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SUN PROTECTION OF CHILDREN – MATERNAL ATTITUDES, KNOWLEDGE AND BEHAVIOUR

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A thesis submitted to the Faculty of Health Sciences, University of the Witwatersrand,
in partial fulfilment of the requirements for the degree
of
Master of Family Medicine

Johannesburg, November 2004

DECLARATION

I, Susan Merle Handelsman, declare that this research report is my own work. It is being submitted for the degree of Master of Family Medicine in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other university.

This study has received ethical approval from the University of the Witwatersrand Committee for research on Human Subjects (Medical). Approval protocol number M 950924

_____

Dr Susan Merle Handelsman

_____ day of _____ 2005

DEDICATION

In memory of my mother, Bella.

ABSTRACT

Childhood protection from the sun affords lifetime protection from skin cancer. This cross sectional descriptive study was conducted on 184 mothers in 4 medical waiting rooms in Gauteng. The purpose of the study was to determine mothers' knowledge, attitude and behaviour towards sun protection of their children. Data was collected by means of an anonymous, confidential, self-administered questionnaire. There was a significant correlation between personal behaviour of the mother and behaviour of the use of sun protection on their children.

The majority of mothers purchase a sunscreen of SPF factor > 15. Knowledge often does not transfer into behaviour, with many parents still believing that a suntan is healthy. Mothers' attitudes towards sun protection was positive. Knowing someone with skin cancer does not increase the usage of sun protection. Mothers attain their knowledge of sun protection from magazines and television. Mothers felt they would benefit from more information. Sun avoidance methods need to be taught and the perception of a suntan being healthy needs to be changed in the public media.

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The participants, receptionists and locations that participated and made the study possible.

To my family for their support, even though they never believed I would ever complete this research.

To myself for not giving up.

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CHAPTER 1

1.1 INTRODUCTION

It has been said of skin cancer that childhood protection from the sun affords lifetime protection from skin cancer[1]. Approximately eighty percent of total lifetime sun exposure occurs in the first twenty years of life[1]. Harmful short-term effects of sun exposure are acute sunburn, dehydration, and hyperthermia. The long-term harmful effects of sun exposure manifest in adulthood as skin telangiectasia, solar keratoses, squamous cell carcinoma, basal cell carcinoma and malignant melanoma. Stern *et al* have calculated that routine sunscreen use by children could reduce subsequent skin cancer development by 78%[12]. Grob *et al* concluded that only good sun protection habits of the mother were predictive of acceptable sun exposure in children[33].

In Australia, there have been extensive public education campaigns alerting people to the dangers of sun exposure. Australia has the highest incidence of skin cancer in the world, with an estimated two out of every three people expected to develop at least one skin cancer in their lifetime[14]. One of the campaigns is the "slip, slop and slap" campaign: slip on a shirt, slop on a sun protection cream and slap on a hat[2]. Australian data has shown that changing people's attitude to suntans and sun protection is possible and can therefore lead to less sunburn[3].

In Britain a campaign has been launched "to halt the year-on-year increase in skin cancer by the year 2005"[4]. A four-point approach to minimising skin damage from the sun is advised:

- Avoid the noonday sun
- Seek natural shade
- Wear clothes and hats
- Use a broad-spectrum sunscreen with a SPF (sun protection factor) of 15 or more.

Life time analysis shows that approximately 1 in 1500 people born in 1935, 1 in 600 born in 1960, 1 in 105 born in 1990, and a projected 1 in 75 people born in the year 2000 will develop a malignant melanoma in their life time[5]. Melanoma incidence continues to rise at a rate faster than any other human cancer and the increase in its mortality rate is second only to the mortality rate of lung cancer[5]. In South Africa, skin cancers are more common among white people than all other forms of cancer[6]. 11518 cases of skin cancer were reported to the cancer registry in 1989 in South Africa. This number is regarded as an under estimate as reporting is done on a voluntary basis. In South Africa, 1 in 7 white males will develop a basal cell carcinoma in their lifetime and 1 in 19 white males will develop a squamous cell carcinoma in their lifetime. And 1 in 14 white females will develop a basal cell carcinoma and 1 in 43 white females will develop a squamous cell carcinoma in their lifetime[7].

According to the American Academy of Dermatology, skin cancer is the most common form of cancer in the U.S.A. Mermelstein *et al* postulates that life style

factors such as the widespread enjoyment of outdoor recreation, an emphasis on tanning, and a popular shift toward the Sun Belt may all contribute to these increasing rates[35]. It is estimated that 87900 people were diagnosed with melanoma in 2002, with approximately 7400 deaths attributed to melanoma in 2002. This translates to one person dying every hour of melanoma[43]. Virtually all reported cases of skin cancer are among Caucasians. Aborigines, African-Americans and other darker skinned groups are at a lower risk of developing skin cancer because their melanocytes, located in the epidermal layer of the skin, are able to produce more melanin than the melanocytes of Caucasians[19]. This produces a darker skin colour and also provides increased protection from the harmful effects of the ultra-violet radiation exposure.

Exposure to the sun is a risk factor that can be modified by making people aware of the dangers of the sun[8]. Good sun protection habits of mothers have been shown to be predictive of acceptable sun exposure in children[9]. There is a greater awareness of sun protection developing in South Africa. “Sun without Tears” was produced by Summers and Summers and aims to educate the public about sun-induced skin damage, and the prevention and treatment of sun-induced skin damage. A school guide to sun protection, called “Sunsense”, has been produced to educate teachers and thereby include sun protection in the junior primary school syllabus. However the majority of government schools no longer have a hat or cap as part of their daily school uniform as it is felt it was contributing to a lice problem. In Australia, 90% of schools offer skin protection education as a part of the health education program[29]. Only 3.4% of public American elementary schools have a sun protection policy[44].

Borland *et al* suggest that public education campaigns have significantly raised the public's level of knowledge of the dangers of over-exposure to the sun[20]. However, it has also been shown that levels of attitude to sun tanning and actual sun related behaviour are not always congruent with the knowledge of risks that people possess[14].

Family practitioners and all primary care health providers have an important role to play in sun protection education because all the harmful effects of sun exposure are primarily preventable. This research involves studying the baseline knowledge of mothers about sun protection and sun exposure, where they have acquired this knowledge from, and how it has influenced their attitudes to sun protection of their children. Knowledge of what types of sun protection behaviour mothers are practising on their children and what influences their choice of methods was attained. No research on this topic has ever been published in South Africa. Similar work was done in a survey in Leicester, looking at parental behaviour regarding sunburn and how this relates to their knowledge of malignant melanoma[31].

It is not clear how parental knowledge and attitudes affect the sun protection behaviours of children. Understanding the parental characteristics that influence children's sun protection use is an important area of inquiry as interventions directed at parents have generally been more successful than interventions targeted at children themselves[11]. A descriptive study was done by Johnson *et al* in Florida, to examine the frequency with which sun protection is used by parents for their children[11]; this is used as a comparison in the discussion.

1.2 AIMS AND OBJECTIVES FOR RESEARCH

The aims of this study are to determine knowledge, attitudes and behaviour of Gauteng mothers with regard to sun protection of their children.

The objectives of the study are to:

- Establish a demographic profile of the respondents:
    - Age
    - Marital status
    - Home language
    - Standard of education
    - Number, age and sex of their children
- Determine the knowledge of mothers regarding sun exposure and sun protection of their children.
- Establish if mothers practise sun protection on their children, what methods they are using and what influences their choice of methods.
- Reasons for mothers not practising sun protection on their children, is this due to lack of knowledge, lack of motivation or the inability to perceive that daily all year sun protection is important.
- Identify sources of information regarding sun protection and sun damage amongst the mothers.
- Explore relationships between the demographic variables and the maternal knowledge, attitude and practice of sun protection.

CHAPTER 2

2.1 LITERATURE REVIEW

Routine use of sunscreen by children could reduce the risk of skin cancer development by 78%[12]. The US Preventive Services Task Force concur and advise "avoiding sun exposure or using protective clothing is likely to decrease the risk of malignant melanoma and nonmelanoma skin cancers"[13]. Therefore sun protection use for children, including avoiding excessive sun exposure, covering exposed skin, and using appropriate sunscreen is one of the most important means to prevent the development of skin cancer[11]. However parents primarily use sunscreen to prevent sunburn and do not use methods to reduce sun exposure that may overall increase their child's sun exposure[11]. The types of sun protection methods used for children and the frequency of use have not been thoroughly studied.

Most studies worldwide address adults and teenagers, and are descriptive in nature. They do not question the behavioural theory that influences the behaviour and habits. Johnson *et al* suggest that the social cognitive theory may be relevant to sun protection use for children[11]. This behavioural theory asserts that a person's surrounding social and physical environment influences his or her behaviour. Although this has served as an explanation for one's own decision-making patterns, it is plausible to extend this theory to support the claims that parents are responsible for the sun protective behaviours of their children because of their

beliefs on the subject and their subsequent norms and practices[16]. Parents are, in most cases, the primary agents for socialization with respect to child development[17]. Therefore they are in the right position to influence their child's sun protection habits. It is not yet clear how parental attitude and knowledge affect the sun protection behaviour of children[11]. Adults can encourage children's sun protection by direct (e.g., applying a child's sunscreen for them) or indirect (e.g., providing a child with access to sunscreen) actions[17]. Understanding the parental characteristics that influence children's sun protection use is an important area of question as interventions directed at the parents have generally been more successful than interventions targeted at the children themselves[18].

According to Hill and Dixon, there are two good reasons to reduce exposure of young skin to solar ultra-violet radiation (UVR). One is based on epidemiology, that the relative harmfulness of exposure in the early life is greater than later in life and the second is based on the behavioural theory, that learning sun-safe habits early in life is easier than reversing harmful habits later[17].

Arthey and Clarke review the psychological literature on sun tanning and sun protection behaviours among Caucasians[14]. The major limitation of most of the interventional designs has been the lack of an appropriate control group. Varying the style of information presentation has been the mainstay of intervention designs in sun protection education. Most of the information available is from questionnaire designs. There is a lack of breadth in the types of information collected. There is little or no examination of people's perception of their risk of getting cancer, their level of motivation to engage in sun protective behaviours, their confidence in their

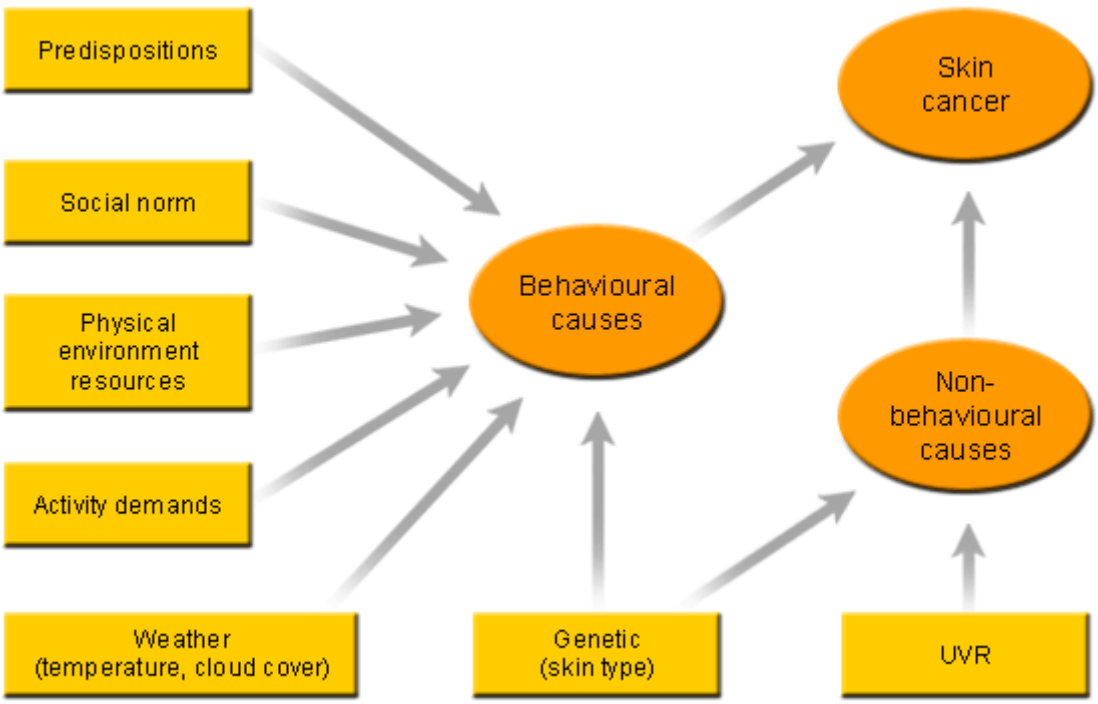
ability to successfully engage in sun protective behaviours, or in their perceptions of those who do (and do not) engage in sun protective behaviours. Direct observation and measurement of behaviour is limited by practical and ethical considerations. Failure to tell people they are being watched may be unethical while informing people that they are being observed may influence their behaviour (Hawthorne effect). Arthey and Clarke are concerned that self-reporting may over-estimate the sun protection behaviours. In an attempt to resolve the self reporting of behaviours, some studies look at behavioural intentions, however self-reporting of intention is also interpreted with caution, as the strong social influence component of sun tanning and sun protection may result in people responding with the intention they believe is socially expected rather than their actual intention[22]. An intention to get a suntan was found to predict actual lack of sun protective behaviour by Arthey *et al* [21]. Intentions to protect the skin from the sun, by using protective clothing and/or sunscreen have shown to be predictive by knowledge of the negative effects of the sun on the skin[23], skin type[24], previous experience with skin cancer[25], and attitudes to sun tanning[21].

Arthey and Clarke explain that there are strong theoretical reasons that, for volitional behaviour (of which sun related behaviour is an example), intention to perform the behaviour is the immediate antecedent of the relevant behaviour. Since intention can be self-reported, it is a more accessible dependent variable in research than is behaviour, making the study of predictions of intention likely to throw new light on the determinants of sun related behaviour. Arthey and Clarke reviewed the theory of reasoned action proposed by Ajzen and Fishbein in 1980, that behaviour is predicted by the behavioural intention, which in turn is predicted

by attitudes and subjective norms. The Health Belief Model of behavioural change has shown that people tend to act on their own perceived susceptibility[28].

Hill created a domain specific model, which is used as a framework for measurement and explanation of sun-related behaviour. The nonbehavioural causes of skin cancer are the ambient ultra violet radiation and the genetic susceptibility. This model takes the intrapersonal variables (such as knowledge, beliefs, values, and perceived social norms) in to account, as well as the variations in the physical environment in which the behaviour of interest occurs. The model allows for the fact that regardless of intrapersonal factors and social norms, the physical environment, the demands of the activity engaged in, and the weather may provide conditions that override predispositions, including habits, that usually determine behaviour[30].

FIGURE 2.1 : BEHAVIOURAL FACTORS IN CAUSATION OF SKIN CANCER[30]



2.2 THE HISTORY OF A SUNTAN

A suntan has been a status symbol among Caucasians since the industrial revolution. Before then, the majority of people worked outdoors in the agricultural fields and a suntan was associated with the poorer, working class. At that time, having pale, porcelain like skin was fashionable because it indicated that the person was wealthy and did not have to work outdoors. After the industrial revolution, most of the working class now spent their days in factories and having a suntan then became associated with being wealthy and having an abundance of leisure time to spend outdoors.

A suntan was associated with health since the early 1900s as part of the "heliotherapy" craze in Europe. Heliotherapy was daily sun exposure on the basis of cure of disease and preventative health such as tuberculosis and skin ailments. The medical benefits were discredited in the 1940s and 1950s, however having a suntan still remained popular. Sun tanning as a fashion statement is reported to have begun with Coco Chanel, the French fashion designer. The first research in sunbathing was reported in 1987 by Keesling and Friedman[14]; it was shown that the desire to have a suntan was motivated by the desire to present an image of being attractive, healthy and active. Sunbathers were found to be less concerned about their actual health than with the appearance of their health. In 1990, Miller *et al* [26] found that people intentionally seeking a suntan as 'vain' and 'egotistical'. American college students described people who seek a suntan to be less attractive than people who develop a suntan as a result of an outdoor lifestyle.

Optimistic bias is described by Weinstein as an individual's belief that something negative is less likely to happen to them than it is to others of the same sex and age. Subjects with a high level of sun exposure thought their chances of getting skin cancer were low. A suntan is considered to be indicative of both health and beauty[26]. According to Hill *et al*, people report feeling healthier with a suntan[27]. Brief exposure to UV radiation does result in an elevation in mood as a result of elevation of beta-endorphins and beta-lipotropin in the hypothalamic-pituitary-adrenal-axis. However there is no medical evidence to suggest that a suntan improves health. This belief is likely to have developed as a result of direct and \or indirect positive reinforcement from others. Approving comments such as 'You look good with a tan' and a suntan being associated with a 'healthy glow' are likely to encourage people to continue sun tanning despite the dangers[14].

Prawer explains that the problem today is compounded because of access to sun tanning salons that emit five times more ultraviolet A rays. This 'perfect tan' can now be maintained all year round[45]. There has also been a marked increase in the sales of self-tanning lotions in western Europe and America[15].

Females are generally more concerned with health and health behaviours than are males and engage in more preventative medical behaviours than do males. Females have a higher level of knowledge of skin cancer and are more likely to protect against than sun than males[14]. In the ADD survey more females displayed knowledge and behaviour change due to the premature aging of skin after sun exposure[43]. Adolescents as a group are the most resistant to adult advice, and

despite having a high level of knowledge, engage in few sun protective behaviours[24].

Combined studies in the literature suggest a U-shaped relationship of sun-protective behaviour with age[17]. Between the ages of 8 and 15, attitudes and behaviours supportive of sun protection declines, even though barriers to sun protection such as positive attitudes to tanning and perceived attitudes of peers to sun protection appear to increase. Sun protection practices seem to gain their lost ground in late adolescence.

In the British 'Are you Dying to Get a Suntan?' campaign launched in 1989 in the newspapers, radio and magazines, there was no reported increase in sun protection measures following the campaign, nor any changes in attitudes towards suntans, with most people still reporting that they considered a suntan personally important and synonymous with health and beauty[14].

Particular subgroups (i.e. outdoor workers) spend more time in the sun and the identification and targeting of these high exposure groups may be beneficial in reducing the incidence of skin cancer[14].

2.3 SUN PROTECTION CAMPAIGNS

The research on sun protection behaviour provides a clear example that knowledge change does not necessarily produce behaviour change. The majority

of interventional studies report an increase in knowledge following the intervention, and some report changes in attitudes toward sun protection, but only a few have reported observed behaviour change as a result of intervention. Generability and durability of behavioural and attitudinal changes has not been studied. Also the accuracy of the self reported attitude and behavioural change must be questioned[14]. To date there have been no published research assessing what skills people need to successfully engage in sun protection. Nor has there been any research-evaluating people's confidence in their ability to increase their sun protective behaviour and resist peer pressure to expose them to the sun. Knowledge alone does not result in change of behaviour. Atkins reports that health education programs that rely solely on increasing the public's knowledge are likely to have only limited success in altering behaviour. Knowledge gain should be seen as the first step toward behavioural change, it is now time to look at what will directly influence people's behaviour[14].

Hill *et al* reviews the Australian research on skin cancer prevention programs and concludes that "prevention of exposure in the early stages of life is likely to have a greater impact on the incidence of skin cancer than strategies to reduce exposure in adults, although programs targeting adults are also important"[17]. Designing audience–appropriate interventions to promote skin cancer prevention requires consideration of the nature and determinants of sun-related behaviour. The behaviour either increases or decreases the probability of exposure of the skin or eyes to ultra violet radiation. The behaviour may be intentional or not, conscious or not, and includes the use and choice of clothing; hats; sunscreen; sunglasses;

shade; timing of outdoor activities; and locations of places to live, to work and to play[17].

Due to the lag time between personal sun exposure and the development of skin cancer, health gains brought about by increases in sun-protective behaviour are unlikely to appear until some years after behavioural change has occurred. The Health Belief Model of behavioural change has shown that people tend to act on their own perceived susceptibility[34]. There is evidence that in Australian cohorts aged 60 years or under, malignant melanoma incidence rates fell or stabilized between 1988 and 1993, contrary to previous trends of increase. More recently, an Australian study tracking trends in nonmelanocytic skin cancer incidence found reductions of basal cell carcinoma rates in young cohorts between 1985 and 1995. This is the first tangible evidence, in any population, that public health campaigns to reduce sun exposure may be having a beneficial effect on skin cancer rates[17].

After the Sun Smart health campaign in Australia, Hill *et al* analysed the effect on behaviour over a 3-year period. The crude proportion of sunburn dropped from 11% to 10% to 9%, with hat wearing increased significantly from 19% to 26% to 29%, as did the use of sunscreen (12%, 18%, and 24%). It was concluded that this campaign had played a significant role in altering melanoma risk exposure of this population[36]. Carter *et al* determined that a comprehensive national skin cancer primary prevention campaign in Australia, would involve a 20 year 5 million Australian dollar annual commitment, which would yield a nett saving of 103 million Australian dollars, and avoid 4300 premature deaths[37].

Most of the world's population, by virtue of colour is at low risk for developing malignant melanoma and nonmelanocytic skin cancer. In South Africa, where the majority of the population are at low risk for developing skin cancer, and at significantly high risk of developing other preventable health problems like HIV and tuberculosis, a national sun protection educational program could not be justified. Hill *et al* in Australia demonstrated that for every dollar spent on prevention, a return profit of a dollar occurred due to the reduced treatment costs. The literature confirms the cost-effectiveness of skin cancer programs in at-risk populations, and in a socialized health care system, supporting sun protection campaigns is a good return on investment[17].

Burry suggests in a letter to the BMJ that the biology of skin cancer should be emphasised. The message that those chosen by Darwinian natural selection to live in Australia have black skins, which protect them against skin cancer, and those chosen by Darwinian natural selection to live in Europe have no such protection when living in Australia, is not commonly given as it would be unpopular. He proposes that it could be a most effective educational tool[40].

Skin cancer prevention interventions that address contextual factors (e.g. availability of shade, social norms of communities) and individual factors (e.g. personal risk factors) are most likely to succeed[48].

2.4 SUNSCREEN EFFICACY

Diffey describes that there is a mismatch between expectation and realisation of sunscreen efficacy. SPF 15 does not always protect against sunburn. Protection is dependent on the application technique and thickness, type of sunscreen used, resistance to water immersion and sand abrasion[37]. According to Shoveller, 86% of parents did not re-apply sunscreen to their children once on the beach[38]. Fry and Verne are concerned that sunscreens create a false sense of security and encourage over-exposure to the sun. Therefore sunscreens cannot be relied on to prevent malignant melanoma[15].

Typical sunscreens only weakly absorb ultraviolet A light, which is 97% of ultraviolet radiation and is nearly as carcinogenic as ultraviolet B light. Garland recommends that sunscreen should have equal protection against ultraviolet A and B rays[42].

2.5 BENEFITS OF SUN EXPOSURE

Garland suggests that recommending moderate sun exposure is more prudent than total sun avoidance: 15 minutes of sun exposure a day is sufficient and then sunscreen can be applied. Solar exposure is the main source of vitamin D. Vitamin D and its metabolites have been proven to reduce the risk of cancer of the colon, breast, ovaries, oesophageal, lymphatic and prostate[42]. Avoiding sun exposure is therefore a bad strategy for overall cancer prevention. The U.S. health authorities

explain that squamous-basal cell skin cancers cause only 2000 deaths in America annually, whereas 138000 people in America die annually of cancers that are inhibited by vitamin D, its metabolites, and regular sun exposure. The half-life of Vitamin D is 3 weeks, so Britons are advised to use oral supplementation from November to March. Low levels of Vitamin D have been linked to osteoporosis, type 1 diabetes and muscle and bone pain[42]. Mermelstein and Riesenberg found evidence linking light exposure to positive mood[35].

CHAPTER 3

3.1 METHODOLOGY

3.1.1 Study design

A cross-sectional descriptive study design was used.

3.1.2 Definition of terms

Mothers: A female 18 years or older, who has given birth to, adopted, or has legal guardianship of a child/ren.

Child/ren: A female or male 18 years or younger.

Sun protection: The use of sun avoidance behaviour, sun protective clothing including clothes, hats and sunglasses, and sun protection creams and products.

Sunburn: Painful erythema (redness of the skin) after sun exposure.

3.1.3 Population and sampling

The respondents consisted of mothers from four different practices in Gauteng. These practices were selected for ease of access: as either the researcher knew

the professional or the receptionist. This made the choice of practice convenient for the researcher, and the researcher thought that the personal involvement would translate to better co-operation from the receptionist. The researcher felt that different socio-economic groups would be sampled.

1. Parkhurst Medical and Dental Centre: the centre where the researcher practises as a general practitioner. This practice is situated in the north western suburbs of Johannesburg. It is predominantly a middle and upper socio-economic class area, but also includes all the domestic workers and office staff who may commute on a daily basis. It is a predominantly English speaking population, with the second biggest language group being a Black language. The practice is a secondary referral base for the local government primary health care clinic as well as the local government co-educational primary school, which consists of only black students.

2. Rosewood Day Clinic: This is a private day clinic in the northern suburbs of Johannesburg, situated in Rosebank. It is attended by upper and middle class socio-economic population of all races, predominantly English speaking. The surgery performed includes plastics, dental, ear, nose, and throat, orthopaedic and ophthalmology procedures.

3. Lister Day Clinic: This is a day clinic situated in the Johannesburg city centre. It services medical aid patients mainly of the Black and Indian population who either work or live in the surrounding area. It also services the white population

of lawyers and bankers who still work in town. All day clinic procedures are done including gynaecology and gastro-enterology.

4. Edenvale Day Clinic: This is situated in the eastern suburbs of Johannesburg in the city centre of Edenvale. It draws from a cross section of the community, mainly white English and Afrikaans speaking white and blue-collar workers who are on medical aids. The majority of the surgery done is dental; rates are charged at medical aid tariff.

The doctors and medical staff consented for the study to be conducted in their waiting rooms, as they may have to answer any questions or concerns a mother may have arising from the questionnaire. The sample consists of mothers 18 years and older who can read and write English. The researcher chose mothers as respondents, as they are usually the principal caregivers, and the researcher has assumed that mothers would take on the responsibility of sun protection of their children. Time was spent with each receptionist to inform him or her about the topic and the methods of data collection.

Inclusion criteria were as follows:

a) a mother, a female 18 years or older, who has given birth to, adopted, or has legal guardianship of a child\ren. The child\ren can be male or female, but must be 18 years old or younger
b) literate in English
c) a willing participant
d) able to spend 10 minutes filling out the self-administered questionnaire

Exclusion criteria:

a) no consent

b) not enough time to complete the questionnaire

c) mother was too sick to complete the questionnaire

d) the mother did not meet the inclusion criteria

3.2 MEASURING INSTRUMENT

The data was collected by means of an anonymous, confidential, self-administered questionnaire (see Appendix A). The questionnaire was only available in English. It includes an introductory page explaining to participants the investigators status, the purpose of the study, and what contribution the participants make to enable the research to be conducted. Participation in the study was voluntary. The questionnaire consists of 27 questions. It took about 10 minutes to complete. Four types of answer formats were used, namely, yes/no answers, point scale lists of options and open-ended questions.

The first seven questions relate to the demography of the participant. The information included the age, marital status, home language and level of education of the mother. Question 6 and 7 enabled the researcher to identify how many children the mother had, and to identify the children's' ages and sexes as these were factors that were thought to influence the usage of sun protection.

Eight questions relate to the participant's knowledge of sun exposure and sun protection.

The following aspects were explored:

1. The safety of sun exposure.
2. The knowledge of skin cancers.
3. Where the participants attain their knowledge.
4. The actual methods of sun protection that are known.
5. Whether the participant wants access to more information.

Seven questions relate to the participants' behaviour. These include:

1. The practise of sun protection on themselves.
2. The practise of sun protection on their children
3. Which actual sun protective methods are used?
4. How often and in what situation is sun protection used?
5. Whether the participant or their children have ever had a suntan and been sun burnt.

Five questions relate to the mothers attitude to the sun, its safety, sun protective behaviour and what or who influences their belief.

3.3 ETHICS

The Committee for Research on Human Subjects of the University of the Witwatersrand granted a clearance certificate. Clearance no M 950924. See appendix B. Participation in the study was voluntary, and information and data received was confidential and anonymous. This information was presented to the potential participant by the receptionist in an introductory letter. See appendix C.

3.4 THE PILOT STUDY

The questionnaire was piloted on a sample of 20 mothers attending a general practice in Parkhurst. The respondents covered a range of ages and level of education. The questionnaire, method of data collection and ease of data analysis were all reviewed. The pilot study resulted in a few minor changes in the wording of the questionnaire. The data from the pilot study was excluded from the actual study, because the questionnaire was altered slightly. Mothers from the Parkhurst practice were asked if they had completed the questionnaire before, in order to avoid including them in the study.

3.5 DATA COLLECTION

Data was collected by means of an anonymous self-administered questionnaire. 100 questionnaires were given to each of the four practices. The researcher

requested the receptionist to ask each consecutive mother, who satisfied the inclusion criteria, whether she would participate in the study. The receptionist was defined as the front desk person or person of first contact in the waiting room. The mother was asked to read the introductory letter. The mother decided if she was literate enough to complete it. The completion of the questionnaire involved between 5 and 10 minutes of their time, which either occurred while waiting to see their health care provider or after their consultation.

The mothers were free to refuse to participate. The participant then placed the completed questionnaire in a box. The receptionist then gave the participant and any other interested parties an information booklet on sun protection. The receptionists were phoned by the researcher after two weeks to encourage compliance.

The study was conducted over a month in January 1998. The researcher collected the completed questionnaires from the receptionists at the end of the month.

3.6 METHOD OF DATA ANALYSIS

The data obtained from this study was processed and analyzed by computer using Epi-info 6. In order to describe the data frequencies and percentages were calculated for each question. Cross-tabulations using chi-squares and p-values were calculated to compare different variables.

3.7 LIMITATIONS OF THE RESEARCH REPORT

The following limitations are noted:

3.7.1 The sample population may represent a biased group of mothers as they are taken from medical and dental waiting rooms. This may represent a more health conscious group of mothers.

3.7.2 It is beyond the scope of this research to investigate the correct use of the different sun protection methods. For example, is the parent using the correct sunscreen? Does the hat have a wide enough brim? Also self – reporting of preventative behaviour is generally over reported.

3.7.3 It is assumed that mothers take the primary responsibility for sun protection. Fathers, teachers, grandparents and child-minders (including domestic workers) have not been included in this study.

3.7.4 The study was conducted in January. Public awareness may be greater at this time of year as it is mid-summer.

3.7.5 The questionnaires were only available in English. This excludes all the people from the sample population that are not literate in English, which could lead to a bias result. The questions were formulated in simple English to avoid misinterpretations.

3.7.6 Although the questionnaire is anonymous and confidential, mothers may have answered what they know is correct and not what they actually do or think. This would be in order to comply with expected attitude and behaviour.

3.7.7 It is recognised that the selection of practices is by no means random or stratified and therefore elements of bias could have been introduced. Also the respondents may all be from a specific group of people as the majority of them were English speaking and had attained a tertiary level of education.

3.7.8 The sample is drawn from private and medical aid patients and therefore the population group studied are from a high socio-economic status group.

CHAPTER 4 – RESULTS

4.1 RESPONSE RATES

Of the 400 questionnaires that were distributed, 184 questionnaires were completed giving a response rate of 46% (184). Of the respondents, 62.3% (114) was from Rosewood and Parkhurst, representing the northern suburbs. 19.1% (35) was from Lister Clinic, representing the Johannesburg city centre, and 18.6% (34) from Alberton.

Each receptionist was asked to keep a count of the number of mothers that refused to fill in the questionnaire, but this unfortunately did not happen due to time pressure and the receptionist forgetting. The receptionists reported that most of the interested respondents managed to fill in the questionnaire while waiting to see their health care provider. On a busy day the next appropriate mother may not have been selected, as the receptionist may have been too busy to ask the mother whether she was willing to participate. On a quiet day, the participant may not have to wait in the waiting room and therefore would also not have been included, if the mother was not willing to fill in the questionnaire after the consultation.

If the receptionist did not know the woman, she may have been too embarrassed to ask them if she is a mother and she would therefore not be included in the study. The response rate in the 4 different practices was directly related to the willingness and helpfulness of the receptionist. The receptionists did not keep a

record of the non-responders, as they said it was too difficult to keep track of, and the receptionists used the excuse of sometimes being too busy and the mothers not being interested and that sometimes they never saw any mothers.

The response rates per question ranged from 52% to 99%.

4.2 DEMOGRAPHIC DATA

4.2.1 Age of mothers

Of the 179 respondents who answered the question, the mean age of mothers was 36 years. The youngest mother was 17 years old and the oldest mother was 69 years old. 53.6% (96) of mothers were between 31 and 40 years old. 96.6% (173) of mothers were between 21 and 50 years old. The age distribution of respondents is shown in Table 4.1.

TABLE 4.1 : AGE DISTRIBUTION

Age of Mothers	Frequency n = 184	%	Cumulative %
< 20	1	0.6	0.6
21-30	36	20.1	20.7
31-40	96	53.6	74.3
41-50	41	22.9	97.2
51-60	4	2.2	99.4
> 60	1	0.6	100
Total	**179**	**100**	

4.2.2 Marital status

Of the respondents 82.4% (150) of mothers were married. Table 4.2 depicts the frequencies of the respondents' marital status.

TABLE 4.2 : MARITAL STATUS OF RESPONDENTS

Marital Status	Frequency n = 184	%	Cumulative %
Single	12	6.6	6.6
Married	150	82.4	89.0
Divorced	15	8.2	97.3
Separated	5	2.7	100
Widowed	0	0	100
Total	**182**	**100**	

4.2.3 Home language of mothers

The majority (71.4%) of the respondents spoke English as a home language. The second most common home language was a Black language. The researcher did not ask which Black language. This distribution does not represent that of the general population of South Africa.

TABLE 4.3 : HOME LANGUAGE OF RESPONDENTS

Home Language	Frequency n = 184	%	Cumulative %
English	130	71.4	71.4
Afrikaans	20	11	82.4
Black	28	15.4	97.8
Other	4	2.2	100
Total	**182**	**100**	

4.2.4 Level of education of mothers

The majority of mothers (83.1%) had attained matric. See table 4.4 for the distribution of highest standard of school education passed.

TABLE 4.4 : MOTHERS' LEVEL OF SCHOOLING

Std of Education	Frequency n = 184	%	Cumulative %
7	3	1.7	1.7
8	19	10.7	12.4
9	8	4.5	16.9
10	147	83.1	100
Total	**177**	**100**	

58% (107) of mothers had attained tertiary education. 35% (64) of mothers had a diploma and 23% (43) had a university degree. The sample was therefore highly educated. All respondents had attained at least standard seven.

4.2.5 Age and sex of children

There was an average of 1.8 children per family. The sex distribution of the children was 49% (146) male and 51% (148) female. The majority of children (45.6%) were between the ages of 5 and 11 years old. See table 4.5 for the distribution of the children's ages.

TABLE 4.5 : AGE DISTRIBUTION OF CHILDREN

Age Group	No. of Children	%	Cumulative %
0-18 months	33	10.4	10.4
19 months-4 years	58	18.4	28.8
5-11 years	144	45.6	74.4
12-18 years	81	25.6	100
Total	316	100	

4.2.6 Cross-tabulations

The following demographic variables were cross-tabulated against the questionnaire (question 8 to 27b inclusive). Results were considered significant if the statistics yielded a p-value of less than 0.05 when cross-tabulated.

Age

The maternal age was grouped into three groups. Mothers less than or equal to 30 years of age, between 31 and 40, and mothers over the age of 40.

Marital status

For the cross-tabulations the variable of marital status was grouped into two, married and unmarried, which included single, divorced, widowed and separated mothers.

Language

Interesting but not relevant because skewed.

Level of education

For the purpose of the cross-tabulations mothers were divided into two groups, educated (matric and post matric studies) and uneducated (< standard ten).

Number of children

Mothers were divided into two groups for the purpose of the cross-tabulations. Mothers who had two or less children (small family) and mothers who had three or more children (bigger family).

4.3 KNOWLEDGE OF SUN PROTECTION METHODS

4.3.1 Knowledge of sun protection methods

In an open-ended question (question 8) mothers were asked to list the ways that they know about protecting the skin from the sun. Of the 184 respondents, there was a 99% (183) response rate.

TABLE 4.6 : METHODS OF SUN PROTECTION

Method	Frequency	%
Sunscreen	149	81.4
Sunhat	94	51.4
Clothes	73	39.9
Sun avoidance	47	25.7
Sunglasses	17	9.3
Umbrella	11	6

81.4% (149) of mothers knew about sunscreen as a method of sun protection, and only 51.4% (94) listed a sunhat. Clothes, sun avoidance behaviour, sunglasses and umbrellas were also mentioned but by a minority of mothers. In an open ended question, asking what methods are known to protect against the sun, 85% (114) of English speaking mothers, 75% (15) of Afrikaans speaking mothers and 59% (19) of Black African speaking mothers reported sunscreen as a method (p=0.003).

60% (76) of English speaking mothers listed a sunhat as a sun protective method (p=0.003) whereas 55% (11) of Afrikaans speaking mothers and 5% (24) of Black African speaking mothers did not list a sunhat.

The majority of educated mothers listed sunscreen (p=0.000) and a hat (p=0.002) as ways of protecting the skin from the sun in an open-ended question.

The majority of uneducated mothers did not list a hat (p=0.002), clothes (p=0.000), and sun avoidance (0.003) as methods of sun protection in an open-ended question.

In an open-ended question, 56% of mothers with 2 or less children list hats as a method of sun protection whereas 62% of mothers with 3 or more children did not (p=0.034).

4.3.2 Knowledge of the effect of sun exposure to the body

Mothers were asked using a five-point scale, what the effect of sun exposure is to the body. 76% (130) of the mothers responded that the sun was either harmful or very harmful to the body. 12.2% (21) of mothers responded that the sun was either healthy or very healthy for the body. 11.6% (20) of mothers thought that sun exposure was neither healthy nor unhealthy for the body. Table 4.7 represents a table of the respondents.

TABLE 4.7 : EFFECT OF SUN EXPOSURE TO THE BODY

Effect	Frequency (n=184)	%
Very healthy	1	0.6
Healthy	20	11.7
Neither healthy nor harmful	20	11.7
Harmful	64	37.4
Very harmful	66	38.6
Total	**171**	**100**

81% (97) of English speaking mothers and 85% (17) of Afrikaans speaking mothers believe that the effect of sun exposure to the body is harmful. Only 50% (15) of Black African speaking mothers believes that sun exposure is harmful, with 30% (9) believing that sun exposure is healthy and 20% (6) admitting to not knowing the answer (p=0.005).

78% of educated and 61% of uneducated mothers agreed that sun exposure to the body is harmful (p=0.021).

Does knowledge of the effect of sun exposure alter the mother's behaviour?

A cross-tabulation was done of question 11 (What is the effect of sun exposure to the body?) and question 17 (In which situation and how often do you use sun protection on your children?). Does knowledge of the effect of sun exposure alter the mothers' behaviour and use of sun protection in different situations?

On the weekends, 73% (73) of mothers who think it is harmful to expose the body to the sun use sun protection on their children all the time, however 6% (6) of them never use sun protection on their children. 75% (6) of mothers who never use sun protection on their children think that sun exposure is harmful (p=0.002). Why are they not using the sun protection if they have the knowledge that it is harmful?

TABLE 4.8 : WHAT IS THE EFFECT OF THE SUN TO THE BODY / HOW OFTEN DO YOU USE SUN PROTECTION ON YOUR CHILDREN ON THE WEEKEND

	Never	**1-3 times a week**	**4-6 times a week**	**Daily**	**Total**
Healthy	1 7.14 12.50	4 28.57 16.00	2 14.29 22.22	7 50.00 8.43	14 100.00 11.20
Neither healthy nor harmful	1 9.09 12.50	3 27.27 12.00	4 36.36 44.44	3 27.27 3.61	11 100.00 8.80
Harmful	6 6.00 75.00	18 18.00 72.00	3 3.00 33.33	73 73.00 87.95	100 100.00 80.00
Total	8 6.40 100.00	25 20.00 100.00	9 7.20 100.00	83 66.40 100.00	125 100.00 100.00
Pearson chi2(6) = 21.3463 Pr = 0.002					

When the children are swimming, 73% (83) of mothers who believe that sun exposure is harmful use sun protection on their children daily. 62% (8) of mothers

who think sun exposure is healthy also use sun protection daily on their children while swimming (p=0.051). Why do they use the sun protection?

TABLE 4.9 : WHAT IS THE EFFECT OF THE SUN TO THE BODY / HOW OFTEN DO YOU USE SUN PROTECTION ON YOUR CHILDREN WHILE SWIMMING

	Never	1-3 times a week	4-6 times a week	Daily	Total
Healthy	0 0.00 0.00	4 30.77 18.18	1 7.69 12.50	8 61.54 8.25	13 100.00 9.56
Neither healthy nor harmful	3 30.00 33.33	1 10.00 4.55	0 0.00 0.00	6 60.00 6.19	10 100.00 7.35
Harmful	6 5.31 66.67	17 15.04 77.27	7 6.19 87.50	83 73.45 85.57	113 100.00 83.09
Total	9 6.62 100.00	22 16.18 100.00	8 5.88 100.00	97 71.32 100.00	136 100.00 100.00
Pearson chi2(6) = 12.5563 Pr = 0.051					

73% (78) of mothers who believe that sun exposure is harmful use sun protection on their children daily when they are playing outdoors. 31% (4) of mothers who believe that sun exposure is healthy never use sun protection on their children when playing outdoors (p=0.025).

TABLE 4.10 : WHAT IS THE EFFECT OF THE SUN TO THE BODY / HOW OFTEN DO YOU USE SUN PROTECTION ON YOUR CHILDREN WHILE PLAYING OUTDOORS

	Never	1-3 times a week	4-6 times a week	Daily	Total
Healthy	4 30.77 28.57	3 23.08 10.34	1 7.69 7.69	5 38.46 6.67	13 100.00 9.92
Neither healthy nor harmful	1 9.09 7.14	6 54.55 20.69	1 9.09 7.69	3 27.27 4.00	11 100.00 8.40
Harmful	9 8.41 64.29	20 18.69 68.97	11 10.28 84.62	67 62.62 89.33	107 100.00 81.68
Total	14 10.69 100.00	29 22.14 100.00	13 9.92 100.00	75 57.25 100.00	131 100.00 100.00
Pearson chi2(6) = 14.4016 Pr = 0.025					

A cross-tabulation was done of question 9 (Do you protect your children from the sun?) and question 11 (What is the effect of sun exposure to the body?). Does knowledge of the effect of the sun exposure alter the mothers' behaviour?

TABLE 4.11 : KNOWLEDGE OF EFFECT OF THE SUN / THE USE OF SUN PROTECTION ON CHILDREN

	Never	1-3 times a week	4-6 times a week	Daily	Total
Healthy	5 23.81 26.32	7 13.21 36.84	0 0.00 0.00	7 10.00 36.84	19 11.95 100.00
Neither healthy nor harmful	5 23.81 26.32	5 9.43 26.32	0 0.00 0.00	9 12.86 47.37	19 11.95 100.00
Harmful	11 52.38 9.09	41 77.36 33.88	15 100.00 12.40	54 77.14 44.63	121 76.10 100.00
Total	21 100.00 13.21	53 100.00 33.33	15 100.00 9.43	70 100.00 44.03	159 100.00 100.00
Pearson chi2(6) = 11.8498 Pr = 0.065					

Of the mothers that believe that the sun is harmful, 45% (54) use sun protection on their children daily, 12% (15) use sun protection between 4-6 times a week, 34% (41) 1-3 times a week and 9% (11) never use sun protection on their children (p=0.065). 52% (11) of mothers who never use sun protection on their children think that the effect of the sun is harmful, and 23.8% (5) of non-users think the sun is healthy.

Cross-tabulations were done between the knowledge of the effect of sun exposure to the body (question 11) versus the attitude of the mother to using sun protection on her children (question 18).

TABLE 4.12 : KNOWLEDGE OF EFFECT OF THE SUN / SUN PROTECTION IS A WASTE OF TIME

	Strongly agree	Agree	Disagree	Strongly disagree	Total
Healthy	0 0.00 0.00	2 14.29 50.00	5 35.71 22.73	7 50.00 6.80	14 100.00 10.53
Neither healthy nor harmful	1 7.69 25.00	1 7.69 25.00	3 23.08 13.64	8 61.54 7.77	13 100.00 9.77
Harmful	3 2.83 75.00	1 0.94 25.00	14 13.21 63.64	88 83.02 85.44	106 100.00 79.70
Total	4 3.01 100.00	4 3.01 100.00	22 16.54 100.00	103 77.44 100.00	133 100.00 100.00
Pearson chi2(6) = 16.1230 Pr = 0.013					

86% (12) of mothers who believe that sun exposure is healthy disagreed that the use of sun protection is a waste of time. 96% (102) of mothers who believe that sun exposure is harmful disagreed that sun protection use is a waste of time (p=0.013).

TABLE 4.13 : KNOWLEDGE OF EFFECT OF THE SUN / USE OF SUN PROTECTION IS TOO EXPENSIVE

	Strongly agree	Agree	Disagree	Strongly disagree	Total
Healthy	2 13.33 25.00	0 0.00 0.00	6 40.00 18.18	7 46.67 8.14	15 100.00 11.11
Neither healthy nor harmful	1 7.69 12.50	2 15.38 25.00	6 46.15 18.18	4 30.77 4.65	13 100.00 9.63
Harmful	5 4.67 62.50	6 5.61 75.00	21 19.63 63.64	75 70.09 87.21	107 100.00 79.26
Total	8 5.93 100.00	8 5.93 100.00	33 24.44 100.00	86 63.70 100.00	135 100.00 100.00
Pearson chi2(6) = 13.2010 Pr = 0.040					

90% (96) of mothers who think that sun exposure is harmful disagreed that sun protection use is too much effort. 87% (13) of mothers who think that sun exposure is healthy disagreed that it is too much effort to use sun protection (p=0.040).

TABLE 4.14 : KNOWLEDGE OF EFFECT OF THE SUN / SUN PROTECTION IS AN ADVERTISING GIMMICK

	Strongly agree	Agree	Disagree	Strongly disagree	Total
Healthy	0 0.00 0.00	1 7.69 14.29	6 46.15 28.57	6 46.15 5.94	13 100.00 9.70
Neither healthy nor harmful	0 0.00 0.00	3 25.00 42.86	1 8.33 4.76	8 66.67 7.92	12 100.00 8.96
Harmful	5 4.59 100.00	3 2.75 42.86	14 12.84 66.67	87 79.82 86.14	109 100.00 81.34
Total	5 3.73 100.00	7 5.22 100.00	21 15.67 100.00	101 75.37 100.00	134 100.00 100.00
Pearson chi2(6) = 22.1119 Pr = 0.001					

93% (101) of mothers who believe that sun exposure is harmful disagree that sun protection is an advertising gimmick and 92% (12) of mothers who believe sun exposure is healthy also disagree that it is an advertising gimmick (p=0.001).

4.3.3 The safety of tanning slowly

Mothers were asked if they thought it was safe to tan slowly. Only 31.5% (56) of mothers believe that it is not safe to tan slowly. 39.9% (71) of respondents believe that it is safe to tan slowly and 28.6% (51) of mothers did not know the answer. See Table 4.15.

TABLE 4.15 : IS IT SAFE TO TAN SLOWLY

n=178	Yes		No		Don't Know	
Is it safe to tan slowly?	71	39.9	56	31.5	51	28.7
	f	%	f	%	f	%

42% (53) of English speaking mothers believe that it is safe to tan slowly, whereas 65% (13) of the Afrikaans speaking mothers and 64% (19) of the Black African speaking mothers answered that they did not know if it is safe to tan slowly (p=0.000).

TABLE 4.16 : HOME LANGUAGE / IS IT SAFE TO TAN SLOWLY

	Yes	No	Don't know	Total
English	53 74.65	47 83.93	27 54.00	127 71.75
Afrikaans	13 18.31	3 5.36	4 8.00	20 11.30
Black	5 7.04	6 10.71	19 38.00	30 16.95
Total	71 100.00	56 100.00	50 100.00	177 100.00
Pearson chi2(4) = 27.2243 Pr = 0.000				

In the uneducated mothers 57% (17) believe that it is safe to tan slowly whereas 33% (10) were unsure of the answer. Of the educated mothers an equal amount of 36% (52) believed it is safe to tan slowly and 36% (52) believed it is unsafe to tan slowly with 28% (39) of educated mothers not knowing the answer (p=0.016).

TABLE 4.17 : LEVEL OF EDUCATION / IS IT SAFE TO TAN SLOWLY

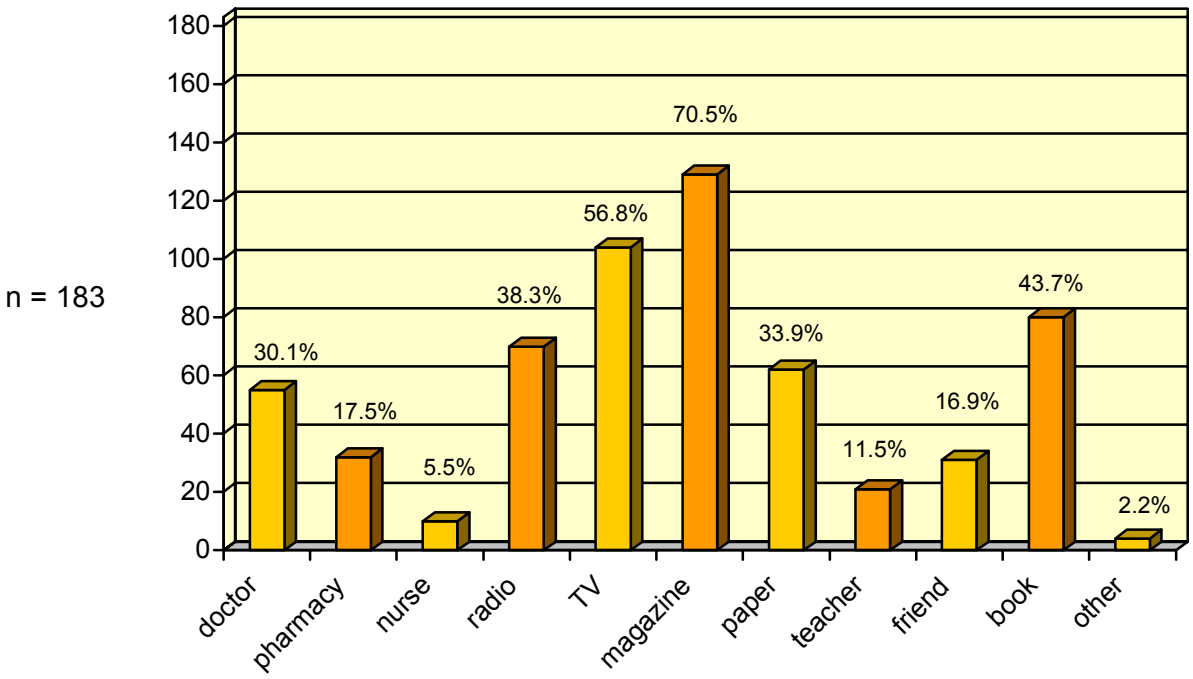
	Yes	No	Don't know	Total
Not matric	17 24.64	3 5.45	10 20.41	30 17.34
Matric	52 75.36	52 94.55	39 79.59	143 82.66
Total	69 100.00	55 100.00	49 100.00	173 100.00
Pearson chi2(2) = 8.3058 Pr = 0.016				

4.3.4 The source of knowledge of sun protection

In an open-ended question in the pilot study ten common sources of knowledge about sun protection were identified. These ten sources were listed in the questionnaire. More than one answer was allowed. 183 mothers responded.

Only 4 ticked “other sources” but did not state what they were. 70.5% (129) of mothers said they get their information from magazines and 56.8% (104) from the television. Doctors, pharmacists and nurses have a small function in providing information 30.1% (55), 17.5% (32) and 5.5% (10) respectively.

FIGURE 4.1 : SOURCE OF INFORMATION



The majority of English and Afrikaans speaking mothers get their knowledge about sun protection from the television (p=0.001), and magazines (p=0.001) and not the newspapers (p=0.051). The majority of Black African speaking mothers attains their knowledge from magazines (p=0.003).

TABLE 4.18 : LANGUAGE / TV

	Yes	No	Total
English	80 77.67	50 63.29	130 71.43
Afrikaans	14 13.59	6 7.59	20 10.99
Black	9 8.74	23 29.11	32 17.58
Total	103 100.00	79 100.00	182 100.00
Pearson chi2(2) = 13.3148 Pr = 0.001			

TABLE 4.19 : LANGUAGE / MAGAZINE

	Yes	No	Total
English	100 78.13	30 55.56	130 71.43
Afrikaans	13 10.16	7 12.96	20 10.99
Black	15 11.72	17 31.48	32 17.58
Total	128 100.00	54 100.00	182 100.00
Pearson chi2(2) = 11.4168 Pr = 0.003			

TABLE 4.20 : LANGUAGE / PAPER

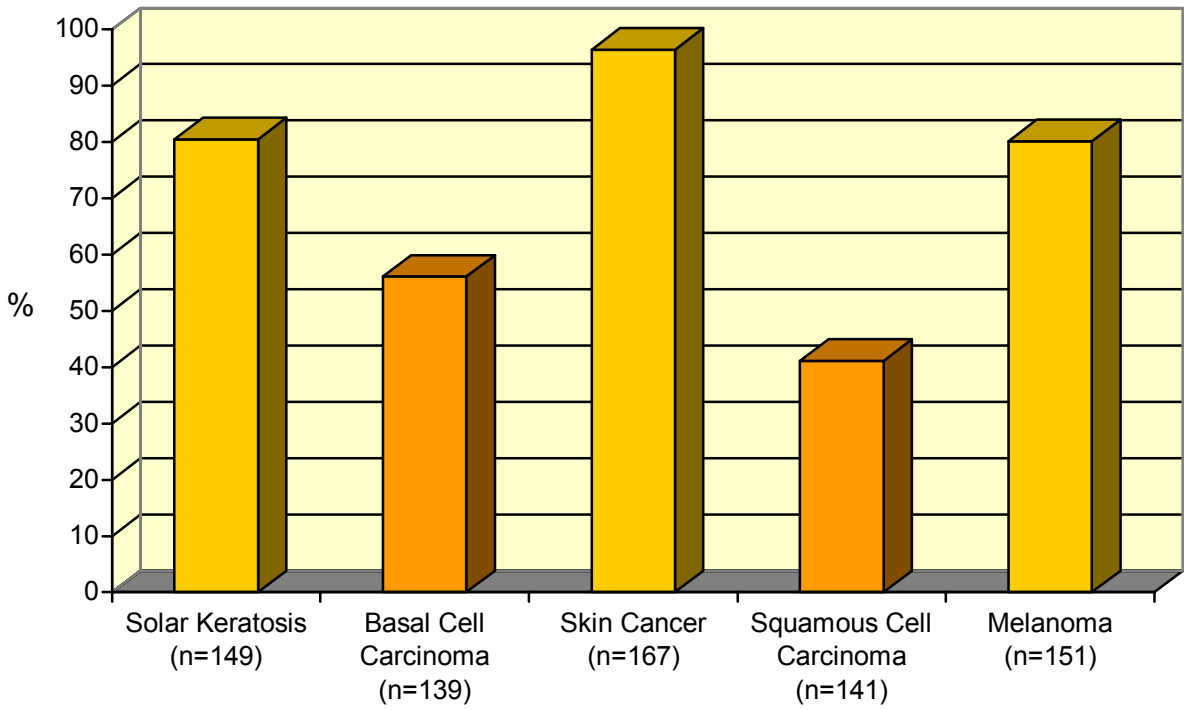
	Yes	No	Total
English	51 82.26	79 65.83	130 71.43
Afrikaans	3 4.84	17 14.17	20 10.99
Black	8 12.90	24 20.00	32 17.58
Total	62 100.00	120 100.00	182 100.00
Pearson chi2(2) = 5.9517 Pr = 0.051			

4.3.5 Knowledge of awareness of harmful effects of the sun

4.3.5.1 Knowledge of skin cancers

Respondents were asked whether or not they had heard of the complications of too much sun exposure and the different skin cancers. 96.4% (161) of mothers had heard of skin cancer. 80.1% (121) of mothers had heard of melanoma and 80.5% (120) had heard of solar keratosis.

FIGURE 4.2 : KNOWLEDGE OF SKIN CANCER TYPES



98% (123) of English speaking, 100% (18) of Afrikaans speaking and 83% (19) of Black African language speaking mothers have heard of skin cancer (p=0.001).

TABLE 4.21 : LANGUAGE / SKIN CANCER

	Yes	No	Total
English	123 76.88	2 33.33	125 75.30
Afrikaans	18 11.25	0 0.00	18 10.84
Black	19 11.88	4 66.67	23 13.86
Total	160 100.00	6 100.00	166 100.00
Pearson chi2(2) = 14.6616 Pr = 0.001			

Whereas 87% (105) of English, 60% (9) of Afrikaans and 43% (6) of Black African speaking mothers had heard of malignant melanoma (p=0.000).

TABLE 4.22 : LANGUAGE / MELANOMA

	Yes	No	Total
English	105 87.50	16 53.33	121 80.67
Afrikaans	9 7.50	6 20.00	15 10.00
Black	6 5.00	8 26.67	14 9.33
Total	120 100.00	30 100.00	150 100.00
Pearson chi2(2) = 19.2946 Pr = 0.000			

99% (137) of educated and 83% (19) of uneducated mothers had heard of the term skin cancer (p=0.000). Knowledge of basal cell carcinoma was significantly related to the age of the mother. The older group of mothers, 31 and older, (63% (67)) had a greater knowledge of basal cell carcinoma (rodent ulcer) than the younger mothers (28% (8)) (p=0.003). There was no significant correlation between age and knowledge of the other skin cancers. This may be because basal cell carcinoma incidence increases with age.

More married mothers had heard of solar keratoses (83% (104)) (p=0.046) and basal cell carcinoma (60% (70)) (p=0.042) than unmarried mothers.

4.3.5.2 Relationship between childhood exposure and adult cancers

Mothers were asked if sun exposure and sunburn in childhood causes skin cancer in adulthood. 66.1% (117) of the respondents thought that this was correct while 33.9% (60) either thought it was untrue or did not know the answer. See Table 4.23.

TABLE 4.23 : KNOWLEDGE OF CONSEQUENCES OF SUN EXPOSURE

	Yes		No		Don't know	
	f	%	f	%	f	%
Sun exposure in childhood causes skin cancer in adulthood (n=177)	117	66.1	15	8.47	45	25.42
Childhood sunburn and sun exposure causes sun-damaged skin (n=177)	151	85.31	7	3.95	19	10.73
Sun exposure for fair skinned children is more dangerous (n=178)	116	65.17	32	17.98	30	16.85
There is such a thing as a healthy suntan (n=175)	62	35.43	70	40	43	24.57

70% of educated mothers and 46% of uneducated mothers believe that sun exposure and sunburn in children causes skin cancer in adulthood, 21% of educated and 46% of uneducated mothers did not know the answer (p=0.026).

TABLE 4.24 : LEVEL OF EDUCATION / SUN EXPOSURE & SUNBURN IN CHILDHOOD CAUSES SKIN CANCER IN ADULTHOOD

	Yes	No	Don't know	Total
Not matric	12 10.62	2 13.33	12 27.91	26 15.20
Matric	101 89.38	13 86.67	31 72.09	145 84.80
Total	113 100.00	15 100.00	43 100.00	171 100.00
Pearson chi2(2) = 7.2647 Pr = 0.026				

4.3.5.3 Is there such a thing as a healthy suntan?

When asked if there is such a thing as a healthy suntan, 35.4% (62) of mothers (n=175) responded positively. 24.6% (43) said they did not know and only 40% (70) knew that there was no such thing as a healthy suntan. See Table 4.23.

4.3.5.4 Sun exposure is more dangerous for fair skinned children

When mothers were asked if they believe that sun exposure for a fair child is more dangerous than sun exposure for a dark skinned child 65.2% (116) responded positively. 18% (32) of mothers did not believe that fair skin complexion is more dangerous than dark skin complexion. 17% (30) did not know the answer to the question. See Table 4.23.

Married mothers were found to know that sun exposure is more dangerous in fair skinned children than dark skinned children (p=0.043).

TABLE 4.25 : MARITAL STATUS / SUN EXPOSURE IS MORE DANGEROUS IN FAIR SKINNED CHILDREN

	Yes	No	Don't know	Total
Separate	16 13.91	5 15.63	10 33.33	31 17.51
Married	99 86.09	27 84.38	20 66.67	146 82.49
Total	115 100.00	32 100.00	30 100.00	177 100.00
Pearson chi2(2) = 6.3080 Pr = 0.043				

The majority of mothers in all three language groups agree that fair skin sun exposure is more dangerous than dark skin sun exposure (p=0.022).

TABLE 4.26 : LANGUAGE / THE DANGER OF SUN EXPOSURE IN FAIR SKINNED CHILDREN

	Yes	No	Don't know	Total
English	89 77.39	23 71.88	15 50.00	127 71.75
Afrikaans	10 8.70	5 15.63	4 13.33	19 10.73
Black	16 13.91	4 12.50	11 36.67	31 17.51
Total	115 100.00	32 100.00	30 100.00	177 100.00
Pearson chi2(4) = 11.4292 Pr = 0.022				

69% (101) of educated and 46% (12) of uneducated mothers believe that fair skin sun exposure is more dangerous than sun exposure to dark skinned children, with 13% (19) of educated and 38% (10) of uneducated mothers not knowing the answer (p=0.006).

TABLE 4.27 : EDUCATION OF MOTHER / SUN EXPOSURE IN FAIR SKINNED CHILDREN IS MORE DANGEROUS

	Yes	No	Don't know	Total
Not matric	12 10.62	4 13.33	10 34.48	26 15.12
Matric	101 89.38	26 86.67	19 65.52	146 84.88
Total	113 100.00	30 100.00	29 100.00	172 100.00
Pearson chi2(2) = 10.3319 Pr = 0.006				

4.3.5.5 Sun exposure and sunburn in childhood causes sun-damaged skin in adulthood

Mothers were asked if they know that sun exposure and sunburn in childhood causes sun-damaged skin in adulthood. Only 4% (7) mothers believe it is not harmful and 10.7% (19) did not know. 85.3% (151) of mothers knew that sun exposure and sunburn in childhood causes sun-damaged skin in adulthood. See Table 4.23.

There was no difference between the knowledge of sun exposure causing sun-damaged skin in the marital status of the mother (p=0.056).

TABLE 4.28 : MARITAL STATUS / SUN EXPOSURE AND SUNBURN IN CHILDHOOD CAUSES SUN-DAMAGED SKIN IN ADULTHOOD

	Yes	No	Don't know	Total
Separate	23 15.33	2 28.57	7 36.84	32 18.18
Married	127 84.67	5 71.43	12 63.16	144 81.82
Total	150 100.00	7 100.00	19 100.00	176 100.00
Pearson chi2(2) = 5.7735 Pr = 0.056				

93% (118) of English speaking mothers believe that childhood exposure and sunburn causes adult sun-damaged skin, whereas 78% (14) of the Afrikaans speaking mothers and 58% (18) of the Black African speaking mothers answered that they did not know (p=0.000).

TABLE 4.29 : LANGUAGE / SUN EXPOSURE AND SUNBURN IN CHILDHOOD CAUSES SUN-DAMAGED SKIN IN ADULTHOOD

	Yes	No	Don't know	Total
English	118 78.67	3 42.86	6 31.58	127 72.16
Afrikaans	14 9.33	1 14.29	3 15.79	18 10.23
Black	18 12.00	3 42.86	10 52.63	31 17.61
Total	150 100.00	7 100.00	19 100.00	176 100.00
Pearson chi2(4) = 25.2979 Pr = 0.000				

90% (131) of educated mothers believe that sun exposure and sunburn in childhood causes sun-damaged skin in adulthood as opposed to 58% (15) in the uneducated mothers (p=0.000).

TABLE 4.30 : EDUATION OF MOTHER / SUN EXPOSURE AND SUNBURN IN CHILDHOOD CAUSES SUN-DAMAGED SKIN IN ADULTHOOD

	Yes	No	Don't know	Total
Not matric	15 10.27	1 14.29	10 55.56	26 15.20
Matric	131 89.73	6 85.71	8 44.44	145 84.80
Total	146 100.00	7 100.00	18 100.00	171 100.00
Pearson chi2(2) = 25.4892 Pr = 0.000				

4.3.6 Does knowledge of sun-damaged skin alter behaviour in parent?

The knowledge of sun exposure and sunburn in childhood causing sun-damaged skin in adulthood (question 20b) was cross-tabulated with the behaviour of the mother in question 22b (I have been sunburnt in the last 2 years).

23% (34) of mothers who believe that sun exposure and sun burn causes sun-damaged skin have never been sun burnt in the last 2 years, 34% (50) of mothers have been sunburnt more than five times in the past two years despite believing that sunburn causes damage. 43% (3) of mothers who do not believe that sun exposure and sunburn causes skin damage never have been sunburnt in the last two years. Only 29% (2) of mothers who believe that it does not cause damage often (more than five times a year) have a suntan. (p=0.052)

TABLE 4.31 : SUN EXPOSURE AND SUNBURN IN CHILDHOOD CAUSES SUN-DAMAGED SKIN IN ADULTHOOD / MOTHERS HAVE SUNBURNT IN LAST 2 YRS

	Never	Seldom	Often	Total
Yes	34 23.13 73.91	63 42.86 90.00	50 34.01 92.59	147 100.00 86.47
No	3 42.86 6.52	2 28.57 2.86	2 28.57 3.70	7 100.00 4.12
Don't know	9 56.25 19.57	5 31.25 7.14	2 12.50 3.70	16 100.00 9.41
Total	46 27.06 100.00	70 41.18 100.00	54 31.76 100.00	170 100.00 100.00
Pearson chi2(4) = 9.4029 Pr = 0.052				

4.3.7 Does knowledge of the cause of skin cancer alter the mother's sun protection behaviour on herself?

The knowledge of sun exposure and sunburn in childhood causing cancer in adulthood (question 20a) was cross-tabulated with the behaviour of the mother in question 21a (Do you have a suntan?).

49% (55) of mothers who never have a tan believe that sun exposure and sunburn causes skin cancer and 45% (51) seldom have a tan. However 54% (7) of mothers who do not believe that sun exposure causes skin cancer also do not have a tan and 46% (6) of them seldom have a tan. They may not be exposed to the sun because of their lifestyle (p=0.063).

TABLE 4.32 : SUN EXPOSURE AND SUNBURN IN CHILDHOOD CAUSES SKIN CANCER / DO YOU HAVE A TAN (MOTHER)

	Never	Seldom	Often	Total
Yes	55 48.67 72.37	51 45.13 68.00	7 6.19 46.67	113 100.00 68.07
No	7 53.85 9.21	6 46.15 8.00	0 0.00 0.00	13 100.00 7.83
Don't know	14 35.00 18.42	18 45.00 24.00	8 20.00 53.33	40 100.00 24.10
Total	76 45.78 100.00	75 45.18 100.00	15 9.04 100.00	166 100.00 100.00
Pearson chi2(4) = 8.9151 Pr = 0.063				

4.3.8 Knowledge of a person who has been treated for skin cancer

Of the respondents 52.4% (89) of mothers knew someone personally that has been treated for skin cancer. Only 3 mothers had a form of skin cancer themselves. The chart below represents how many mothers know friends, relatives and colleagues who have had treatment for skin cancer.

FIGURE 4.3 : KNOW SOMEONE WITH SKIN CANCER

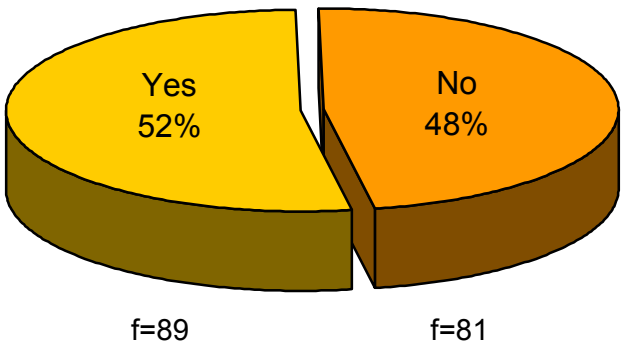
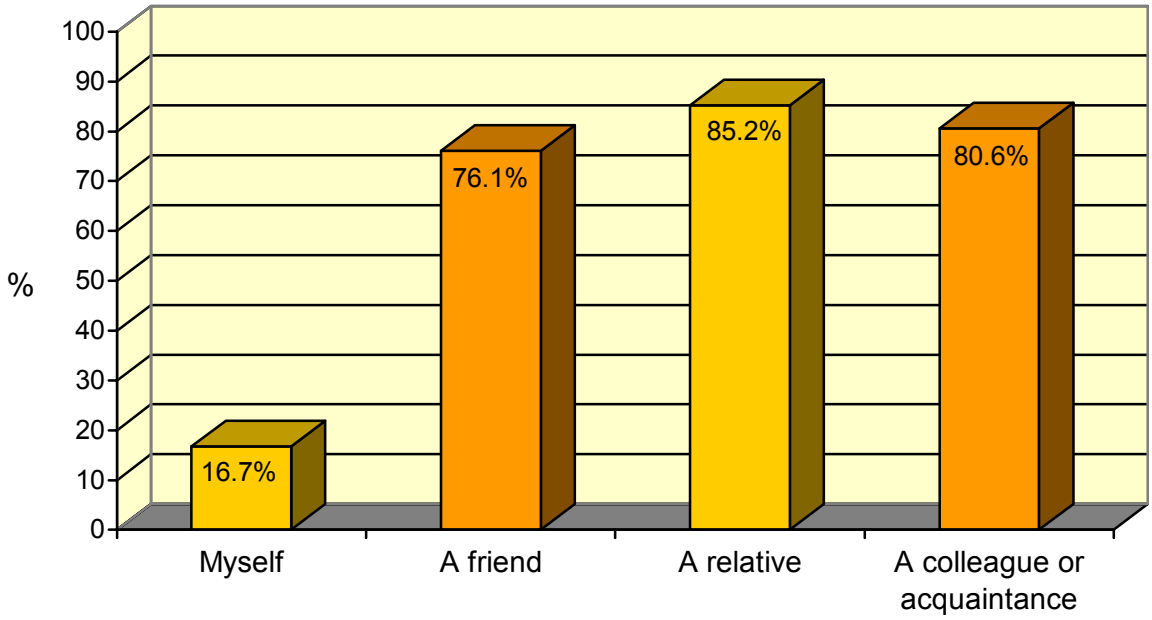


FIGURE 4.4 : RELATIONSHIP TO SOMEONE WITH SKIN CANCER



61% (77) of English speaking mothers know someone who has been treated for skin cancer, whereas 78% (14) of Afrikaans 68% (17) of Black African speaking mothers did not know anyone who had been treated for skin cancer (p=0.001). Of the 61% (77) of English speaking mothers that knew someone with skin cancer, 55% (42) of those was a relative, 42% (32) a friend and 3% (2) was self.

TABLE 4.33 : LANGUAGE / KNOW SOMEONE WITH SKIN CANCER

	Yes	No	Total
English	77 86.52	49 61.25	126 74.56
Afrikaans	4 4.49	14 17.50	18 10.65
Black	8 8.99	17 21.25	25 14.79
Total	89 100.00	80 100.00	169 100.00
Pearson chi2(2) = 14.5798 Pr = 0.001			

56% (78) of educated mothers know someone personally who has been treated for skin cancer whereas 71% (17) of the uneducated mothers did not know anyone personally with skin cancer (p=0.016).

TABLE 4.34 : EDUCATION / KNOW SOMEONE WITH SKIN CANCER

	Yes	No	Total
Not matric	7 8.24	17 21.52	24 14.63
Matric	78 91.76	62 78.48	140 85.37
Total	85 100.00	79 100.00	164 100.00
Pearson chi2(1) = 5.7835 Pr = 0.016			

Knowledge of someone with skin cancer (question 27a) was cross-tabulated with behaviour of the mother (question 17). Does knowing someone who has been treated for skin cancer alter the mothers' sun protection behaviour?

TABLE 4.35 : KNOW SOMEONE WITH SKIN CANCER / BEHAVIOUR OF MOTHER TO PROTECT CHILD WHILE PLAYING SPORT

	Never	1-3 times a week	4-6 times a week	Daily	Total
Know someone	3 4.17 23.08	14 19.44 70.00	3 4.17 33.33	52 72.22 61.18	72 100.00 56.69
Don't know someone	10 18.18 76.92	6 10.91 30.00	6 10.91 66.67	33 60.00 38.82	55 100.00 43.31
Total	13 10.24 100.00	20 15.75 100.00	9 7.09 100.00	85 66.93 100.00	127 100.00 100.00
Pearson chi2(3) = 10.1221 Pr = 0.018					

TABLE 4.36 : KNOW SOMEONE WITH SKIN CANCER / BEHAVIOUR OF MOTHER TO PROTECT CHILD WHILE OUTDOORS

	Never	1-3 times a week	4-6 times a week	Daily	Total
Know someone	3 3.80 23.08	23 29.11 74.19	7 8.86 53.85	46 58.23 60.53	79 100.00 59.40
Don't know someone	10 18.52 76.92	8 14.81 25.81	6 11.11 46.15	30 55.56 39.47	54 100.00 40.60
Total	13 9.77 100.00	31 23.31 100.00	13 9.77 100.00	76 57.14 100.00	133 100.00 100.00
Pearson chi2(3) = 10.1314 Pr = 0.017					

TABLE 4.37 : KNOW SOMEONE WITH SKIN CANCER / BEHAVIOUR OF MOTHER TO PROTECT CHILD THROUGH SUN AVOIDANCE

	Never	1-3 times a week	4-6 times a week	Daily	Total
Know someone	3 4.41 23.08	18 26.47 66.67	8 11.76 72.73	39 57.35 57.35	68 100.00 57.14
Don't know someone	10 19.61 76.92	9 17.65 33.33	3 5.88 27.27	29 56.86 42.65	51 100.00 42.86
Total	13 10.92 100.00	27 22.69 100.00	11 9.24 100.00	68 57.14 100.00	119 100.00 100.00
Pearson chi2(3) = 8.2524 Pr = 0.041					

72% (52) of mothers who know someone with skin cancer use sun protection on their children daily when playing sport (p=0.018), and 58% (46) when outdoors (p=0.017), and 57% (39) between 11h00 and 15h00 (p=0.041). However of the mothers who do not know someone with skin cancer, 60% (33) use sun protection on their children daily when playing sport (p=0.018), 56% (30) when outdoors (p=0.017) and 57% (29) between 11h00 and 15h00 (p=0.041). Knowing someone with skin cancer does not increase the usage of sun protection.

4.4 SUN PROTECTION : MATERNAL BEHAVIOUR

4.4.1 Mothers use of sun protection

Mothers were asked how often, if ever they protect themselves from the sun. Of the 175 who responded, 22.3% (39) of mothers never practise sun protection methods on themselves. 39.4% (69) of mothers protect themselves from sun exposure on a daily basis.

Mothers were also asked if and how often they practise sun protection methods on their children. 12.9% (22) of respondents (n=170) never practised sun protection on their children and 44.1% (75) of mothers who responded, practised sun protection methods on a daily basis. The table below compares the mother's own behaviour, to the behaviour she practises on her children.

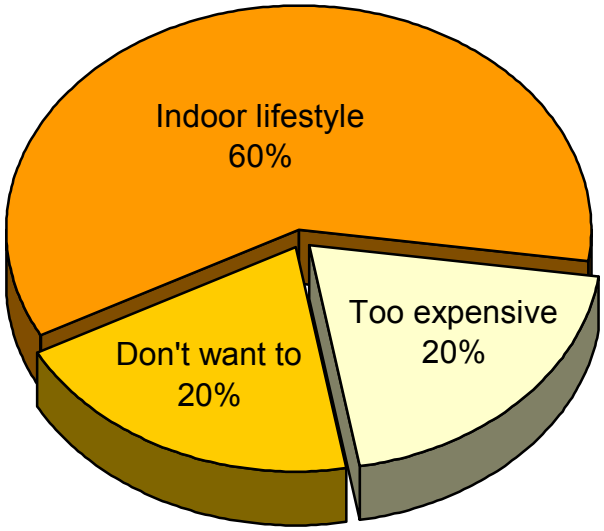
TABLE 4.38 : USE OF SUN PROTECTION ON SELF / USE OF SUN PROTECTION ON HER CHILDREN

n=184	Use of sun protection on self			Use of sun protection on children		
	f	%	cum %	f	%	cum %
Never	39	22.3	22.3	22	12.9	12.9
1-3 times per week	54	30.9	53.1	57	33.5	46.5
4-6 times per week	13	7.4	60.6	16	9.4	55.9
Every day	69	39.4	100	75	44.1	100

45% (10) of the mothers who do not practise sun protective behaviour on their children answered an open-ended question about why they do not use sun protection. Three main reasons for not using sun protection were volunteered:

- the children do not want to
- the children are indoors and do not therefore have sun exposure
- the products are too expensive

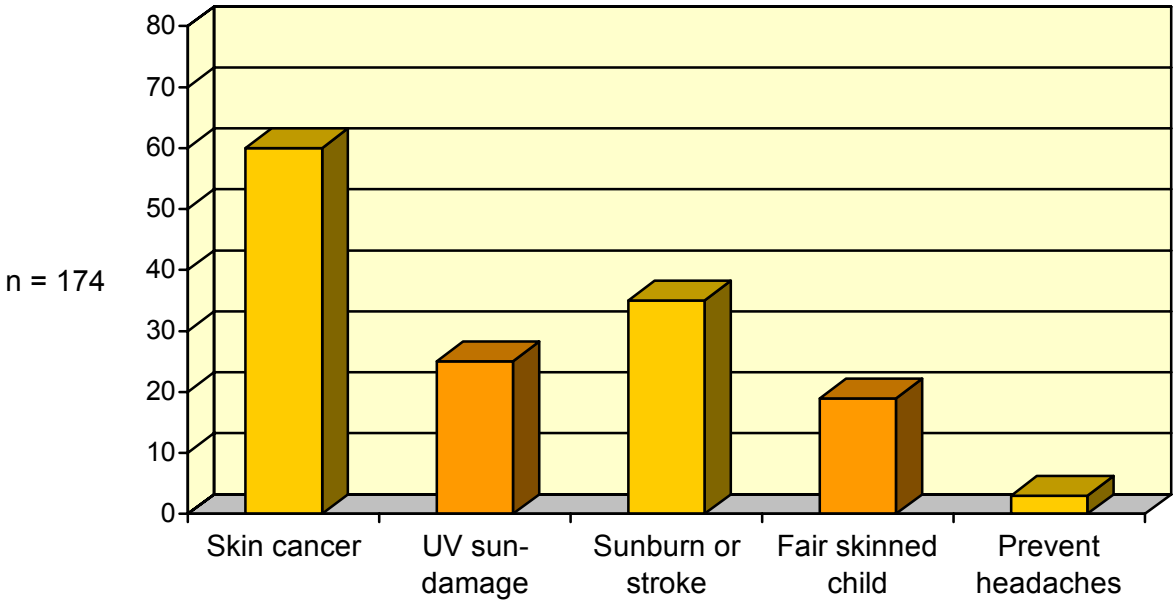
FIGURE 4.5 : REASONS FOR NOT PRACTISING SUN PROTECTION ON CHILDREN



The mothers were asked in an open-ended question, what is their reason for using sun protection on their children. Three main reasons for using sun protection were volunteered:

- skin cancer
- sunburn
- the child having a fair skin

FIGURE 4.6 : REASONS FOR USING SUN PROTECTION ON CHILDREN



Of the older mothers, greater than 31 years, there was a significant relationship between using sun protection on their children to protect them from getting sunburnt (p=0.019) but no statistical significance in using sun protection to prevent their children from getting skin cancer.

61% (11) of Afrikaans speaking mothers protect their children daily from the sun. 54% (66) of English speaking mothers use sun protection four or more times a week on their children and 52% (15) of Black African speaking mothers use sun protection less than three times a week on their children (p=0.003).

Of the English speaking mothers 37% (46) used sun protection personally on themselves on a daily basis, whilst 40% (50) used it < three times a week and 15% (19) never used sun protection on themselves. 47% (14) of the Black African

speaking mothers never used sun protection and an equal amount of 47% (14) used sun protection daily on themselves (p=0.000).

Of English speaking mothers, 57% (64) use sun protection on their children > four times a week and 38% (43) of mothers between one and three times a week. 41% (5) of Black African speaking mothers and 63% (10) of Afrikaans speaking mothers use sun protection > four times a week on their children (p=0.023).

Comparison of the behaviour of the mother to the behaviour for her children:

A cross-tabulation was done of question 9 (Do you protect your children from the sun?) and question 12 (Do you practise sun protection on yourself?). This compares personal behaviour to behaviour for children. The results were statistically significant (p=0.000).

66% (49) of mothers who protect their children from the sun also protect themselves. 75% (49) of mothers who use sun protection on themselves protect their children on a daily basis. 44% (15) of mothers who never use sun protection themselves, also never protect their children. The majority of mothers practise better sun protection on their children than on themselves (p=0.000). There is a 61% concordance in the behaviour, with 28% discordance with protection of their children and 11% discordance with self-protection.

TABLE 4.39 : PROTECTION OF CHILD / PROTECTION OF SELF

	Never (self)	1-3 times a week	4-6 times a week	Daily	Total
Never (child)	15 71.43 44.12	2 9.52 3.70	0 0.00 0.00	4 19.05 6.15	21 100.00 12.73
1-3 times a week	12 21.82 35.29	33 60.00 61.11	1 1.82 8.33	9 16.36 13.85	55 100.00 33.33
4-6 times a week	3 20.00 8.82	6 40.00 11.11	3 20.00 25.00	3 20.00 4.62	15 100.00 9.09
Daily	4 5.41 11.76	13 17.57 24.07	8 10.81 66.67	49 66.22 75.38	74 100.00 44.85
Total	34 20.61 100.00	54 32.73 100.00	12 7.27 100.00	65 39.39 100.00	165 100.00 100.00
Pearson chi2(9) = 89.0066 Pr = 0.000					

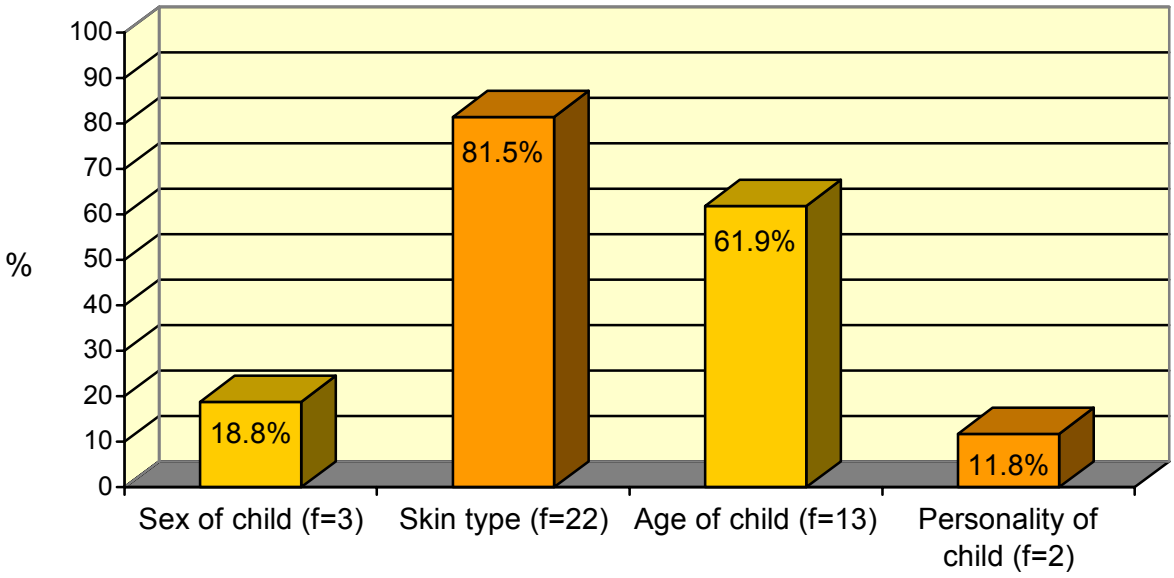
4.4.2 Mothers behaviour relating to the number of children she has

70% (129) of the respondents were mothers who have more than one child. 78.3% (101) of mothers with more than one child, practise the same sun protection methods on each child. 21.7% (28) of the mothers with more than one child, do practise different methods of sun protection on their children. In question 14 mothers were asked for the reasons why they practise different sun protection methods for each child. The respondent was asked to tick yes or no for each of the following variables:

- The child's sex
- The child's skin type
- The child's age
- The personality of the child

The chart below depicts the response.

FIGURE 4.7 : VARIABLES THAT INFLUENCE DIFFERENT USE OF SUN PROTECTION METHODS ON DIFFERENT CHILDREN



There was a significant relationship between both the English and Afrikaans speaking mothers and the choice of sun protection methods practised being influenced by the skin type of the child (p=0.003).

The majority of the married mothers' behaviour of the use of sun protection on their children, differed according to the skin type of the child. The unmarried mothers did not change their behaviour (p=0.024).

Of the mothers who have more than one child, the method of sun protection used is the same for each child in 61% (14) of the uneducated and 81% (83) of the educated mothers (p=0.033).

4.4.3 Methods and frequency of use of sun protection

TABLE 4.40 : METHODS OF SUN PROTECTION / FREQUENCY OF USE

Sun protection behaviour	Never		1-3 times a week		4-6 times a week		Daily	
	f	%	f	%	f	%	f	%
Sun block (n=142)	12	8.5	51	35.9	20	14.1	59	41.5
Hat (n=138)	10	7.2	52	37.7	21	15.2	55	39.9
Clothing (n=126)	6	4.8	25	19.8	17	13.5	78	61.9
Sun avoidance (n=112)	17	15.2	30	26.8	16	14.3	49	43.8
Sunglasses (n=96)	44	45.8	24	25	8	8.3	20	20.8

Sun block

Respondents were asked how often they applied sun block on their children. The method of application was not defined. 41.5% (59) of mothers (n=142) applied sun block to their children on a daily basis. 8.5% (12) of mothers never use sun block on their children.

Hat

Mothers were asked how often their children used a hat as a method of sun protection. Of the respondents (n=138) 39.9% (55) of children wore hats every day and 7.2% (10) of children never wore hats.

Clothing

Mothers were asked if they use clothing as a form of sun protection. Of the 126 mothers who responded, 4.8% (6) of mothers never used clothing as a method of sun protection for their children. The majority of mothers, 61.9% (78) use clothing as a form of sun protection for their children on a daily basis.

Sun avoidance behaviour

Mothers were asked if they use sun avoidance behaviour on their children. 15.2% (17) of mothers never do and 43.8% (49) of the respondents (n=112) always do.

Sunglasses

Mothers were asked if their children used sunglasses as a method of sun protection. Of the respondents (n=158) the majority, 45.8% (44) never wear sunglasses and only 20.8% (20) wear sunglasses daily. The use of sunglasses as a method of sun protection was not well utilised across all language groups (p=0.004).

64% (7) of uneducated mothers used sunglasses on their kids regularly (> four times a week), however only 26% (21) of the educated mothers used sunglasses on their children regularly (p=0.049).

4.4.4 The influence of season, weather and activities on the mother's behaviour

TABLE 4.41 : THE INFLUENCE OF EXTERNAL FACTORS ON BEHAVIOUR

	Never		1-3 times a week		4-6 times a week		Daily	
	f	%	f	%	f	%	f	%
Summer (n=158)	12	7.59	47	29.75	25	15.82	74	46.84
Winter (n=121)	70	57.85	25	20.66	10	8.26	16	13.22
On weekends (n=133)	9	6.77	26	19.55	9	6.77	89	66.92
On holiday (n=137)	4	2.92	20	14.6	8	5.84	105	76.64
Cloudy day (n=118)	45	38.14	22	18.64	14	11.86	37	31.36
Swimming (n=146)	11	7.53	22	15.07	8	5.48	105	71.92
Playing sport (n=136)	14	10.29	22	16.18	10	7.35	90	66.18
Outdoors (n=141)	16	11.35	32	22.7	14	9.93	79	56.03
Between 11–3 (n=127)	13	10.24	30	23.62	12	9.45	72	56.69

The older mothers, greater than 31, used sun protection on their children on the weekend (p=0.003), while swimming (p=0.010) and when outdoors (p=0.012) compared to the behaviour of the younger mothers.

The married mothers used sun protection daily on their children when playing sport as opposed to the unmarried mothers (p=0.049).

The use of sun protection on a daily basis and > four times a week on children while on holiday (p=0.004), while swimming (p=0.008), and while playing sport (p=0.019) was consistent in the majority of mothers in all language groups.

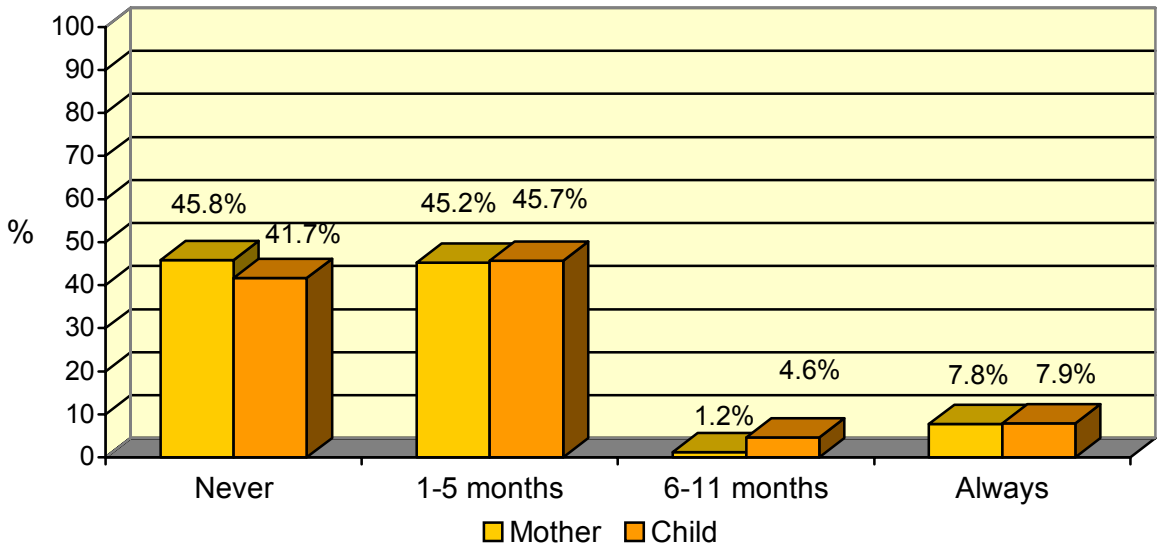
On a cloudy day, 43% (37) of mothers with smaller families, never use sun protection, and 31% (27) always use sun protection on their children. 39% (11) of mothers of bigger families use sun protection 1-3 times a week and 29% (8) of them use sun protection on their children daily when it is cloudy (p=0.016).

When children are outdoors, 62% (64) of mothers with smaller families apply sun protection daily, but only 34% (12) of mothers with bigger families do (p=0.025)

4.4.5 Frequency of the mother having a suntan vs the child having a suntan

In question 21 the researcher wanted to assess if the mother had a suntan. Of the respondents (n=166) only 7.8% (7) of mothers always had a tan and 45.8 % (76) never had a tan. 45.2% (75) of respondents only had a tan for 1-5 months of the year. When asked the same question regarding how often their children had a suntan in the last two years, 7.9% (12) of respondents (n=151) always had a tan and 41.7% (63) never had a suntan. The chart below shows the statistics and comparison of the frequencies between mother and child.

FIGURE 4.8 : HAS A SUNTAN



39% (47) of English speaking mothers and 36% (41) of their children never have a suntan. 53% (64) of English speaking mothers and 53% (60) of their children seldom have a suntan. 30% (5) of Afrikaans speaking mothers and 30% (5) of their children never have a suntan. 89% (24) of Black African mothers and 90% (17) of their children have a suntan (p=0.000).

43% (55) of educated mothers and 30% (5) of uneducated mothers have children who never have a suntan. However 35% (6) of children of uneducated mothers often (for more than six months of the year) have a suntan (p=0.010). Only 9% (12) of children of educated mothers often have a suntan.

Question 21a and 21b were compared; I have a tan vs my child/ren have a tan (p=0.000)

TABLE 4.42 : MOTHER HAS A SUNTAN / CHILD HAS A SUNTAN

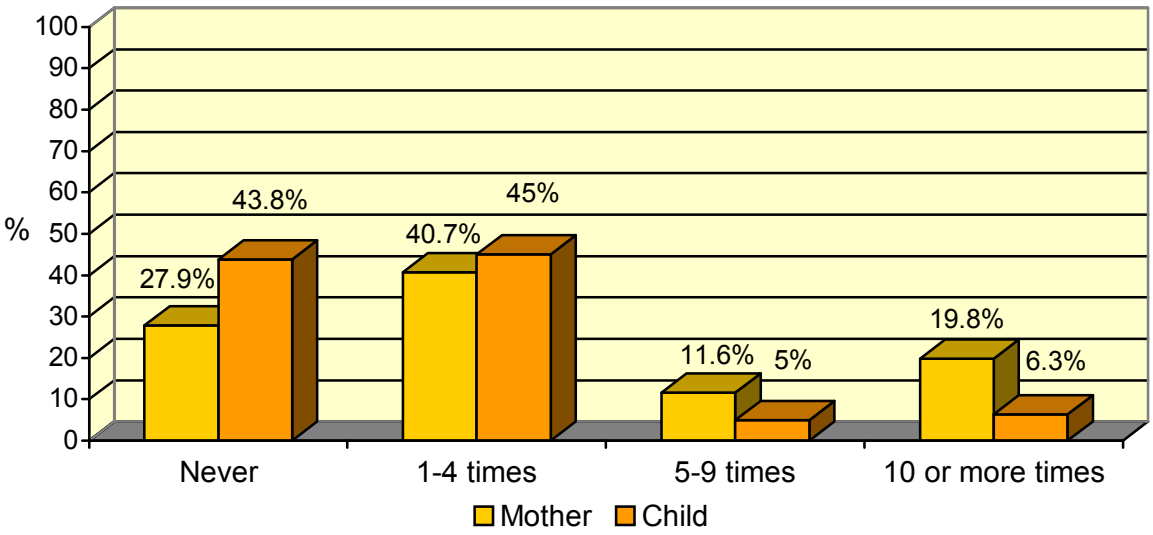
	Never (child)	Seldom	Often	Total
Never (mother)	44 68.75 70.97	18 28.13 26.09	2 3.13 12.50	64 100.00 43.54
Seldom	16 25.54 25.81	50 70.42 72.46	5 7.04 31.25	71 100.00 48.30
Often	2 16.67 3.23	1 8.33 1.45	9 75.00 56.25	12 100.00 8.16
Total	62 42.18 100.00	69 46.94 100.00	16 10.88 100.00	147 100.00 100.00
Pearson chi2(4) = 85.8640 Pr = 0.000				

69% (44) of mothers who never have a tan, have children who never have a tan and 75% (9) of mothers who often have a tan have children who often have a tan. 17% (2) of mothers who have a tan, children never have a tan and only 3% (2) of mothers who never have a tan have children who often have a tan. This result has a concordance of 71%.

4.4.6 The frequency of mother ever being sunburnt vs the child ever being sunburnt

Mothers were asked if they had ever been sunburnt and if their children had ever been sun burnt. 27.9% (48) of mothers (n=172) and 43.8% (70) of children (n=160) had never been sunburnt. Whereas 19.8% (34) of mothers and only 6.3% (10) of children had been sunburnt 10 or more times in the preceding two years. The chart below shows the frequencies of both mother and children.

FIGURE 4.9 : HAS BEEN SUNBURNT



Mothers less than 30 and between 31 and 40 years old reported that their children had never or seldom been sunburnt in the last 2 years (p=0.003), whereas 50% (22) of the older mothers, 41 years and older, said that their children had been sunburnt between five and nine times in the past two years.

50% (15) of unmarried mothers have often been sunburnt whereas 72% (102) of married mothers have never or seldom have been sunburnt in the last two years (p=0.019).

25% (5) of unmarried mothers stated that their children had often been sunburnt, whereas 92% (125) of married mothers' children had never or seldom been sunburnt in the last two years (p=0.009).

44% (55) of English speaking mothers and 51% (61) of their children have seldom been sunburnt in the last two years. 40% (50) of English speaking mothers and

only 12% (14) of their children have been sunburnt often (> five times) in the past two years. 86% (24) of Black African speaking mothers (p=0.000) and 71% (15) of their children (p=0.022) has never been sunburnt.

Question 22a and 22b were compared; I have been sunburnt vs my child/ren have been sunburnt (p=0.000)

TABLE 4.43 : MOTHER HAS BEEN SUNBURNT / CHILD HAS BEEN SUNBURNT

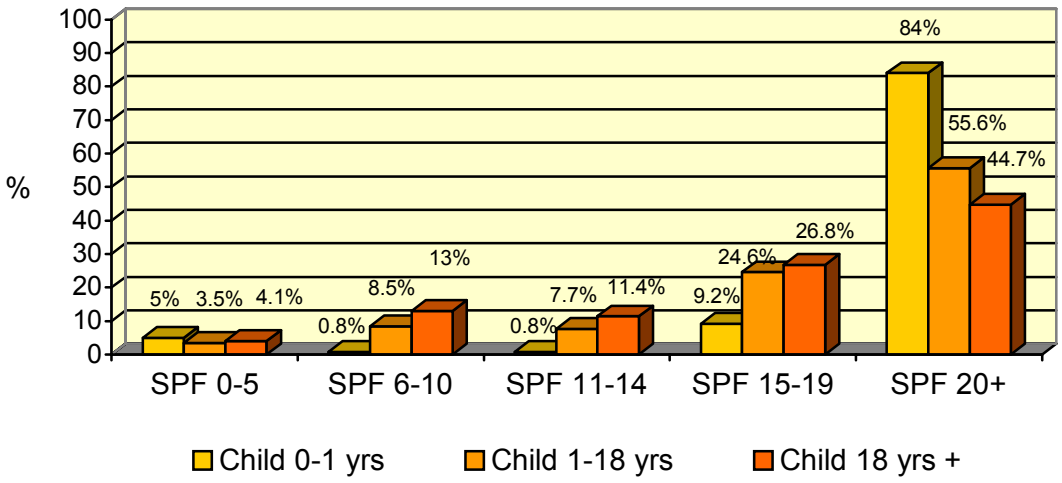
	Never (child)	Seldom	Often	Total
Never (mother)	29 76.32 42.65	6 15.79 8.33	3 7.89 17.65	38 100.00 24.20
Seldom	26 37.68 38.24	39 56.52 54.17	4 5.80 23.53	69 100.00 43.95
Often	13 26.00 19.12	27 54.00 37.50	10 20.00 58.82	50 100.00 31.85
Total	68 43.31 100.00	72 45.86 100.00	17 10.83 100.00	157 100.00 100.00
Pearson chi2(4) = 29.2462 Pr = 0.000				

76% (29) of mothers who have never been sunburnt have children that have never been sunburnt. However only 43% (29) of children who have never been sun burnt have mothers who have never been sunburnt. 20% (10) of the mothers who are often sunburnt have children that are often sunburnt and 59% (10) of children who are often sunburnt have mothers that are often sunburnt.

4.4.7 Maternal behaviour when buying a sunscreen product

This question was designed to see if the age of the child influenced the choice of sunscreen that the mother purchased. 84% (100) of mothers of children less than a year old bought factor 20 or higher, whereas 55.6% (79) of mothers of children between 1 and 18 years of age bought a sun protection factor of 20 or more. The chart below compares the frequency in each category.

FIGURE 4.10 : WHEN BUYING A SUNSCREEN, WHICH SPF IS CHOSEN FOR EACH AGE GROUP OF CHILD



Marital status did not influence the choice of sun protection factor when buying a sunscreen. 82% (13) of unmarried and 85% (97) of married mothers bought SPF > 20 for children between the ages of birth to 1 year (p=0.006).

When buying sunscreen for 0 to 1 year olds, 98% (95) of English, 86% (12) of Afrikaans and 50% (4) of Black African speaking mothers buy sun protection factor (SPF) >15, and 92% (92) of English, 87% (13) of Afrikaans, and 50% (8) of Black

African speaking mothers buy a sunscreen of SPF > 15 for children between 1 and 18 years old (p=0.000).

The majority of educated and uneducated mothers bought sunscreen with SPF> 15 for 0-1 year olds (p=0.004) and children older than 18 (p=0.003).

4.5 MATERNAL ATTITUDE

4.5.1 Maternal attitudes to the use of sun protection on their children

Using a four-point scale, four questions were asked to establish the mothers' attitude to sun protection in general.

TABLE 4.44 : ATTITUDE TO SUN PROTECTION

	Strongly agree		Agree		Disagree		Strongly disagree	
	f	%	f	%	f	%	f	%
Sun protection is a waste of time (n=143)	6	4.2	4	2.8	23	16.08	110	76.92
Sun protection is too expensive (n=154)	13	8.44	36	23.38	30	19.48	75	48.70
Sun protection is too much effort (n=145)	8	5.52	9	6.21	37	25.52	91	62.76
Sun protection is an advertising gimmick (n=145)	8	5.52	8	5.52	22	15.17	107	73.79

Sun protection is a waste of time

Of the respondents (n=143) 76.9% (110) of mothers strongly disagreed that it was a waste of time to use sun protection. See table 4.44. 2% (6) of mothers felt that sun protection was a complete a complete waste of time. Mothers of all ages disagreed that the use of sun protection on their children is a waste of time (p=0.013). 96% (109) of English speaking mothers, 94% (14) of Afrikaans speakers and 70% (9) of Black African speakers disagreed that using sun protection was a waste of time (p=0.03). 94% of educated and 92% of uneducated mothers disagreed that using sun protection on their children is a waste of time (p=0.036). 88% of mothers with bigger families and 95% of mothers with smaller families believe that sun protection of their children is not a waste of time (p=0.023)

Sun protection is too expensive

31.8% (49) of mothers (n=154) felt that sun protection was too expensive. 48.7% (75) of mothers strongly disagreed that sun protection was too expensive. See table 4.44. 76% (88) of English speakers and 80% (12) of Afrikaans speakers disagreed that sun protection is too expensive, but 83% (19) of Black African speaking mothers agreed that sun protection is too expensive (p=0.000). 50% of the uneducated mothers and 72% of educated mothers disagreed that using sun protection is too expensive (p=0.002).

Sun protection is too much effort

Only 11.7% (17) of respondents (n=145) believe that it is too much effort to protect their children from the sun. 62.8% (91) of mothers strongly disagree that it is too

much effort. See table 4.44. Mothers of all ages disagreed that the use of sun protection on their children was too much effort (p=0.034). 94% (105) of English speaking mothers and 93% (14) of Afrikaans speaking mothers disagreed that it was too much effort to protect their children from the sun. 53% (9) of Black African speaking mothers agreed that it is too much effort to use sun protection (p=0.000). 77% of uneducated and 89% of educated mothers believe that using sun protection is not too much effort (p=0.001).

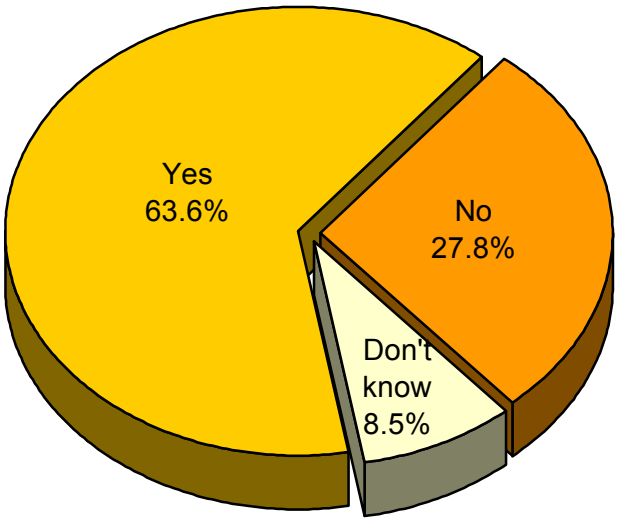
Sun protection is an advertising gimmick

89% (129) of respondents (n=145) felt that sun protection was not an advertising gimmick. Only 5.5% (8) of mothers felt that sun protection was an advertising gimmick. See table 4.44. 96% (108) of English speaking mothers and 75% (12) of Afrikaans speaking mothers disagreed that sun protection of is an advertising gimmick. 50% (8) of Black African speaking mothers agreed that sun protection is an advertising gimmick (p=0.000). 92% of educated and 64% of uneducated mothers disagreed that sun protection is an advertising gimmick (p=0.000).

4.5.2 A suntanned person looks more attractive

Of the 176 mothers who answered the question, 63.6% (112) of mothers thought that a person with a suntan looks more attractive than a person without a suntan. 27.8% (49) of mothers did not think that having a suntan was more attractive and 8.5% (15) of mothers did not know what they felt.

FIGURE 4.11 : A SUNTANNED PERSON LOOKS MORE ATTRACTIVE



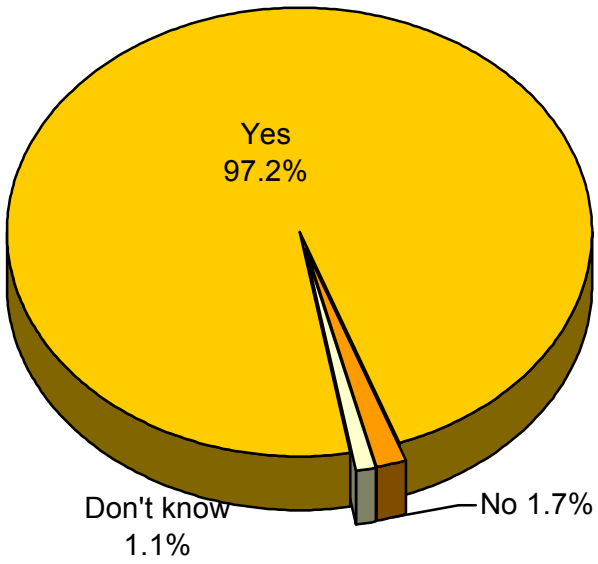
Mothers between the ages of 31 and 40 thought that a sun tanned skin looks more attractive (p=0.007). Both married and unmarried mothers think it is attractive to have a suntan (p=0.055). 48% (15) of Black African speaking mothers disagreed that a sun-tanned person looks more attractive.70% (89) of English, 94% (15) of Afrikaans and 23% (7) of Black African speaking mothers all agree that a sun tanned person looks more attractive (p=0.000).

4.5.3 Desire for more public education

Mothers were asked whether they thought there should be more eduction about sun protection and skin cancer in particular. Of the 178 responders 97.2% (173) of mothers felt that they would benefit from more public education. 1.7% (3) of mothers did not think that any more public education was required and 1.1% (2) mothers did not know what they thought about more education. 97% (143) of

educated and 93% (25) of uneducated mothers wanted to have more access to information and education about sun protection and skin cancer (p=0.046).

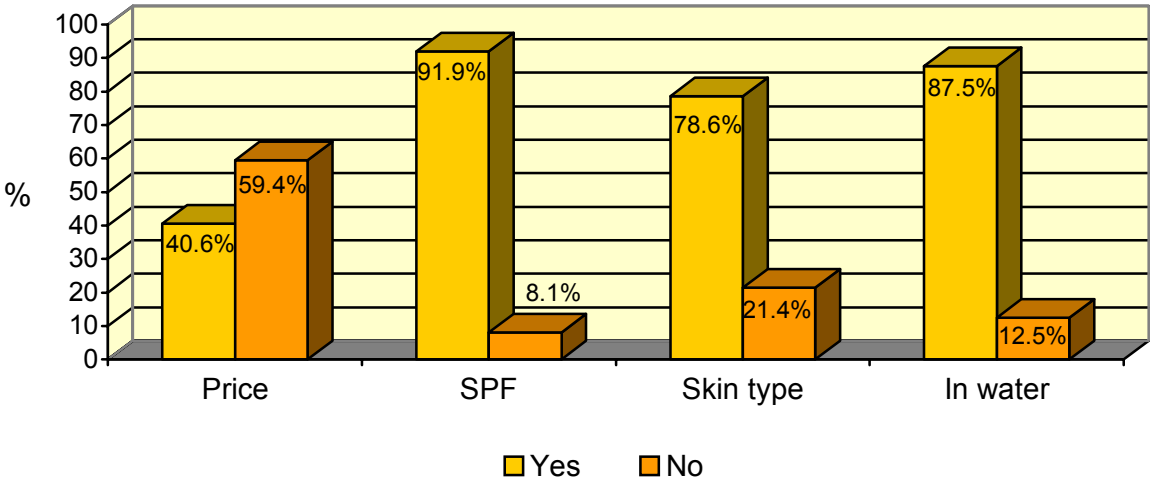
FIGURE 4.12 : SHOULD THERE BE MORE INFORMATION ABOUT SUN PROTECTION



4.5.4 Maternal considerations when buying a sunscreen

99% (137) of mothers consider the sun protective factor of the sunscreen, 79.7% (110) of mothers consider the skin type of the child that they are buying for and 91.3% (126) consider whether or not the child will be partaking in water activities when purchasing a sunscreen product. Only 40.6% (56) of the 138 respondents believed that price influenced their choice. The bar chart below shows the frequencies.

FIGURE 4.13 : WHAT INFLUENCES THE CHOICE OF PURCHASING SUNSCREEN



Married mothers were less sensitive to the price of sunscreen than the unmarried mothers (p=0.058).

92% (104) of English speaking moms and 88% (15) of Afrikaans speaking moms considered whether or not the child was doing water activities when buying a sunscreen, whereas only 46% (6) of Black African mothers considered this (p=0.000).

When buying a sunscreen 94% (123) of educated and 71% (10) of uneducated mothers considered the SPF number (p=0.004).

CHAPTER 5 – DISCUSSION

5.1 PROFILE OF THE RESPONDENTS

This research report study was conducted on 184 mothers who were predominantly English speaking, married, between the ages of 31 and 40, and from the Northern suburbs of Johannesburg. The sample was a highly educated group of women who mostly attained a tertiary level of education. People with a higher level of education are more aware of the dangers of over-exposure to the sun and are more likely to report sun protection behaviour[14]. This is similar to findings in other areas of behavioural health research, where educated people are more likely to be aware of the health risks associated with their behaviour[14]. Bourke *et al* found a peak of knowledge awareness in people between the ages of 35 and 40[31].

The average family had 1.8 children and the sex distribution of 49% boys and 51% girls. The majority of the children were between 5 and 11 years old, the age where parents still have an influential role on childhood behaviour. 25% of the children were teenagers, whose behaviour is more influenced by social image and peer pressure. Knowledge based methods to change adolescents' sun tanning attitudes and behaviour have limited effectiveness[24].

In the Johnson study[11] there were 77 responses, of which most caregivers were highly educated women. The average age of the children was 5,8 years, the

ethnicity was more diverse, with 55% White, 26% African-American, 15% Hispanic and 4% other, and the 35% were nonurban. The researcher did not distinguish between urban and nonurban in this research, therefore the influence of city life could not be analysed.

Although four different areas were used in order to accommodate mothers from different ethnic and socio-economic groups, the study was conducted in private health care facilities. This would imply that all participants could afford private health care. The poor response rates from the Johannesburg city centre practice (19.1%) and the Alberton practice (18.6%) precluded comparing the results by area and socio-economic status. The poor response rate may be due to a lack of interest, or unwillingness of the receptionists to help. It could be that the mothers were not interested in the topic of sun protection, that they did not have the time, that they were illiterate or that an English questionnaire intimidated them. 71.4% of respondents spoke English as a home language.

On a busy day at the practice, the next appropriate mother may not have been chosen, as the receptionist may have been too busy to ask the mother if she was willing to participate in the study. On a quiet day at the practice, the patient may not have had to wait in the waiting room before seeing the doctor and therefore would not be included in the study. If the receptionist did not know the female, she may have been intimidated or embarrassed to ask if they were a mother and therefore they may have been excluded from the study. The receptionists did not keep an accurate record of the nonrespondents, as they said it was too difficult to keep track of, and they used the excuse of being too busy.

5.2 ATTITUDES

Mothers' attitude towards sun protection was positive. 94% of mothers disagreed that it was a waste of time to use sun protection. 68% of mothers disagreed that sun protection is too expensive, however 83% of Black African speaking mothers agreed that sun protection usage was too expensive. This result may not be generalisable to the general population as the sample represents a high socio-economic group in the English and Afrikaans speaking mothers. From the cross-tabulations it is evident that the attitudes of the Black African speaking mothers believe that sun protection is too expensive (83%), it is too much effort to use (53%) and that it is perceived as an advertising gimmick (50%). From these results the researcher suggests that specific education needs to be done in the Black African speaking and reading press to change the knowledge and therefore the attitude toward sun protection. However due to small numbers, although statistically significant, it may not be generalisable to the Black population.

94% of English and 93% Afrikaans speaking mothers are motivated to use sun protection, as they do not believe it is too much effort. The fact that 96% of English speaking mothers and 75% of Afrikaans speaking mothers do not believe that the use of sun protection is a marketing advertising gimmick, correlates with a good knowledge and awareness of the advantages of sun protection. Grob *et al* in the study of sunbathing habits of children and adolescents, found that the majority of mothers were well informed, but they considered the hazards of sun exposure to be over exaggerated by the media[33]. Despite the knowledge of the harmful effects of the sun being good, 97.2% (173) of mothers still wanted more education

regarding sun protection and particularly skin cancer. This represents a willingness to improve preventative behaviour.

By far the biggest obstacle to attaining good sun protection behaviour is the fact that 64% (112) of mothers believe that a person with a suntan looks more attractive than a person without a suntan. Johnson *et al* also demonstrated that the majority of caregivers believe that children look healthier with a suntan[11]. 81% of the ADD survey respondents think that they look healthier and better after having been out in the sun[43]. On cross-tabulation, 48% (n=15) of the Black African speaking mothers disagree that a suntanned person looks more attractive. This may represent a cultural difference in the definition of attractive.

5.3 SOURCE OF KNOWLEDGE

Mothers attain their knowledge of sun protection from magazines (70.5%) and television (56.8%). This finding is consistent with the influence of media as seen in Bourke's research in Leicester[31] where newspapers and magazines were cited as the most common source of information regarding melanoma. Why are the primary care doctors, nurses and pharmacists not seen as a source of attaining knowledge? The researcher questions if the primary care providers are not interested in preventative measures and education or do they just not have enough time? In a study in Queensland to describe the response of general practitioners during a National Skin Cancer Awareness Week, GPs regarded skin checking as the responsibility of the patient. 90% of skin checks were initiated by

the patient, and 70% of GPs considered it over servicing or inappropriate to initiate skin checks on patients that came to the doctor for other reasons. Full skin checks were regarded appropriate for high risk patients. 50% of GPs in the study were reluctant to make a comment about primary preventative activities, even if the patient came in with sunburn (10). The knowledge attained by these mothers from magazines and television is adequate, however the doctor, nurse and/or pharmacist may have a greater role in influencing intention to have a suntan and therefore influence behaviour.

Johnson *et al* described that 14.3% of caregivers use sun protection because the doctor recommended it, and 1% because of information that the caregiver had received from school[11]. Davey *et al* concluded that physician sun protection counselling, while infrequently reported, was associated with more favourable sun protection knowledge, attitudes and self reported behaviours of caretakers and their children[46].

5.4 KNOWLEDGE

The majority of mothers volunteered a sunscreen (81.4%) and a sunhat (51.4%) as methods of sun protection in an open-ended question. 67% of respondents in the Johnson study used sunscreen as sun protection[11]. In the Grob study, the use of sunscreen did not correlate with the social class of the parent, and the main reason for using sunscreen was to protect from sunburn[33]. Mothers' knowledge of the harmful effect of the sun is excellent (76%). Of the 11.6% of mothers, who

believe that sun exposure is healthy, 50% are Black African speaking mothers. 41% of caregivers in the Johnson study believe that sun exposure is healthy for a child[11]. According to Grob, the main reason that mothers exposed their children to the sun is for good health[33].

96.4% of mothers know about skin cancer and 66.1% of mothers know the causal link of sun exposure and skin cancer. However 35.4% of mothers believe that having a suntan can be healthy and 40% of mothers believe that it is safe to tan slowly. 52.4% of mothers know some one who has skin cancer. Knowing some one with skin cancer did not increase the use of sun protection in this study. Hall *et al* found in the National Health Interview Survey there was a significant relationship between sun protection and a personal history of skin cancer[47]. Intentions to protect from the sun through the use of sun protection has been shown to be predicted by knowledge of the negative effects of the sun on the skin, skin type, previous experience with skin cancer and attitudes to sun tanning. The intention to get a suntan therefore actually predicts actual sun protective behaviours[21], and the intention was not questioned in this study.

There is a good knowledge of the difference in sun exposure and the effects; depending on the type of skin type the child has (65.2%), which correlates with better sun protection behaviour in children with fair skin.

In the cross-tabulation of question 11 and question 17, i.e. comparing the effect of sun exposure (knowledge) with behaviour in specific situations, a few interesting questions were postulated from the results.

Of the 6% of mothers who never use sun protection on their children on the weekends, 75% know that sun exposure is harmful. Why are they not using sun protection? Are their children not in the sun on the weekend, or do they not believe that the sun protection methods work?

62% of mothers who think that sun exposure is healthy still use sun protection on their children daily when they swim. This is postulated to prevent sunburn and the immediate discomforts of sun exposure.

Of the mothers that believe that the sun is harmful, 45% use sun protection on their children daily, 12% use sun protection between 4-6 times a week, 34% 1-3 times a week and 9% never use sun protection on their children (p=0.065). If mothers know that the sun is harmful, why are these 9% of mothers not using sun protection? This is an opportunity for further research. Possible reasons include: The child is not in the sun, the methods are too expensive, the child refuses, there is no faith in the efficacy of the product, or for reasons we are unaware of.

Despite knowledge that sun exposure and sunburn in childhood causes sun-damaged skin, 34% of mothers had been personally sunburnt 5 times in the past 2 years. Only 6.4% of children had been sunburnt in the last 2 years in this study as compared to 28% in the Johnson study[11]. This may be due to a different definition of sunburn as apposed to better sun protection methods in the researcher's sample. Jarret *et al* in a paediatric clinic in Sunderland found that 38% of children had been sunburnt in the previous year[32]. This correlates with Campbell *et al*, who found that only 45% of Alberta adults believed that sun exposure affected their

own risk of developing cancer[34]. The ADD study reported that 55% of people surveyed reported having a tan in the past year[43]. In the regional survey, 15% of children wanted a suntan, and of those that had a tan, 43% had started an interest in having a suntan by eight years old. 8% of children had begun to sunbathe, of which 51% first expressed their interest by the age of eight[48].

These results are consistent with findings across studies. Many people show a high level of knowledge of the dangers of excessive sun exposure and the need for sun protection, however, this knowledge often does not transfer into behaviour, particularly adolescents, still desiring and actively seeking a suntan[14]. Livingston *et al* concluded in their study of adolescence, that over 80% knew about the issues of skin cancer prevention, frequency of burning and burning through cloud, and there had been a shift in attitude towards use of shade and sun avoidance over the period of 1993 to 1996[39].

5.5 BEHAVIOUR

There was a significant correlation between personal behaviour of the mother and behaviour of the use of sun protection on their children. Studies verify that children's use of sun protection correlates with their parent's use of sun protection[11]. 46.8% of mothers used sun protection on themselves more than 4 times a week. 53.5% of mothers use sun protection on their children more than 4 times a week. This is consistent with results from the Johnson study where 42.9% of respondents used sun protection on their children either usually or always[11].

The ADD reported that 90% of respondents always or sometimes wear sunscreen; this is much higher than the surveys done in the rest of the world[43].

Of the 22.3% of mothers who never use sun protection on themselves, and the 12.9% that never use sun protection on their children, a large percentage could be dark skinned. Mothers that believe that the sun is harmful do practice sun protection on their children; there is a correlation between knowledge and behaviour in this group of mothers. Despite knowledge, mothers and children are still getting sunburnt. Fewer children get sunburnt than mothers. The behaviour is driven by the desire to avoid acute effects of the sunburn (that is pain, sunstroke, dehydration, and headache) and to avoid skin cancer in adulthood. The ADD survey revealed that more than 80% of adults believe that they use sunscreen to tan without burning[43].

Johnson reported that the most common reasons for using sunscreen in their study were cited as: the prevention of sunburn (71.4%): the prevention of skin cancer (53.5%): and prevention of premature skin aging (28.6%). Almost half of the respondents in the Johnson study allowed their children to stay in the sun for longer periods of time because of the use of sunscreen[11]. Unfortunately the use of sunscreen prevents sunburn, but may lead to increase overall exposure to the sun. Therefore there is an associated greater development of naevi as a result of increased length of sun exposure. The use of sun avoidance and the wearing of sun protective clothing need to be equally emphasized[11]. In the regional survey, three top barriers for parents who protect their children from the sun:[48]

- it is unrealistic to always avoid the sun (27%)
- it is easy to forget to apply sunscreen (24%)
- my child does not always want to co-operate with sun protection efforts (17%)

People believe that skin cancer is a disease of the elderly and therefore they will not get it for at least another 20 to 30 years, if at all[14]. Because 10 to 15 years is the most distant practical time frame that is salient to most people, people's current beliefs on skin cancer puts the time frame beyond their practical limits for concern and action. For people to begin to change their sun protective behaviour it is necessary to reduce the time frame that they associate with the consequences of over-exposure to the sun, increase the urgency of the message on the dangers of the sun and demonstrate the existence of virtually immediate rewards for covering up when in the sun. The size of the reward does not appear to be as important as the immediacy of the reward[14].

If there is no sun exposure and an indoor lifestyle, then this is a valid reason for mothers not to use sun protection. For some people the sun protection products are too expensive. Some mothers volunteered that sun protection was not being used because the child did not want to. The researcher proposes that this should not be the child's decision and that sun protection should be obligatory, and receive the same importance as wearing a seatbelt.

Sun blocks, hats, and clothing were the daily methods used for sun protection of children. Sun avoidance was not stated as a method used. This might be because

it is not a conscious method of sun protection, or the unavailability of shade structures. This is consistent with Shoveller's results where only 5% of children used shaded areas that were provided under trees and umbrellas at public beaches[38]. Sunglasses may not be used as it is seen as an adult accessory, too expensive for children and too difficult for children to look after. The role of sunglasses in the protection of the ultra violet damage to the retina and the development of cataracts and pterygiums needs to be more publicly advertised and recommended by the media and the health care professionals. The use of sunglasses in children was higher in the uneducated mothers than the educated mothers. This could be due to the influence of image and appearance rather than knowledge.

The practice of sun protection methods in summer (62.6%), on weekends (73.7%), on holiday (82.4%), when swimming (77.4%), playing sport (73.6%), and outdoors (65.9%) was used more than 4 times a week. This does not correlate with the frequency of sun protection use as a general question (53.5%). Are the mothers over exaggerating their behaviour when asked in a specific situation or was their initial valuation of how often they use sun protection more accurate? This may be a reflection of what the mothers think they should be doing as apposed to what they actually are doing. Mothers in this study are not using sun protection on cloudy days. Education is required about ultra violet sun damage that occurs through clouds. Campbell and Birdsell confirm that sun related behaviour is highly context dependent (34). 69.8% of mothers used sunscreen on their children when going to the beach in a survey in Florida[41].

Mothers' behaviour if they have more than one child was usually the same for each child (78.3%). This could be a convenience factor. The child's age and skin type were the two variables that altered the mothers' behaviour. The younger the child the more responsible the mother feels for the sun protection, this differed from the Johnson study, which did not alter behaviour depending on the age of the child[11].

Australian, American and European studies have found sun protection generally to be higher in infants and young children than in older children[17]. The skin type of the child correlates with the knowledge that sun damage to fair skinned children is more dangerous than dark skinned children. The use of sun protection on a daily basis was better in smaller families than larger families. This may be due to cost or that it is more time consuming to put sun protection cream on a bigger family. The sex of the child did not alter the mothers' behaviour. The researcher thought that vanity and skin damage in later life in the female children may be influential. The personality of the child was not stated as a reason for the use of different sun protection methods being used. From a practical point of view the researcher thought that the rebellious teenager or the difficult two-year-old child might influence behaviour. Older mothers (greater than 31 years old) were more vigilant with sun protection on the weekend, while swimming and while playing outdoors, which could be due to maturity or knowledge. The older mothers use sun protection more because they want to prevent sunburn and they have a greater knowledge of the association of sun exposure and basal cell carcinoma. 50% of mothers over 41 reported that their child had been sunburnt as opposed to the mothers less than 40 reporting their children had never or seldom had sunburn.

Are the older mothers more honest or are they less careful or less aware? The researcher proposes more honest. In the Johnson study, the older the caregiver, the better the level and practice of sun protection behaviour[11]. Knowledge has been shown to affect self-reported behaviour, however it appears that people may exaggerate the amount of sun protective behaviour they are actually using[22]. Bennett *et al* found that children's observed sun protection behaviour was less than the sun protection behaviour that the children reported[22].

There were no significant differences in behaviour of mothers in the different language groups depending on the activities that the children were doing or the weather. The use of sun protection in the black African speakers was less than 3 times a week compared to the English and Afrikaans speakers using sun protection more than 4 times a week. This correlates with the knowledge that dark skinned people are at less risk than fair skinned people. African-Americans, Aborigines and other dark skinned groups are at lower risk of developing skin cancer because their melanocytes, located in the dermal layer of the skin, are able to produce more melanin than the melanocytes of Caucasians[19]. This produces a darker skin colour and also provides increased protection from the harmful effects of ultra-violet radiation exposure. 71 % of the Black African speakers' children had never been sunburnt and 86% of the mothers had never been sunburnt. An equal amount of Black African speakers never use sun protection daily as use sun protection on a daily basis. This could be a conscious decision or may be due to the fact that a lot of adult moisturisers now contain a sun protection factor in the cream.

Married mothers were more diligent about the prevention of sunburn in their children. 25% of the unmarried mothers said that their child had been sunburnt as apposed to 92% of the married mothers saying their child had never been sunburnt. 50% of unmarried mothers often have a suntan, which correlates with the response that a suntanned person looks more attractive. 72% of married mothers never have a suntan.

5.6 PURCHASE OF SUNSCREEN

The age, marital status, level of education and language group of the mother did not influence the choice of sunscreen purchase. The purchase was influenced by the age of the child, which correlates with the knowledge that the sun protection factor must be greater than 15.

The majority of English and Afrikaans speaking mothers considered water activities when buying a sunscreen, however only 46% of the Black African language speakers considered water activities when buying a sunscreen. These children may not be doing water activities, or the mothers may not feel this is an important differentiating feature. Is the effect of water on sunscreen known, and do mothers and children know that re-application is necessary?

CHAPTER 6 – CONCLUSION

By establishing mother's attitudes to sun exposure, it will give primary health care workers insight into what educational programmes are required to try and influence behaviour and thereby decrease the incidence of skin cancer in future generations.

Sunscreen and sun hat were the two methods of sun protection used by mothers and sun avoidance behaviour was under utilised. The majority of the mothers knew that sun exposure is harmful to the body. These mothers use sun protection on their children on a daily basis, especially when they are playing outdoors, on the weekends and on holiday. Only 31.5% (56) of mothers believes that it is not safe to tan slowly. Mothers said they get their information from magazines and from the television. 66.1% (117) of mothers knew of the relationship between sun exposure in childhood and the development of skin cancer in adulthood, with the majority of mothers actually knowing the different types of skin cancers. 23% (34) of mothers who believe that sun exposure and sun burn causes sun-damaged skin have never been sun burnt in the last 2 years. Knowing someone with skin cancer does not increase the usage of sun protection. 22.3% (39) of mothers never practise sun protection methods on themselves. 39.4% (69) of mothers protect themselves from sun exposure on a daily basis. 12.9% (22) of respondents (n=170) never practised sun protection on their children and 44.1% (75) of mothers who responded, practised sun protection methods on a daily basis.

Three main reasons for using sun protection on their children in this study were skin cancer, sunburn, and having a fair skin.

Three main reasons for mothers not using sun protection on their children were:

- the children do not want to
- the children are indoors and do not therefore have sun exposure
- the products are too expensive.

66% (49) of mothers who protect their children from the sun also protect themselves. 75% (49) of mothers who use sun protection on themselves protect their children on a daily basis. 44% (15) of mothers who never use sun protection themselves, also never protect their children. The majority of mothers practise better sun protection on their children, than on themselves. 78.3% (101) of mothers with more than one child, practise the same sun protection methods on each child.

45.8 % (76) of mothers never had a tan. 41.7% (63) of children never had a suntan. 69% (44) of mothers who never have a tan, have children who never have a tan and 75% (9) of mothers who often have a tan have children who often have a tan. 17% (2) of mothers who have a tan, children never have a tan and only 3% (2) of mothers who never have a tan have children who often have a tan. In this study there was a significant correlation between the mother and the child having a suntan.

I have been sunburnt versus my child\ren have been sunburnt (p=0.000). 76% (29) of mothers who have never been sunburnt have children that have never been sunburnt. However only 43% (29) of children who have never been sun burnt have mothers who have never been sunburnt. 20% (10) of the mothers who are often sunburnt have children that are often sunburnt and 59% (10) of children who are often sunburnt have mothers that are often sunburnt. In this study there was a significant correlation between the mother and the child being sunburnt.

84% (100) of mothers of children less than a year old bought factor 20 or higher, whereas only 55.6% (79) of mothers of children between 1 and 18 years of age bought a sun protection factor of 20 or more.76.9% (110) of mothers strongly disagreed that it was a waste of time to use sun protection. 31.8% (49) of mothers (n=154) felt that sun protection was too expensive.

Only 11.7% (17) of respondents (n=145) believe that it is too much effort to protect their children from the sun.89% (129) of respondents (n=145) felt that sun protection was not an advertising gimmick. 63.6% (112) of mothers thought that a person with a suntan looks more attractive than a person without a suntan.

97.2% (173) of mothers felt that they would benefit from more public education. 99% (137) of mothers consider the sun protective factor of the sunscreen, 79.7% (110) of mothers consider the skin type of the child that they are buying for and 91.3% (126) consider whether or not the child will be partaking in water activities when purchasing a sunscreen product. Only 40.6% (56) of the 138 respondents believed that price influenced their choice. The intention to get a suntan predicts

actual sun protective behaviours[21], and the intention was not questioned in this study.

There is a good knowledge of the difference in sun exposure and the effects; depending on the type of skin type the child has (65.2%), which correlates with better sun protection behaviour in children with fair skin.

Of the mothers that believe that the sun is harmful, 45% (54) use sun protection on their children daily, 12% (15) use sun protection between 4-6 times a week, 34% (41) 1-3 times a week and 9% (11) never use sun protection on their children (p=0.065). If the knowledge that the sun is harmful, why are these 9% of mothers not using sun protection? This is an opportunity for further research. The child is not in the sun, the methods are too expensive, the child refuses, there is no faith in the efficacy of the product, or for reasons we are unaware of.

The relationship between knowledge and behaviour, for use of sun protection methods is good in this group of mothers, which is not consistent with the literature, which shows a disparity between knowledge and behaviour. The disparity between sun protection behaviour reported and the high incidence of sunburn both for mothers and children is worrying, as the point of avoiding long term cancers has been missed. Unreliability of self-reporting behaviour may be worse than estimated. The reason generally for good sun protection behaviour of children is to protect against sunburn, skin cancer, heat stroke and headaches.

RECOMMENDATIONS

Opportunities for further research in South Africa:

- Do doctors believe that it is their role to educate the public regarding sun protection?
- Do doctors only educate about prevention once the patient has a complication of sun exposure? (i.e. sun burn, sunstroke, cancer)
- Are sun protective techniques being used correctly?
- Statistics on whether people are using sun tanning lamps and studios
- Do people intend to get a suntan?
- To study the perception of susceptibility and the behavioural intention

Emphasis needs to be placed on the education of mothers and children regarding sun exposure, sunburn and the causal link with cancer. Parents need to get involved at a school level in order to influence sun protection measures. For example, covered areas for children to sit at sports events, trees and shade in the playgrounds at break, encouraging sport and physical outdoor activities not between 11am and 3pm, and the compulsory wearing of hats.

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APPENDIX A – QUESTIONNAIRE

QUESTIONNAIRE

Please tick the appropriate box or boxes, and fill in the answer or answers where applicable.

1. What is your age in years? .....

2. What is your current marital status? Please tick the correct box.

Status	**Single (S)**	**Married (M)**	**Divorced(D)**	**Separated(P)**	**Widow (W)**
Tick					

3. What language do you speak at home? Please tick the correct box.

Language	**English (E)**	**Afrikaans (A)**	**Black (B)**	**Other:State (O)**
Please tick				

4. What is the highest standard of school education that you have passed? STD .....

5.Have you passed any tertiary education after school? Please tick the correct box. .

a) Technikon Diploma	
b) University Degree	

6. How many children do you have? .....

7. Please fill in the number of children you have in the correct age and sex group.

Age group	**Sex**	**Number of children**
7.1) 0-18 months	Male	
7.2) 0-18 months	Female	
7.3) 19 months-4 years	Male	
7.4) 19 months-4 years	Female	
7.5) 5-11 years	Male	
7.6) 5-11 years	Female	
7.7) 12-18 years	Male	
7.8) 12-18 years	Female	

8.What are the ways that you know about, or have heard of, to protect skin against the sun? Please list.

.....

.....

.....

.....

9. How often, if ever, do you protect your child/ren from the sun? Please tick the correct box.

How often	**Never** (N)	**1-3time/week**(S)	**4-6time/week**(O)	**Every day** (D)
Please tick				

10a) If you use sun protection on your child/ren, what is the reason/s for this?

.....

.....

10b) If you do not use sun protection on your child/ren, what is the reason/s for this?

.....

.....

11. In your opinion, what is the effect of sun exposure to the body? Please tick only **one** option.

a) Very healthy	
b) Healthy	
c) Neither healthy nor harmful	
d) Harmful	
e) Very harmful	

12. Do you practise sun protection on yourself? Please tick the relevant box.

Never (N)	**1-3 times/ week** (S)	**4-6 times/ week** (O)	**Every day** (D)

13. If you have more than one child, is the choice of method of sun protection that you use different for each child? **Y)** Yes..... **N)** No .....

14. If your answer to 13 is yes, why do you practise different methods of sun protection on your children? Please tick yes or no **for each option**.

	Yes (Y)	**No** (N)
a) the child's sex?		
b) the child's skin type?		
c) the child's age?		
d) the child's personality?		

e) list any other reason?.....

.....

15. Is it safe to tan slowly ? Please tick the correct box.

Yes (Y)	No (N)	I do not know (K)

16. Which of the following sun protection methods do you use on your child/ren? Please tick the correct box **for each option**.

	Never (N)	**1-3time/week**(S)	**4-6time/week**(O)	**Every day** (D)
a) Sunblock				
b) Hat				
c) Clothing				
d) Keep out of the sun				
e) Sunglasses				

17. In each situation, a to i, how often do you use sun protection on your child/ren? Please tick the correct box for **each option a to i inclusive.**

	Never (N)	**1-3time/week**(S)	**4-6time/week**(O)	Every day (D)
a) Summer				
b) Winter				
c) On weekends				
d) On holiday				
e) Cloudy day				
f) Swimming				
g) Playing sport				
h) Outdoors				
i) At 11am-3pm				

18. How do you feel about using sun protection on your child/ren? Please tick the correct box for **each option a to d**.

	Strongly agree (Y)	**Agree** (A)	**Disagree** (D)	**Strongly disagree** (N)
a) It is a waste of time				
b) It is too expensive				
c) It is too much effort				
d) It is an advertising gimic				

19. Where do you get your knowledge of sun protection from? Tick **one or more** options:

a)Doctor	d)Radio	g)Newspaper	j)Books
b)Pharmacist	e)Television	h)Teacher	k)Others (State)
c)Nurse	f)Magazines	i)Friend	

20. Which of the following best describes how you feel about the following statements? Please answer **each** question with a tick.

a) Sun exposure and sunburn in childhood causes skin cancer in adulthood?

Yes (Y)	No(N)	I do not know (K)

b) Sun exposure and sunburn in childhood causes sun damaged skin (i.e. wrinkling, sagging, and blotchiness) in adulthood?

Yes (Y)	No (N)	I do not know (K)

c) Sun exposure for fair children is more dangerous than sun exposure for dark children?

Yes (Y)	No(N)	I do not know (K)

d) A sun-tanned person looks more attractive?

Yes (Y)	No (N)	I do not know (K)

e) There is such a thing as a healthy sun tan?

Yes (Y)	No (N)	I do not know (K)

21. Please tick the appropriate box for **each** statement: (applicable to the last 2 years)

	Never (N)	**1-5months/year**(S)	**6-11months/year** (O)	**Always** (A)
a) I have a tan				
b) My child/ren have a tan				

22. Please tick the appropriate box for **each** statement: (applicable to the last 2 years)

	Never (N)	**1-4 times (1)**	**5-9 times (5)**	**10 or >times (10)**
a) I have been sunburnt				
b) My child/ren have been sunburnt				

23. Do you think that more public education about sun protection and skin cancer is necessary?

Yes (Y)	No (N)	I do not know (K)

24. When buying a sunscreen product, which SPF (sun protection factor) would you choose? Please tick the correct box for **each** age category a to c.

	0-5 (0)	6-10 (6)	11-14 (11)	15-19 (15)	20 or > (20)
a) 0-1 year					
b) 1-18years					
c) >18years					

25. What do you consider when buying a sunscreen? Please tick yes or no for **each option** a to d.

	Yes (Y)	**No (N)**
a) the price?		
b) the SPF (sun protection factor) number?		
c) the type of skin of the child you are buying for?		
d) if the child will be using it for water activities?		

26. Have you ever heard of : Please tick yes or no for **each option** a to e.

	Yes (Y)	**No (N)**
a) Solar keratosis (sunspots)		
b) Rodent ulcer (basal cell carcinoma)		
c) Skin cancer		
d) Squamous cell carcinoma		
e) Melanoma		

27.a) Do you personally know anyone who has been treated for skin cancer?
Yes (Y): ..... **No** (N): .....

b) If your answer to 27a above is yes, what is your relationship to this person?

	Yes (Y)	**No (N)**
1) Myself		
2) A friend		
3) A relative		
4) A colleague or aquaintance		

I would appreciate any additional comments,feedback or questions on the questionnaire and topic of sun protection.

.....
.....
.....
.....

THANK YOU!

APPENDIX B – ETHICS CLEARANCE CERTIFICATE

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Division of the Deputy Registrar (Research)

COMMITTEE FOR RESEARCH ON HUMAN SUBJECTS (MEDICAL)
Ref: R14/49 Handelsman

CLEARANCE CERTIFICATE PROTOCOL NUMBER M 950924

PROJECT	Sun protection of children-maternal attitudes, knowledge & behaviour
INVESTIGATORS	Dr S M Handelsman
DEPARTMENT	Family Medicine, Private Practice
DATE CONSIDERED	950929

DECISION OF THE COMMITTEE *

Approved unconditionally

DATE 951004

CHAIRMAN. .....pp (Professor P E Cleaton-Jones)

* Guidelines for written "informed consent" attached where applicable.

c c Supervisor: Dr R Weiss
Dept of Dermatology,

==========

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10001, 10th Floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee.

DATE 1/11/1995 SIGNATURE .....

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Faculty of Health Sciences
UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
7 York Road, Parktown, 2193 South Africa · Telegrams 'Witsmed' · Telephone (011) 647-1111 · Fax: (011) 643-4318

Student No: 83-25808
Degree: MFamMed

27 November 1995

Dr S M Handelsman
17 Edgewood Avenue
BIRDHAVEN
2196

Dear Dr Handelsman

APPROVAL OF PROTOCOL ENTITLED "SUN PROTECTION OF CHILDREN - MATERNAL ATTITUDES, KNOWLEDGE AND BEHAVIOUR"

I should like to advise you that the protocol that you have submitted for the degree of MFamMed has been approved by the Postgraduate Committee at its recent meeting, for continuation of candidature, (subject to ethics approval being obtained).

Dr A Wright of the Department of Family Medicine and Dr R Weiss of the Department of Medicine have been appointed as your supervisors. You are asked to maintain regular contact with your supervisors who must be kept advised of your progress.

Please note that all candidates for higher degrees must make reference in their research reports to the clearance number of the relevant ethics committee. The final title should comply with the above approved title, and a signed declaration, noting that the work has been your own and not submitted to any other University, must also be included.

Yours sincerely,

MRS G GABRIEL
FACULTY OFFICER (POSTGRADUATE)
FACULTY OF HEALTH SCIENCES

The University of the Witwatersrand rejects racism and racial segregation. It is committed to non-discrimination particularly in the constitution of its student body, in the selection and promotion of its staff, and in its administration.

APPENDIX C – INTRODUCTORY LETTER

Susan Handelsman
74-12th Street
Parkhurst
2193
788-3404

Dear Participant,

My name is Dr Susan Handelsman. I am conducting a research report as part of a requirement for my Masters Degree in Family Medicine at the University of Witwatersrand. My field of interest is sun protection of children.

This questionnaire is to help me understand and research what mothers know about sun exposure and sun protection and what methods are being used. If you are a mother of one or more children, 18 years old or younger, I would appreciate your help by filling in this questionnaire. All your answers will be strictly confidential and anonymous, so the receptionists and doctors will not know who filled in the questionnaires or what you answered.

The questionnaire will take less than 10 minutes to complete. Most questions are answered by ticking the box that applies to your answer. Participation is voluntary, please make every effort to complete the questionnaire, but feel free to leave out or discontinue participation at any time. When you have completed the questionnaire please put it in the sealed box. Please ask the receptionist for an information booklet on sun protection. If you have any questions about sun protection, please feel free to ask me or your family practitioner.

Thank you for your time and contribution. Without your help this research would not be possible. If you are interested, the results of my survey will be available from the receptionist on request

Thanking you,

Susan Handelsman.