but considered as "natural health products" if they contain only titanium oxide, zinc oxide, or para-

aminobenzoic acid; in Australia most sunscreens are considered as ‘therapeutic goods”; and in other countries they are regarded as cosmetics by differing criteria (*Young et al, 2016*). Use of sunscreen is a modifiable behaviour that can help to decrease the risk of skin cancers, prevent sunburn, reduce photo-ageing and control photosensitive dermatoses (*Xu et al, 2016*). There is a significant increase in new cases of non-melanoma skin cancers (BCC and SCC), with a worldwide annual incidence ranging from 3-8% due to increased exposure to the sun among the human population (*Sanchez et al*, 2016). It has also been shown that regular sunscreen use is not significantly associated with having previous history of skin cancer (*Holman et al, 2015*). In a study by Van der Pols et al, there was a tendency for a decreased incidence of BCC with sunscreen use 5 years after stopping sunscreen; and a reduced number of skin SCC in the long term with regular sunscreen use, up to 8 years after stopping it. It is also important to note that Caucasians have a much higher risk of developing skin cancers than the darker-skinned population because of the low protective melanin production (*Dlova et al, 2018*). Therefore individuals with a history of skin cancer or other risk factors should ensure that they implement necessary precautions to protect their skin (*Mallett et al, 2015*).

The following factors, particularly correct use of sunscreen determine its efficacy in sun protection: use of a broad spectrum, water resistant sunscreen with an SPF of 30 or higher; generous application (about 5ml for each body part) to all sun exposed areas; applied 20 minutes before sun exposure; and re-applied every 2 hours (*Guitera, 2017*). Adults that do use sunscreen regularly, particularly women, use it only on the face and not on other sun exposed areas; as they may be focusing only on its anti-ageing purposes (*Holman et al, 2015*).

Counselling on sunscreen should be focused more on children and young adults to get maximum benefits because most damaging sun exposure is seen during childhood and young adulthood, which then places these individuals at risk of developing skin cancer at a later stage in life (*Vasicek et al, 2018*). A recent study aimed at clarifying the frequency and nature of sunscreen recommendations by dermatologists showed that dermatologists discuss sunscreen with their patients at only 1.6% visits (*Winkelmann and Rigel, 2015*). This highlights the need for more enhanced education or counselling from dermatologists (and other clinicians) to reduce the burden of skin cancer on our health care system.

3. AIMS AND OBJECTIVES

The rise of skin cancers seen in dermatology sparks the question on what the general population, particularly dermatology patients, think of the use of sunscreen. The aim of this study is to then find out the practice, knowledge, and perception/understanding with regards to sunscreen use in dermatology patients visiting Universitas dermatology clinic in Bloemfontein, Free State province. Patients with a skin cancer history or risk factors will be compared with the group of patients that do not have skin cancer history or risk factors. These risk factors will be reflected in the questionnaire. They include race (giving a clue to the skin type), occupation (giving an idea of the duration of sun exposure), having more than ten atypical nevi (moles), family history of skin cancer, and personal history of skin cancer.

The study will help to elicit whether patients know the important role of sunscreen use in photo-protection against the damages of ultraviolet radiation (especially sun-induced skin cancers), particularly those patients with skin cancer history or with high risk for developing skin cancers.

This survey will subsequently identify any gaps that require further or intense awareness and education to alter photo-protective behaviour of patients and promote prevention of skin cancer in all dermatology patients. Using the prevalence of skin cancer in the country, Guidelines on sunscreen use in South Africa need to be implemented to educate the general population and guide clinicians when counselling susceptible patients on proper sunscreen use. Further intervention strategies will improve or help reduce the risk of skin cancers.

4. METHODS

4.1. Study design

A quantitative, observational, cross-sectional analytical study is the type of study design that will be performed.

4.2. Study setting

This study will be conducted at a tertiary care dermatology clinic at Universitas Academic hospital in Bloemfontein Free State province.

4.3. Study population and sampling

Study population is all patients, new and old, visiting the dermatology clinic at Universitas Academic hospital, from 04-15 February 2019. The study will not be conducted on Tuesdays and Wednesdays due to the following recent changes in our clinic: on Tuesdays there will be no clinic running as from the month of June 2018, and on Wednesdays it is a paediatrics dermatology clinic (children are not included in the study). The inclusion criteria will be all patients who are aged 18 years or older and those volunteering to participate. Patients that have already completed the survey on previous visits will be in the exclusion criteria. The average number of patients seen per month was 852 in the last 3 years (according to collected statistics) at the dermatology clinic in Universitas Academic hospital. Thus the target sample size expected will be 150-200 participants within the two-week duration, and this as already stated above, excludes children. A larger sample size is also avoided as it would require more days for data gathering and also pose the risk of delaying the normal operations of the busy dermatology clinic that sees on average 50 patients per day.

4.4. Measurements

Data collection will be obtained by means of a four-page questionnaire that will take 15-20 minutes to fill in. These are to be distributed to all dermatology patients visiting the dermatology clinic during the survey duration. Patients will be handed the information sheets and questionnaire forms by the assistants/translators at the waiting area an hour before the clinic starts. During this time, the researcher, as well as the translators will briefly explain the process to the patients for 5 minutes. The participants will have time to fill in the questionnaires anonymously before being seen by the Doctor. Illiterate participants will also be able to be helped during this period and those that come afterwards will be helped after the clinic is finished while waiting for their treatment at the pharmacy waiting area. The questionnaires will be then be placed in a box by each participant, which will be collected by the investigator at the end of each day.

The questionnaire has 25 multiple choice questions (closed questions) and will be made available in English, Sotho, and Afrikaans. Instructions on how to fill in the form are stated in the beginning, followed by a space for the date on which the form is completed.

The questionnaire begins with patient demographics; including whether the respondent is a new or old/known patient to the Universitas dermatology clinic, gender, age, race, highest level of education and employment. The next few questions from 6-10 measure the clinical characteristics which are: participant's skin type, any skin sensitivity to the sun (itchy or burning sensation to skin, or worsening skin condition on exposure to the sun), any atypical (unusual) moles more than 10 in number, family history of skin cancer, and respondent's history of any skin cancer. This is followed by questions 11-16 assessing the practice of sunscreen use by the participant by asking whether the patient gets prescribed sunscreen, if the patient wears sunscreen, how often it is used, where it is applied, the number of SPF used, and how often the sunscreen is reapplied. The next parameter (questions 17-21)

measures the knowledge of the respondent on sunscreen usage. These include whether the patient has been counselled on sunscreen use before, how often one should wear sunscreen, the minimum amount of time it should be applied before sun exposure, how often it should be reapplied, and if it protects the skin from skin cancers. The last set of questions from 22-25 assess the perception of the respondent regarding sunscreen use. In this parameter, the participant is asked what he/she thinks sunscreen is, whether the participant thinks it protects the skin from photo-ageing, if it protects the skin from sunburn, and lastly, whether the participant thinks a person needs to wear sunscreen if he/she uses or practises other sun protective measures such as umbrella, hat, and staying indoors or under shades.

4.5. Methodological and measurement errors

The following potential random errors (variations) and solutions to them have been considered. There is a possible chance of participants discussing and sharing answers amongst themselves while filling in the questionnaire at the waiting area at the same time. During the brief explanation of the survey to the patients, they will be informed about the effects of discussing or sharing answers on the results of the study. Illiterate participants may have difficulty understanding or answering the questionnaire. The two assisting registrars will help them with filling in the questionnaires. Illiterate patients will also have to sign a consent form as their answers will no longer be anonymous since they will be verbalised to the person helping them to fill-in the questionnaire.

4.6. Pilot study

A pilot study will be done on 5 participants after ethics approval. It will be conducted at the same study site by distributing the questionnaires to the first 5 patients visiting the Universitas dermatology clinic on one particular day. The results of this trial run will not be included in the main study.

5. ANALYSIS OF DATA

All the questionnaire forms will be thoroughly checked to identify any errors or gaps on a daily basis during the period of the survey. Questionnaires found to have more than 50% errors (e.g. not properly filled, will unfortunately be considered as invalid. The collected questionnaires will be stored at the dermatology department and copies will be made and kept with the researcher. AAD guidelines (*Sambandan and Ratner, 2011*) on proper sunscreen will be used as reference model for correct answers on sunscreen use knowledge, and a score will be allocated for the correct answers. Data will be recorded on an excel spreadsheet.

Data will be analysed by the Department of Biostatistics, UFS. Subgroups will be compared using 95% confidence intervals for differences in means, medians or percentages, with appropriate hypothesis testing. The results will be summarised by frequencies and percentages.

6. IMPLEMENTATION OF FINDINGS

The outcome of the results will determine whether there is a gap that needs to be filled by heath care workers, particularly dermatologists, with regard to educating, counselling and increasing awareness on the role of sunscreen in skin protection and reduction of sun-induced skin cancers. These findings will be shared with the Universitas dermatology department who will decide on the need for implementation of intense education and counselling of dermatology patients on sunscreen use.

7. FEASIBILTIY

7.1. Time schedule

Protocol completion – 10 May 2018
Submission to supervisor – 16 May 2018
Submission to Statistician – 16 July 2018
Submission to Research Ethics Committee – 21 September 2018
Commencement of study – 04 February 2019
End of data collection – 15 February 2019
Data analysis with Statistician– February to March 2019
Report writing – March to April 2019
First study draft completed and submitted to supervisor –End of April 2019
Final study report completed and submitted for marking –May 2019

7.2. Budget consideration

The budget for this study includes costs for printing and making photocopies for the questionnaires. The total cost for 150-200 copies times 4 pages per questionnaire (600-800 copies) will be R480-R640 (80 cents per copy). Costs of these will be funded by the researcher. The participants and study personnel will not have to receive any remuneration.

7.3. Contributors

The protocol and report will be submitted to the supervisor to proof-read and give necessary advice, on the above scheduled date. A meeting with the Statistician is to be held regarding guidance on proper data collection and data management. Two registrars have been asked to assist with translation to those participants who will require it and also with illiterate participants.

7.4. Participating centres

The study is to be conducted only at Universitas Academic hospital in Bloemfontein as the dermatology clinic is only run at this institution. It is the point of referral or draining site for all patients in the Free State.

8. ETHICAL CONSIDERATIONS

8.1. Ethics review

Permission has been granted from the Clinical head of dermatology. This research protocol is to be submitted to the Health Science Research Ethics Committee at the University of Free State and Free State Department of Health for approval prior to commencement of the study.

8.2. Community participation

Community engagement will not be necessary in this type of study, since it is a cross-sectional analytical study.

8.3. Social value

This study will highlight the need for proper and thorough counselling and awareness of photo-protection, to most importantly reduce the risk of sun damage and skin cancers among the Free State community.

8.4. Scientific validity

A questionnaire is an appropriate, relevant, commonly used and valid research instrument which will be used in terms of collecting data for this particular study.

8.5. Fair selection of participants

Selection of participants will be fair and unbiased. The inclusion criteria for this study will be any patient above the age of 18, who will be visiting the Universitas dermatology clinic during the period of the study. Patients not interested in participating in the survey, and vulnerable patients such as children and inmates will not be included in this study.

8.6. Informed consent

A standard information sheet (in English, Sotho and Afrikaans) from UFS HSREC will be handed to the participating patients to fill in. No consent form will be issued to ensure anonymity. Volunteering to fill in the questionnaire will be consent to participate. Illiterate participants will however have their anonymity breached as stated above in methods, since their answers will be said to the nurse helping them out to fill in the questionnaire. Therefore a consent form will be handed to these particular patients to sign. The information and reason for the study will also be verbally explained to the participants in their respective preferred language.

8.7. Risk/benefit balance

Benefits of this study far outweigh the risks. There are possible social risks such as breach of confidentiality or embarrassment. This potential of embarrassment may be brought by not knowing some of the answers to questions asked in the questionnaire. These risks will be minimized by maintaining privacy and anonymity. After the patients have completed the questionnaires, they will drop them in a box located at the nursing station.

8.8. **Ongoing respect of participants**:

Confidentiality and anonymity will be preserved during and after completion of the study. At any given point in time, any participant can decide to exit the study if they no longer wish to form part of the survey.

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E.

PARTICIPANT INFORMATION SHEET

Study title: A CROSS-SECTIONAL STUDY OF THE PRACTICE, KNOWLEDGE AND PERCEPTION OF SUNSCREEN USE AMONG DERMATOLOGY PATIENTS AT UNIVERSITAS ACADEMIC HOSPITAL.

Introduction: I, Dr J.R. Maepa, am doing research from 04-15 February 2019. Research is just the process to learn the answer to a question. In this study we want to find out exactly how much dermatology patients know about sunscreen use, their thoughts on it, and the trends of using sunscreen for sun protection.

Invitation to participate: We are asking/inviting you to participate in this research study.

What is involved in the study: as the participant, you will receive an information leaflet and questionnaire form to fill in at the waiting area while waiting to be seen by the doctors. The questionnaire is a multiple choice question and only one box for each question will need to be marked with a cross. All questions not understood will be verbally explained in your preferred language. As soon as you have completed the questionnaire, you put it in a box at the nursing station and then go back to the waiting area. Approximately 150-200 patients visiting the dermatology clinic within the period 04-15 February 2019 are anticipated to take part in this study.

Risks: there will not be any associated risks.

Benefits of being in the study: no benefits.

Participation is voluntary, and refusal to participate will involve no penalty or loss of benefits to which the subject is otherwise entitled; the subject may discontinue participation at any time without penalty or loss of benefits to which the subject is otherwise entitled.

Reimbursements: none.

Confidentiality: Efforts will be made to keep personal information confidential. Absolute confidentiality cannot be guaranteed. Personal information may be disclosed if required by law.
Organizations that may inspect and/or copy your research records for quality assurance and data analysis include groups such as the Health Sciences Research Ethics Committee and the Medicines Control Council *(where appropriate).*

If results are published, this may lead to individual/cohort identification.

Contact details of researcher(s) – 051 405 3832 for further information.

Contact details of Secretariat and Chair: ***Health Sciences Research Ethics Committee, University of the Free State*** **–** for reporting of complaints/problems: Telephone number (051) 4052812

PAMPIRI YA LESEDI LA DITABA

Sehlohoo se ithutwang: TSHEBEDISO YA SESIRELETSO SA LETLALO, LE TSEBO LE TEMOHO YA SONA BAKUDING BA LETLATLO SEPETLELENG SA BOITHUTONG UNIVERSITAS, BLOEMFONTEIN.

Selelekela: Nna, ngaka Dr JR Maepa, ke etsa dipatlisiso ho tloha ka la 04-15 Hlakola 2019. Dipatlisiso ke tsela ya ho ithuta karabo ya potso. Sehloohong sena re batla ho fumana hantle hore bakudi ba letlalo ba tseba hakae ka sesireletsi sa letsatsi, menahano ya bona ka sona, le hore se sebediswa jwang. Patlisiso ena e etswa ho re thusa ho tseba hore na ke batho ba bakae ba se tsebang, le ho se sebedisa ka nepo.
Memo ya ho nnka karolo: Re ho memela ho nnka karolo dipatlisisong tsa sehlooho.
Ho akarelletsa eng? O le monkakarolo, o tla fuwa leqephe la tlhahisoleseding le foromo ya lenane la dipotso ho di tlatsa hantse a emetse ho thuswa ke ngaka. Ke dipotso tse fapaneng, mme o tla kgetha e le engwe. Dipotso tse o sa di utlwisesing di tla hlaloswa ka puo ya hao. Ha o qetile ka dipotso, o tla di kenya lebokosong, mme o kgutlele sebakeng sa ho ema. Ke bakudi ba ka bang 150 ho isa 200 ba kliniking ya letlalo ba lebeletsweng ho nka seabo sehloohong sena, ho tloha ka la 04 ho isa 15 Hlakola 2019.
Dikotsi: ha di fumanehe.
Melemo ya sehlooho se ithutwang: ha e fumanehe.
Ho nka karolo ke boithaopi: O k eke wa ahlolwa kapa wa tingwa menyetla e o tshwanetseng ha o sa +nke karolo; o ka kgotsa ho nka karolo nako efe kapa efe ntle le kahlolo.
Moputso: Ha o teng.
Sephiri: Ho tla nkwa mehato yaho se phatlalatse ditaba tsa hao. Empa di ka phatlalatwsa ha molao o di hloka. Komiti ya Boitshwaro ya Diphuphutso tsa Saense tsa Bophelo le Khansele ya Tsamaiso ya Meriana ke mekgatlo e tlo hlahloba direkoto tsa dipatlisiso bakeng sa boleng le analesese ya ditaba.
Mmatlisisi a ka fumaneha ho 051 405 3832 bakeng sa lesedinyana.
Ba ditokelo lefapheng: bakeng sa ditletlebo/mathata, letsetsa (051) 405 2812

DEELNEMER: INFORMASIE PAKKET

Studie titel: DIE GEBRUIK, KENNIS EN PERSEPSIE VAN SONSKERM ONDER DERMATOLOGIE PASIENTE BY UNIVERSITAS AKADEMIESE HOSPITAL IN BLOEMFONTEIN.

Inleiding: Ek is Dr JR Maepa. Ek doen navorsing vanaf 04-15 Februarie 2019. Navorsing is 'n proses wat mense help om die antwoord op 'n stelling/vraag te kry. In hierdie studie, wil ons sien hoeveel kennis die dermatologie pasiente oor die gebruik van sonskerm en het ook die redes hoekom dit gebruik word as sonbeskermer. Die opname gaan gebruik word om te kyk hoeveel mense weet hoe om sonskerm reg te gebruik.

Uitnodiging vir deelname: Hiermee wil ons u graag uitnooi en vra om deel te neem.

Wat behels die studie: As 'n deelnemer, ontvang jy 'n informasie pakket en 'n vraelys om te voltooi by die wagkamer terwyl u wag om gesien te word deur die dokter . Die vraelys is veelvuldige keuse vrae – een blokkie vir elke vraag moet met 'n kruisie gemerk word. Alle vrae wat u nie verstaan nie sal in 'n taal verduidelik word wat u verstaan. So spoedig as wat u vraelys ingevul het moet u dit asseblief in die boks plaas by die verpleegster stasie. U kan dan teruggaan na die wagkamer. Ons verwag dat ongeveer 150-200 pasiente wat die kliniek besoek tussen 04-15 Februarie 2019, sal deelneem aan die opname.

Risiko's: Daar gaan geen verwante risiko's is nie

Voordele vir deelname aan studie: geen direkte voordele.

Deelname is vrywillig: Daar is geen straf as u sou weier om deel te neem nie. Dit is u vrye keuse om deel te neem of nie.

Vergoeding: Gratis voorsiening van sonskerm vir die deelnemers sal oorweeg word.

Vertroulikheid: Voorsorg maatreels sal getref word om persoonlike inligting te beskerm – maar vertroulikheid kan nie gewaarborg word nie. Persoonlike inligting kan gegee word as dit deur die wet versoek word. Organisasies wat inspeksie en afskrifte van navorsing kan doen vir kwaliteit sorg en data analise sluit die groepe soos Gesondheidswetenskap Navorsing Etiese Komitee en Mediese Kontrole Raad in (waar nodig).
As die uitslae gepubliseer word kan dit lei tot individuele/ identifikasie.

Kontak besonderhede van navorsingsbeampte(s): 051 405 3832 vir meer inligting.

Kontak besonderhede van Sekretaris en Voorsitter: Die Gesondheidswetenskap Navorsing Etiese Komitee , **Universiteit van Vrystaat** – aanmelding van probleme en klagtes: Telefoon nommer (051 405 2812).

F.

CONSENT TO PARTICIPATE IN RESEARCH

PROJECT TITLE*:* A CROSS-SECTIONAL STUDY OF THE PRACTICE, KNOWLEDGE AND PERCEPTION OF SUNSCREEN USE AMONG DERMATOLOGY PATIENTS AT UNIVERSITAS ACADEMIC HOSPITAL.

You have been asked to participate in a research study.

You have been informed about the study by ……..

You may contact **Dr JR Maepa** at 051 405 2324 any time if you have questions about the research.

You may contact the Secretariat of the Health Sciences Research Ethics Committee, UFS at telephone number (051) 4052812 if you have questions about your rights as a research subject.

Your participation in this research is voluntary, and you will not be penalized or lose benefits if you refuse to participate or decide to terminate participation.

If you agree to participate, you will be given a signed copy of this document as well as the participant information sheet, which is a written summary of the research.

The research study, including the above information has been verbally described to me. I understand what my involvement in the study means and I voluntarily agree to participate.

_____	_____
Signature of Participant	Date
_____	_____
Signature of Witness *(Where applicable)*	Date
_____	_____
Signature of Translator *(Where applicable)*	Date

TUMELLO YA HO NKA KAROLO DIPHUPUTSONG TSA RONA

LEBITSO LA DIPHUPUTSO TSA RONA: TSHEBEDISO YA SESIRELETSO SA LETLALO, LE TSEBO LE TEMOHO YA SONA BAKUDING BA LETLATLO SEPETLELENG SA BOITHUTONG UNIVERSITAS, BLOEMFONTEIN.

O kuptjwa ho nka karolo diphuputsong tsa rona, ditaba kaofela o di hlaloseditswe ke:

……

Ha ho ka hlokahala, o ka fumana **ngaka JR Maepa** ho 051 405 2324 nako efe kapa efe ha dipotso di ka ba teng.

O lokollehile ho bua le ba ditokelo lefapheng (Komiti ya Boitshwaro ya Diphuphutso tsa Saense tsa Bophelo) mohaleng o latelang: 051 405 2812.

Tumellano ya ho nka karolo ha se qobello, mme ha ho kahlolo ha o ka se rate ho nka karolo, kapa hona ho fetola monahano ha o ile wa nka karolo.

Ha o ka nka karolo, o tla fumana tokomane eo o tla e tekena.

Ke dumela ho nka karolo, le hore ha ke a qobellwa ho fumana thuso ka mokgwa ona.

_____ _____
Ho Tekena mokudi Letsatsi

_____ _____
Ho Tekena ya pakang Letsatsi
(Ha ho hlokahala)

_____ _____
Ho tekena motoloki Letsatsi
(Ha ho hlokahala)

TOESTEMMING OM AAN NAVORSINSING DEEL TE NEEM

DIE TITEL VAN DIE STUDIE: DIE GEBRUIK, KENNIS EN PERSEPSIE VAN SONSKERM ONDER DERMATOLOGIE PASIENTE BY UNIVERSITAS AKADEMIESE HOSPITAAL

U word hierdeur versoek om aan die studie te neem soos ingelig deur:

……..

Sou dit nodig wees, kan u **Dr JR Maepa** enige tyd kontak by 051 405 2324, indien u vrae het oor die navorsing.

U mag die Sekretaris van die Gesondheidswetenskap Navorsing Etiese Komitee , UFS kontak by telefoon nommer 051 4052812 indien u vrae het oor u regte as ‘n deelnemer aan die navorsing studie.

U deelname in hierdie navorsing is vrywillig en u sal nie gepenaliseer word of voordele verloor indien u weier om aan die studie deel te neem of besluit om u deelname te beëindig nie.

Indien u instem om deel te neem sal u ‘n getekende afskrif van hierdie dokument sowel as die deelnemer inligtingstuk, wat ‘n opsomming is van die navorsing studie, ontvang.

Die navorsing studie, insluitend die bogaande inligting is mondelings aan my beskryf. Ek verstaan wat my betrokkenheid in die studie behels en ek stem vrywillig in om deel te neem.

_____	_____
Handtekening van die Deelnemer	Datum
_____	_____
Handtekening van die Getuie (Indien toepaslik)	Datum
_____	_____
Handtekening van die Tolk (Indien toepaslik)	Datum

G.

QUESTIONNAIRE

PLEASE READ THE INFORMATON BELOW BEFORE COMPLETING THE QUESTIONNAIRE:

You have been asked to participate in a research study. Please note that by completing this questionnaire you are voluntarily agreeing to participate in this research study. You will remain anonymous and your information will be treated confidentially at all times. You may withdraw from this study at any given moment during the completion of the questionnaire. The results of the study may be published.

Instructions: *mark the appropriate box with "X" and fill in the dotted lines*.

Date: (dd/mm/yyyy) …….

1. Are you a new patient to Universitas dermatology clinic?
   1.1 YES ☐
   1.2 NO ☐

2. What is your gender?
   2.1 MALE ☐
   2.2 FEMALE ☐

3. What is your age group?
   3.1 18-25 ☐
   3.2 26-35 ☐
   3.3 36-45 ☐
   3.4 46-60 ☐
   3.5 >60 ☐

4. What is your highest level of education?
   4.1 NO SCHOOLING ☐
   4.2 PRIMARY SCHOOL ☐
   4.3 HIGH SCHOOL, BUT NOT MATRICULATED ☐
   4.4 MATRIC CERTIFICATE ☐
   4.5 HIGHER EDUCATION (COLLEGE, UNIVERSITY) ☐

5. Are you employed?
   5.1 YES ☐ IF YES, what is your occupation……
   5.2 NO ☐

6. What is your skin type (its reaction to sun exposure)?
   6.1 ALWAYS BURNS, NEVER TANS (white) ☐
   6.2 BURNS EASILY, TANS POORLY (white) ☐
   6.3 BURNS MODERATELY, USUALLY TANS (white) ☐
   6.4 BURNS MINIMALLY, TANS EASILY (light brown) ☐
   6.5 RARELY BURNS, TANS DARKLY EASILY(brown) ☐
   6.6 NEVER BURNS, ALWAYS TANS DARKLY (dark brown) ☐

7. Do you have any sensitivity to the sun (i.e. itchy or painful skin, or worsening skin condition on exposure to the sun)?
   7.1 YES ☐
   7.2 NO ☐

8. Do you have more than 10 atypical (unusual looking) moles?
   8.1 YES ☐
   8.2 NO ☐
   8.3 DO NOT KNOW ☐

9. Do you have any family history of skin cancer?
   9.1 YES ☐
   9.2 NO ☐

10. Have you ever had any skin cancer?
    10.1 YES ☐
    If yes, specify: 10.1.1 BASAL CELL CARCINOMA (BCC) ☐
    10.1.2 SQUAMOUS CELL CARCINOMA (SCC) ☐
    10.1.3 MELANOMA ☐
    10.2 NO ☐

11. Do you get prescribed sunscreen?
    11.1 YES ☐
    11.2 NO ☐

12. Do you wear sunscreen?
    12.1 YES ☐
    12.2 NO ☐

13. How often do you wear sunscreen?
    13.1 EVERY DAY, ALL YEAR ROUND ☐
    13.2 EVERY DAY DURING SUMMER MONTHS ONLY ☐
    13.3 ONLY ON SUNNY DAYS ☐
    13.4 ONLY ON DAYS ANTICIPATING PROLONGED SUN EXPOSURE ☐
    13.5 NEVER ☐
    13.6 OTHER ☐ Specify……

14. Where do you apply sunscreen?
    14.1 NOWHERE ☐
    14.2 FACE ☐
    14.3 FACE and NECK ☐
    14.4 ALL SUN-EXPOSED AREAS ☐
    14.5 WHOLE BODY ☐

15. What number SPF do you use?
    15.1 NONE ☐
    15.2 SPF15 ☐
    15.3 SPF30 ☐
    15.4 SPF50+ ☐
    15.5 DO NOT KNOW ☐
    15.6 VARIABLE ☐

16. How often do you reapply sunscreen?
    16.1 DO NOT USE SUNSCREEN ☐
    16.2 NEVER REAPPLY ☐
    16.3 EVERY 1hr ☐
    16.4 EVERY 2hrs ☐
    16.5 EVERY 3-4hrs ☐
    16.6 AFTER >5hrs ☐

17. Have you ever been counselled on sunscreen use before?
    17.1 NO ☐
    17.2 YES, by a GP (general practitioner) ☐
    17.3 YES, by a DERMATOLOGIST ☐
    17.4 YES, by a NURSE ☐

18. How often is one supposed to wear sunscreen?
    18.1 EVERY DAY, ALL YEAR ROUND ☐
    18.2 EVERY DAY DURING SUMMER MONTHS ONLY ☐
    18.3 ONLY ON SUNNY DAYS ☐
    18.4 ONLY ON DAYS ANTICIPATING PROLONGED SUN EXPOSURE ☐
    18.5 NEVER ☐

19. What minimum amount of time should you apply sunscreen before sun exposure?
    19.1 0 MINUTES ☐
    19.2 5 MINUTES ☐
    19.3 20-30 MINUTES ☐
    19.4 45 MINUTES ☐
    19.5 1 HOUR ☐

20. How often do you need to reapply sunscreen?

20.1 NEVER ☐

20.2 EVERY 2hrs ☐

21. Does sunscreen protect the skin from skin cancers?

21.1 YES ☐

21.2 NO ☐

22. What is sunscreen in your opinion?

22.1 A COSMETIC BEAUTY PRODUCT ☐

22.2 AN OVER-THE-COUNTER DRUG ☐

22.3 DO NOT KNOW ☐

23. Do you think sunscreen protects the skin from photo (sun) ageing?

23.1 YES ☐

23.2 NO ☐

24. Do you think sunscreen protects the skin from sunburn?

24.1 YES ☐

24.2 NO ☐

25. In your opinion, if a person uses or practises other measures of sun protection such as umbrella, hat, staying indoors or under shades, does he/she still need to wear sunscreen?

25.1 YES ☐

25.2 NO ☐

LEQHEPE LA DIPOTSO

KE KOPA O BALE TSHEDIMOSETSO ENGOTSWENG PELE O ARABA DIPOTSO TSE LATELANG.

O kupilwe ho nka karolo mo dipatlisisong. Tseba hore ho araba dipotso ke ho ithaopa ho dumela ho nka karolo dipatlisisong. O tla dula o le ya sa tsejwang le tshedimosetso eo o fanneng ka yona e tla nkuwa e le sephiri ka di nako tsohle. O ka tlohela ho ba karolo ya dipatlisiso nako engwe le engwe ha o sa rate ho tswella. Sephetho se ka phatlhalatswa.

Melao: etsa letshwao la "X" lebokosong, o tlatse mo ho nang le mola wa didoto.
Letsatsi (dd/mm/yyyy):.....

1. O mokudi ya motjha mona Universitas kliniking ya letlalo?
   1.1 EYA ☐
   1.2 TJHEHE ☐

2. Bong ba hao ke eng?
   2.1 BOTONA ☐
   2.2 BOTSHEHADI ☐

3. O lemong dife?
   3.1 18-25 ☐
   3.2 26-35 ☐
   3.3 36-45 ☐
   3.4 46-60 ☐
   3.5 >60 ☐

4. O rutehile ho fihlela kae?
   4.1 HA WA KENA SEKOLO ☐
   4.2 SEKOLO SA MATHOMO (PRAEMARE) ☐
   4.3 SEKOLO SE PHAHAMENG, EMPA HA O NA MATRIKI ☐
   4.4 O NA LE LENGOLO LA MATRIKI ☐
   4.5 THUTO E PHAHAMENG (COLECHE, YUNIBESITHI ☐

5. Na wa sebetsa?
   5.1 EYA ☐ O sebetsa eng?.....
   5.2 TJHEHE ☐

6. Letlalo la hao ke la mofuta ofe (mabapi le ha le kopana le letsatsi)?
   6.1 LETJHA KA MEHLA, HA LE FETOHE MMALA ☐
   6.2 LETJHA HA BONOLO, HA LE FETOHE MMALA HA BONOLO ☐
   6.3 LETJHA MAHARENG, HA NGATA LE FETOHA MMALA ☐
   6.4 LETJHA HANYANE, LE FETOHA MMALA HA BONOLO ☐
   6.5 KE KA SEOELO LE ETJHA, LE FETOHA HO BA BOTSHO HA BONOLO ☐
   6.6 HA LETJHE HO HANG, LE FETOHA MMALA (BOTSHO) HAHOLO. ☐

7. O ba le bothata ka letsatsi mo letlalong (ho hlohlona kapa bohloko; ho tetebela ha bothata ba letlalo)?
   7.1 EYA ☐
   7.2 TJHEHE ☐

8. O na le ditlhoba tse fetang leshome?
   8.1 EYA ☐
   8.2 TJHEHE ☐
   8.3 HA KE TSEBE ☐

9. Ho na le bothata ba mofetshe (kanker) wa letlalo lelokong la hao?
   9.1 EYA ☐
   9.2 TJHEHE ☐

10. O kile wa ba le mofetshe (kanker) wa letlalo?
    10.1 EYA ☐
    Ha e le eya, kanker e feng? 8.1.1 BASAL CELL CARCINOMA (BCC) ☐
    8.1.2 SQUAMOUS CELL CARCINOMA (SCC) ☐
    8.1.3 MELANOMA ☐
    10.2 TJHEHE ☐

11. O ngollwa ho fumana salofo ya ho thibela letsatsi?
    11.1 EYA ☐
    11.2 TJEHE ☐

12. O sebedisa salofo ya ho thibela letsatsi?
    12.1 EYA ☐
    12.2 TJEHE ☐

13. O sebedisa salofo ya ho thibela letsatsi neng?
    13.1 KAMEHLA, SELEMO KAOFELA ☐
    13.2 KAMEHLA, EMPA KA DIKGWEDI TSA HLABULA FEELA ☐
    13.3 HA LETSATSI LE TJHABILE FEELA ☐
    13.4 MATSATSING AO KE LEBELETSENG HO BA LETSATSING NAKO E TELELE ☐
    13.5 HOHANG ☐
    13.6 TSE DING ☐ Hlalosa……

14. O sebedisa salofo ya ho thibela letsatsi hoo kae?
    14.1 HOHANG ☐
    14.2 SEFAHLEHONG ☐
    14.3 SEFAHLEHO LE MOLALA ☐
    14.4 KAROLO TSE LETSATSING ☐
    14.5 MMELE KAOFELA ☐

15. O sebedisa nomoro efe ya SPF?
    15.1 LETHO ☐
    15.2 SPF15 ☐
    15.3 SPF30 ☐
    15.4 SPF50+ ☐
    15.5 HA KE TSEBE ☐
    15.6 TSE FAPANENG ☐

16. O pheta ho tlotsa salofo ya ho thibela letsatsi ha kae?
    16.1 HA KE SEBEDISE SALOFO YA LETSATSI ☐
    16.2 LETHO ☐
    16.3 KA MORA 1hr ☐
    16.4 KA MORA 2hrs ☐
    16.5 KA MORA 3-4hrs ☐
    16.6 KA MORA >5hrs ☐

17. O kile wa fumana lesedi ka salofo ya ho thibela letsatsi?
    17.1 TJHEHE ☐
    17.2 EYA, HO NGAKA YA LEHAE (GP) ☐
    17.3 EYA, HO NGAKA YA LETLALO ☐
    17.4 EYA, HO MOOKI ☐

18. O tlameha ho e sebedisa ha kae salofo ya ho thibela letsatsi?
    18.1 KAMEHLA, SELEMO KAOFELA ☐
    18.2 KAMEHLA, EMPA KA DIKGWEDI TSA HLABULA FEELA ☐
    18.3 HA LETSATSI LE TJHABILE FEELA ☐
    18.4 MATSATSING AO KE LEBELETSENG HO BA LETSATSING NAKO E TELELE ☐
    18.5 HOHANG ☐

19. O nka nako e kae ho ya letsatsing ka moraho hore o tlotse salofo ya ho thibela letsatsi?
    19.1 0 MOTSOTSO ☐
    19.2 5 METSOTSO ☐
    19.3 20-30 METSOTSO ☐
    19.4 45 METSOTSO ☐
    19.5 1 HORA (1hr) ☐

20. O lokela ho nka nako e kae ho pheta setlolo sa letsatsi?
    20.1 LETHO ☐
    20.2 KA MORA 2hrs ☐

21. Setlolo sa letsatsi se tshireletsa mofetse (Kanker) wa letlalo?
    21.1 EYA ☐
    21.2 TJHEHE ☐

22. Setlolo sa ho thibela letsatsi ke eng ho ya maikutlo a hao?
    22.1 SETLOLO SA BOTLE ☐
    22.2 MORIANA O SA HLOKENG LENGOLO LA NGAKA ☐

23. O nahana hore se thibela ho tsofala ha letlalo ho bakwang ke letsatsi?
    23.1 EYA ☐
    23.2 TJHEHE ☐

24. O nahana hore se thibela ho tjheswa ke letsatsi letlalong?
    24.1 EYA ☐
    24.2 TJHEHE ☐

25. Ho ya ka mohopolo wa hao, ha motho a sebedisa mefuta e meng ya ho itshereletsa letsatsing jwalo ka sekgete, katiba, ho dula ka tlung kapa meriting, o ntse a hloka ho sebedisa salofo ya lestsatsi?
    25.1 EYA ☐
    25.2 TJHEHE ☐

VRAELYS

U is gevra om deel te neem in 'n navorsingstudie. Neem asseblief kennis dat u met die voltooing van die vraelys vrywillige deelname het aan die navorsingstudie. U gaan anoniem bly en alle data word vertroulik hanteer. U mag onttrek enige tyd gedurende die vraelys. Die resultate van die navorsingstudie mag gepubliseer word.

Instruksies: Merk antwoord in blokkie met "X" en voltooi op die stippellyn u antwoord.

Datum: (dd/mm/yyyy)…….

1. Is u 'n nuwe pasiënt by Universitas Dermatologie kliniek?
   1.1 JA ☐
   1.2 NEE ☐

2. Wat is u geslag?
   2.1 MANLIK ☐
   2.2 VROULIK ☐

3. Wat is u ouderdom groep?
   3.1 18-25 ☐
   3.2 26-35 ☐
   3.3 36-45 ☐
   3.4 46-60 ☐
   3.5 >60 ☐

4. Wat is u hoogste grad van opvoeding?
   4.1 GEEN SKOOLOPLEIDING ☐
   4.2 PRIMÊRE SKOOL ☐
   4.3 HOËRSKOOL, MAAR NIE GEMATRIEKULEERD ☐
   4.4 MATRIEK SERTIFIKAAT ☐
   4.5 HOËR ONDERWYS (KOLLEGE, UNIVERSITEIT) ☐

5. Werk u?
   5.1 JA ☐ Indien JA, wat is u beroep?.....
   5.2 NEE ☐

6. Wat is u veltipe (die reaksie aan sonblootstelling)?
   6.1 Brand altyd, verbruin ("tan") nooit ☐
   6.2 Brand maklik, verbruin swak ☐
   6.3 Brand matig, verbruin gewoonlik ☐
   6.4 Brand selde, verbruin maklik ☐
   6.5 Brand soms, verbruin maklik donker ☐
   6.6 Brand nooit, verbruin altyd donker ☐

7. Het u enige son sensitiwiteit (bv jeukerige of pynlike vel veroorsaak of vererger deur son blootstelling) ?

7.1 JA ☐

7.2 NEE ☐

8. Het u meer as 10 atipiese (ongewone) moesies?

8.1 JA ☐

8.2 NEE ☐

8.3 EK WEET NIE ☐

9. Het u enige familie geskiedenis van vel kanker?

9.1 JA ☐

9.2 NEE ☐

10. Het u al ooit vel kanker gehad?

10.1 JA ☐

Indien JA, spesifiseer: 10.1.1 BASAAL SEL KARSINOOM (BCC) ☐

10.1.2 PLAVEISEL SEL KAESINOOM (SCC) ☐

10.1.3 MELANOOM ☐

10.2 NEE ☐

11. Word sonskerm vir u voorgeskryf?

11.1JA ☐

11.2 NEE ☐

12. Gebruik u sonskerm?

12.1 JA ☐

12.2 NEE ☐

13. Hoe gereeld gebruik u sonskerm?

13.1 ELKE DAG, DIE HELE JAAR LANK ☐

13.2 ELKE DAG, NET GEDURENDE SOMER MAAND ☐

13.3 SLEGS OP SONNIGE DAE ☐

13.4 SLEGS OP DAE BLOOTGESTEL WORD AAN LANGDURIGE SON ☐

13.5 NOOIT ☐

13.6 ANDER ☐ Spesifiseer…….

14. Waar smeer u die sonskerm aan?

14.1 NERENS ☐

14.2 GESIG ☐

14.3 GESIG EN NEK ☐

14.4 ALLE SON BLOOTGESTELOE PLEKE ☐

14.5 HELE LIGGAAM ☐

15. Watter nommer SPF gebruik u?
    15.1 GEEN ☐
    15.2 SPF15 ☐
    15.3 SPF30 ☐
    15.4 SPF50+ ☐
    15.5 EK WEET NIE ☐
    15.6 VARIEER ☐

16. Hoe gereeld smeer weer u sonskerm aan?
    16.1 GEBRUIK NIE SONSKERM NIE ☐
    16.2 NOOIT WEER AANSMEER ☐
    16.3 ELKE uur ☐
    16.4 ELKE 2 ure ☐
    16.5 ELKE 3-4 ure ☐
    16.6 ELKE >5ure ☐

17. Het jy al berading op sonskerm gebruik ontvang?
    17.1 NEE ☐
    17.2 JA, deur ‘n Algemene Praktisyn (GP) ☐
    17.3 JA, deur ‘n DERMATOOG ☐
    17.4 JA, deur ‘n VERPLEEGSTER ☐

18. Hoe gereeld moet iemand veronderstel om sonskerm aan te smeer?
    18.1 ELKE DA, DIE HELE JAAR DEUR ☐
    18.2 ELKE DAG, GEDURENDE SOMER MANDE ALLEENLIK ☐
    18.3 SLEGS OP SONNIGE DAE ☐
    18.4 SLEGS OP DAE BLOOTGESTEL AAN LANGDURIGE SON ☐
    18.5 NOOIT ☐

19. Watter hoeveelheid sonskerm aansmeer is voor blootstelling?
    19.1 0 MINUTE ☐
    19.2 05 MINUTE ☐
    19.3 20-30 MINUTE ☐
    19.4 45 MINUTE ☐
    19.5 1 UUR ☐

20. Hoe gereeld moet u sonskerm weer aansmeer?
    20.1 NOOIT ☐
    20.2 ELKE 2 URE ☐

21. Beskerm sonskerm die vel teen vel kanker?
    21.1 JA ☐
    21.2 NEE ☐

22. Wat is sonskerm in jou opinie?

22.1 ‘n KOSMETIESE PRODUK ☐

22.2 ‘n “OOR DIE TOONBANK” MEDISYNE ☐

22.3 EK WEET NIE ☐

23. Dink jy dat sonskerm beskerm die vel teen foto(son) veroudering?

23.1 JA ☐

23.2 NEE ☐

24. Dink jy dat sonskerm beskerm die vel teen sonbrand?

24.1 JA ☐

24.2 NEE ☐

25. Dink jy dat ‘n persoon wat gebruik aander maatreels vir son beskerming soos sombrele, hoede, binnenshuis of in die skaduwee bly , nog sonskerm nodig.

25.1 JA ☐

25.2 NEE ☐

H.

AUTHOR GUIDELINES

IJD SUBMISSION FORMS

Online Submission

Contact the Editorial Office

1. ABOUT *IJD*

Published monthly, the *International Journal of Dermatology* (*IJD*) is specifically designed to provide dermatologists around the world with a regular, up-to-date source of information on all aspects of the diagnosis and management of skin diseases. Accepted articles regularly cover clinical trials, education, morphology, pharmacology and therapeutics, case reports, and reviews. Additional features include tropical medicine reports, news, correspondence, and proceedings and transactions.

IJD is guided by a distinguished, international editorial board and emphasizes a global approach to continuing medical education for physicians and other providers of health care with a specific interest in problems relating to the skin.

2. MANUSCRIPT CATEGORIES

IJD invites the following types of submission:

Case Report*

A report of 400–600 words, illustrated by no more than three illustrations. This category offers a means for rapid communication about a single subject.

Clinical Trial

An article of 700–1200 words concerning a drug evaluation. This category provides rapid publications and is meant to be a succinct presentation with a minimum of graphs and tables.

Commentary*

An editorial 700–1200 words in length with approximately five references. The author may express his or her opinion without complete documentation.

Clinicopathological Challenge*

A photographic essay that includes both a clinical and a pathological photograph in color. The diagnosis and legends for the photographs should be listed after the references in the article. The article should be no more than 2 pages in length and contain 4-5 references.

Correspondence*

Letters to the editor and short notes. Contributions should not exceed 600 words, two figures, and 5 references. In order to offer rapid dissemination of accepted manuscripts, Correspondence items will be published online-only. Online-only correspondence items are assigned to an issue of the journal, but are excluded from the print edition. Online-only correspondence items are e-paginated and are fully citable and indexable.

Dermatological Surgery

An article relating to the surgical aspects of treatment. Article types may include Review, Report or Correspondence format.

Education

An article about the methodology of curriculum and instruction in dermatology, about 2500 words.

On a Human Scale* (by invitation only)

An article that relates to social, economic, cultural, artistic and humanitarian aspects of medicine. The length of the article should not exceed 1200 words including a short summary

of the topic addressed. A brief author biography and photo should be submitted with the article. If you have a topic that you feel would fit nicely in this section, please send a note to IntJDerm@gmail.com for approval to submit.

Pharmacology and Therapeutics

An article relating to the treatment of diseases and to the pharmacology of dermatologically-related drugs. (Can include Clinical Trials, Reviews, Reports, and Correspondence. The latter is preferred for reports of adverse drug reactions.) When referring to a drug, please use the generic name approved by the United States Food and Drug Administration or recognized as the United States Adopted Name. At the end of the manuscript, please list the American Trade names.

Reminiscence

An article on the history of dermatology or skin diseases; also a biographic account of an historic or noteworthy figure in dermatology.

Report

An original article including, whenever possible, an Introduction, Materials and Methods or Case Report(s), Results, Comment, and References. A Structured Abstract of not more than 250 words must be included and should consist of four paragraphs labelled Background, Methods, Results, and Conclusions. Also, it should describe the problem studied, how the study was performed, the main results, and what the author(s) concluded from the results. The article should range from 2500-3000 words.

Review

A major didactic article that clarifies and summarizes the existing knowledge in a particular field. It should not be an exhaustive review of the literature, and references should not exceed 50 in number. Tables, diagrams, and selected figures are often helpful and preferred. The length is left to the judgment of the author, although it generally should not exceed 5000 words. Topics may include updates in clinically relevant basic science and cutaneous biology. A list of 10 multiple choice and/or true and false questions should be listed at the end of the article to provide additional educational challenge to the reader. An abstract is required, though it need not be structured.

Tropical Medicine Rounds

An article dealing with the diseases and special problems encountered by dermatologists working in the tropics. Article submissions should follow the Report, Case Report, or Correspondence format.

Updates in Medicine

This contribution to the journal should be 700–1200 words in length with sufficient references to document important points. It is not essential that the contribution be heavily referenced as it is meant to serve as an update for dermatologists in various fields of medicine and is not portrayed to be an extensive or exhaustive review of the literature. However, it would be very helpful if pertinent and salient references are included, not only for documentation purposes, but also for additional reading.

Medical Genetics

Report, Review or Correspondence format should be followed.

*No abstract required

3. SUBMISSION OF MANUSCRIPTS

Submissions should be made online at the *IJD* ScholarOne Manuscripts site (formerly known as Manuscript Central). New users should first create an account (do not upload

document files at this time). Once a user is logged onto the site, submissions should be made via the Author Center.
Revised manuscripts must be submitted as revisions as directed by the ScholarOne website. Do not resubmit a revision as a new manuscript as this may result in re-review and considerable delay. The revision should be complete and contain all the tables and figures. Do not resubmit the original manuscript with your revision.
Submission of a manuscript will be held to imply that it contains original unpublished work and is not being submitted for publication elsewhere at the same time. The author must supply a full statement to the Editor about all submissions and previous reports that might be regarded as redundant or duplicate publication of the same or very similar work.
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3. Graham-Brown R, Burns T. *Lecture Notes: Dermatology*. Oxford: Wiley-Blackwell, 2006.

4. Smith A. (1999) Select committee report into social care in the community [WWW document]. URL http://www.dhss.gov.uk/reports/report015285.html [accessed on 7 November 2003].

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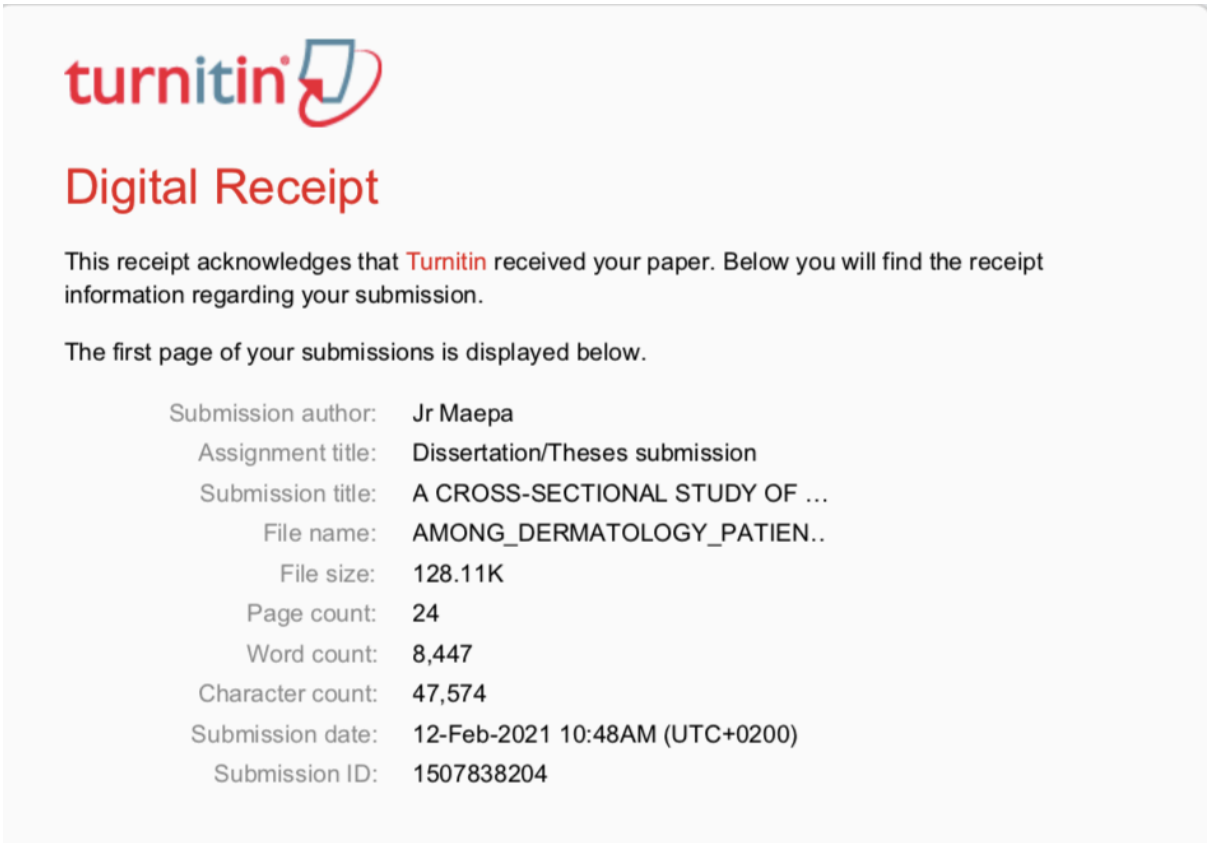

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