

# THE KNOWLEDGE AND AWARENESS OF SUNSCREEN USE AMONGST SOMATOLOGISTS IN BLOEMFONTEIN

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## Abstract

Sunscreen lotions are the skins protection against sunburn. Even though this sounds like a simple fact, somatologists appear to know remarkably little about the usage, ingredients present and their adverse effects on the skin. In the South African Association of Health and Skincare Professionals (SAAHSP) accredited salons of Bloemfontein, 43 somatologists were tested by means of questionnaires in order to determine their awareness and knowledge regarding sunscreen usage, the ingredients in the lotions and their adverse effects. The results were statistically analysed by means of frequencies and percentages which proved that more than half (58%) of somatologists use sunscreen daily, but do not have the knowledge or awareness of toxic ingredients found in these products. In conclusion, most Somatologists in Bloemfontein are not fully equipped with the knowledge surrounding sunscreens in order for them to provide adequate information to their clients. It is recommended that information regarding sunscreens should be included as a higher priority in the professional product house training including the Somatology curriculum.

**Keywords:** Sunscreen use; somatology training

## 1. INTRODUCTION

A perfect suntan is more often than not associated with good health and an active lifestyle; however, such a suntan has no health benefits and is a serious health risk. Small amounts of exposure to ultra violet A (UVA) and ultra violet B (UVB) light can cause skin alteration or damage. UVA radiation does not cause sunburn but can increase the chances of developing skin cancer, referred to as Melanoma. In South Africa, the use of sunscreen has become increasingly popular. Today, sunscreens are associated with a wide range of purported purposes, from reducing skin aging and direct sun damage to decreasing the risk of skin cancer (Maceachern Highton, 1994: 318). Somatologists are in the fortunate position of providing clients with knowledge and advice on sunscreen usage. Sunscreens prevent dangers like cancer and aging which lead to elastin and collagen loss.

This study was aimed at determining the Somatologists level of knowledge regarding sunscreens. The outcome was that it became evident after consulting with Somatology students, professionals and clients that they were not adequately informed regarding the potential harmful effects of sunscreens.

## 2. LITERATURE REVIEW

The assigned sun protection factor (SPF) value of a sunscreen is a measurement taken in a laboratory describing its effectiveness. Sunscreens with higher SPF values offer better protection against UVB (The UV radiation causing the sunburn). According to Haywood (2009) the SPF value is equivalent to the number of ultra violet radiation needed to cause sunburn on the skin when the sunscreen is applied, relative to the amount necessary without sunscreen. This means that applying a sunscreen with a SPF value of 50 will prevent your skin from burning. However, your skin will only be protected until exposed to about 50 times the amount of UV radiation that would under normal circumstances cause it to burn. The amount of UV radiation one is exposed to depend on two aspects: the time span and also the time of the day spent in the sun. SPF 15 is the minimum protection recommended for everyday use, however, for optimal protection SPF30+ is recommended. Sunscreen is most effective when applied to clean, bare skin as it will bond with the skin for better protection. SPF40+ should be applied when one needs to be out in the sun for a couple of hours at a time. Incorrect sunscreen use will reduce the effectiveness of the product to guard against the damage caused by UV radiation. According to Young, (2009: 1532), half a teaspoon of sunscreen, to cover the face and neck, should be applied by patting it on 30 minutes after a moisturiser and before make-up application. Research done at the University of California, Riverside (Hanson, Gratton & Bardeen, 2006: 1205), indicated that one needs to reapply sunscreen every 2 hours to ensure proper, effective protection.

Sunscreen products that provide protection against both UVA and UVB rays are labelled as broad-spectrum. It is not sufficient for a sunscreen to protect against only one of the UV rays. Protection against only UVA rays will allow UVB to slip through and cause damage. Sunscreens can be classified as one of two types being either a physical or a chemical sunscreen. Many people are not aware of the differences between a physical and a chemical sunscreen and that their different ingredients have different effects on the skin and body. Explained below (Table 1) are the differences and similarities between these two classes.

**Table 1: The difference between physical and chemical sunscreens (adapted from Highton, 1994: 318)**

	<b>PHYSICAL</b>	<b>CHEMICAL</b>
<b>How sunscreens work</b>	Physical sunscreens protect your skin from the sun by deflecting / blocking the sun's rays.	Chemical sunscreens work by absorbing the sun's rays.
<b>Other names</b>	Sun block	Organic sunscreen
<b>UV filters</b>  <b>(Active ingredient in sunscreens that protect the skin against the sun)</b>	Titanium dioxide, zinc oxide	Octylcrylene, avobenzene, octinoxate, octisalate, oxybenzone, homosalate, 4-MBC, Mexoryl SX and XL, Tinosorb S and M, Uvinul T 150, Uvinul A Plus
<b>Stability</b>	Generally stable	Most are stable, but some are not. Avobenzene is notoriously unstable. However, it can be stabilised when formulated in conjunction with other UV filters.
<b>Comedogenicity</b>	Titanium dioxide can be problematic for some people.	Chemical filters tend to be more irritating to the skin.
<b>Protection</b>	The amount of protection that is offered depends on the particle size of the UV filters and overall product formulation. Zinc oxide and titanium dioxide are helpful in protecting against UVB and UVA rays, but not the full spectrum of UVA rays.	Chemical filters offer more coverage against UVA and UVB rays than physical sunscreens. Avobenzene, for example, protects against the full spectrum UVA rays.

Certain sunscreens may contain both chemical and physical UV filters (Highton, 1994: 316). Physical sunscreens protect your skin from the sun by deflecting / blocking the sun's rays, chemical sunscreens work by absorbing the sun's rays (Highton, 1994: 318). When using chemical sunscreens it is important to wait for 30 minutes before going outside. This will give the filters time to form a defensive layer over the skin. However, no waiting time is required when using physical sunscreens (Young, 2009: 1532). According to Highton (1994: 318), physical sunscreens are helpful in protecting against UVB and UVA rays, but not the full spectrum of UVA rays. Chemical filters offer more protection against UVA and UVB rays than physical sunscreens. However, both these types of sunscreens have their advantages and disadvantages and are combined in certain products to enhance their levels of protection against both UVA and UVB rays (Highton, 1994: 318).

The main ingredient in sunscreen products usually consists of aromatic molecules with carbonyl groups. Skin-damaging ultra violet (UV) rays are kept from reaching the skin as the molecules absorb high-energy UV radiation and release it as lower-energy radiation. Sunscreens usually include a chemical stabiliser using avobenzene as an agent to slow down the chemical breakdown process. Avobenzene, an ingredient in some sunscreens that absorbs ultra violet radiation energy, also causes its own set of problems. This ingredient, according to Sayre (2005: 452), is known to become unstable when brought into contact with ultra violet light. On application, this dangerous chemical is absorbed into the lower layers of the skin, and once absorbed, it is transported to the organs via the bloodstream. The light energy, still contained by the Avobenzene (now in the organs), cannot be destroyed and for this reason is converted into chemical energy. This chemical energy is then released as high-energy, free radicals that damage cells and cause cancer (Hollick, 1995: 645).

**Sunscreens may contain one or many UV filters, each categorised as one of three types:**

- Chemical compounds, organic in nature that absorb UV light such as oxybenzone (suspected photocarcinogen).
- Particulates (particulate matter), inorganic in nature that reflect, disperse and absorb ultra violet light such as zinc oxide, titanium oxide or even a combination of the two.
- Organic particulates, that mostly absorb light similar to organic chemical compounds, but hold numerous chromophores, might reflect and disperse light similar to inorganic particulate matter, but perform in a different way in formulations than organic chemical compounds. An example of such a particulate is Tinosorb M (Shaath, 2005: 954).

## **Dangerous ingredients**

Recent data from the Food and Drug Administration (FDA) indicate that a form of vitamin A, retinyl palmitate, when applied to the skin in the presence of sunlight, may speed the development of skin tumours and lesions (NTP, 2009).

An ingredient such as Para amino benzoic acid (PABA) causes DNA damage in human cells and Cytotoxicity (dangerous to the cell) is relative to the size of the titanium dioxide particles. Smaller particle sizes are more toxic. Information regarding the dangerous ingredients is relevant to the consumer simply because of a tendency in the cosmetic industry to increase the use of micronized pigments in colour cosmetics and sunscreens. Titanium dioxide nanoparticles are used in sunscreens because they are colourless but are still able to absorb ultra violet light. However, Titanium dioxide particles that are small enough, can penetrate cells, causing photo catalysis within the cell. In response, after exposure to sunlight the DNA could be damaged and, therefore, might lead to skin cancer (Dési, 2009: 42).

An increased risk of exposure to potentially hazardous ingredients, associated with high-SPF products exists. High-SPF products contain greater amounts of sun-blocking chemicals than low-SPF sunscreens. These ingredients may pose health risks when they penetrate through the skin, where they have been linked to tissue damage and potential hormone disruption. If studies supported a reduction in skin damage and skin cancer risk from high-SPF products, the additional exposures might be justified (Autier, 2009: 40-45).

### **3. METHODOLOGY**

A descriptive research study was designed using convenient sampling. A questionnaire was used as a research tool to collect information. The questionnaire was compiled by the researcher in conjunction with a statistician to determine the knowledge of Bloemfontein Somatologists regarding the usage of toxic ingredients and the adverse effects that sunscreen could have on the skin. Both closed and open-ended questions were included in the questionnaire. The questionnaire characters included questions regarding the differences between physical and chemical sunscreens, the usage thereof, and its ingredients and lastly the amount of training provided to somatologists regarding sunscreens. The questionnaire was piloted using the third year Somatology students at the Central University of Technology, Free State and no suggestions were made as all questions were correctly understood and interpreted.

Questionnaires were distributed to 15 SAAHSP accredited salons and Somatologists with a National Diploma and Bachelor of Technology qualification participated in completing the questionnaires. Although participation was voluntary, participants had the right to withdraw from this particular study at any time, irrespective of the reason(s). A cover letter was distributed with each questionnaire informing the participants about the purpose and necessity of the research study as well as their right to withdraw without any penalties. A period of

one week was provided for the completion of the questionnaires. The completed questionnaires were then collected by the researcher and statistically analyzed in conjunction with a statistician.

#### **4. RESULTS AND DISCUSSION**

43 Somatologists participated in this study. All respondents were female (100%). This supports the findings of Reid (2006: 41) that somatology is a female dominated profession internationally as well as in South Africa. The respondents' age groups ranged from between 20 to 37 years. Unfortunately, not all the respondents responded to all the questions. A high percentage (86%) of the participants were Caucasian and only 14% were African. When looking at the number of years in practice, almost half of the respondents (46%) have been practicing in the field of Somatology for a few months to two years. 29% of the respondents have been practicing for three to five years and 10% for six to eight years. This indicates that most of the respondents (75%) have completed their studies less than five years ago. Because most respondents completed their training in Somatology within the last five years, it was surprising to note that their knowledge regarding sunscreens is not at the expected level. The result obtained through this study was that 26% of the participants displayed knowledge and awareness regarding sunscreen usage; therefore, sunscreen training would have to become a more exposed topic in the Somatology programme.

##### **1. Knowledge regarding the difference between chemical, physical and broad spectrum sunscreens**

As indicated in Table 1, physical sunscreens deflect / block the sun's rays and chemical sunscreens absorb the sun's rays (Highton, 1994: 318). It is of interest to note that only 26% of the 42 participants that responded to this question knew the difference between physical and chemical sunscreens.

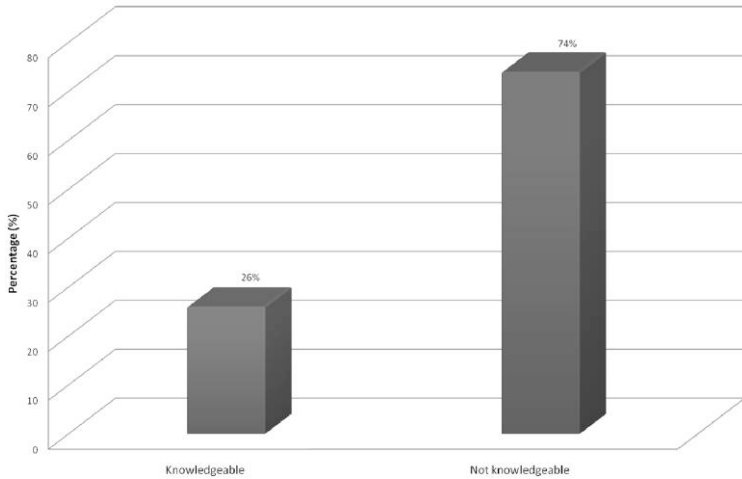
A respondent wrote: *"A chemical sunscreen is the product applied to the skin to protect against UV rays and physical sunscreens are things like sunglasses, umbrellas and hats."*

This proves that the knowledge of physical and chemical sunscreens is unknown.

Broad-spectrum protection means that a sunscreen protects against both UVA and UVB rays. Protecting just against one of the UV rays will not be sufficient. If, for example, one is protected from UVB rays, UVA rays will still cause damage and vice versa. Therefore, it is necessary to select a sunscreen with broad-spectrum protection (Highton, 1994: 318).

More than half (51%) of the somatologists claimed they knew what broad-spectrum protection meant (see Fig 1).

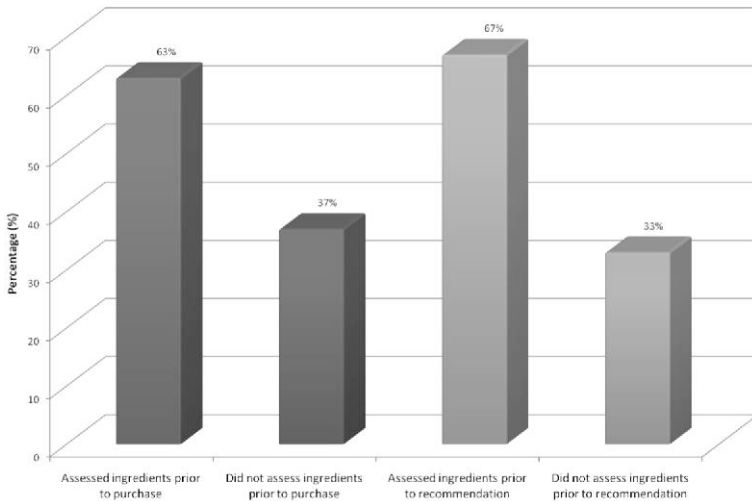
**Figure 1: Respondents' knowledge between physical, chemical and broad spectrum sunscreens (n = 42)**



## **2. Assessment of sunscreen ingredients prior to purchasing**

Figure 2 show that 67% of the respondents assess the ingredient list of a sunscreen before they recommend it to their clients. These percentages then indicate that quite a few respondents (about 35%) do not assess ingredients used in sunscreens at all.

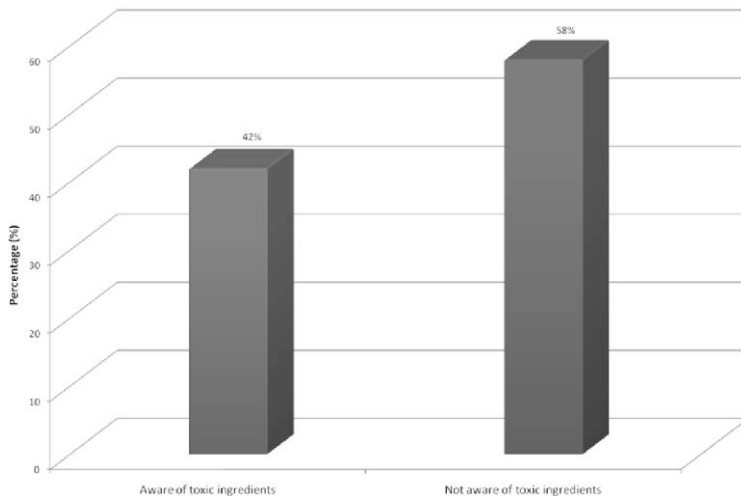
**Figure 2: Respondents' assessment of ingredients prior to purchase and recommendation (n = 41)**



### 3. Awareness of toxic ingredients

Figure 3 shows that 58% of somatologists are not aware of any toxic ingredients in sunscreens. The respondents, who stated that they are aware of toxic ingredients used in sunscreens, were asked to specify which toxic or harmful ingredients they were familiar with. Figure 4 below states that 30% of respondents who are aware of toxic ingredients used in sunscreens are familiar with the risks of titanium dioxide as a sunscreen ingredient. Oxybenzone and zinc oxide were both mentioned by 15% of the respondents and 10% stated that Benzophenone-3, copper and lead are sometimes used in sunscreens. According to Maynard (2005: 42), a study was conducted by the Therapeutic Goods Administration of Australia in 2006 and concluded that there is evidence from isolated cell experiments that zinc oxide and titanium dioxide may cause free radical formation in the presence of light and that this may be harmful to these cells (photomutagenicity with zinc oxide). This, however, would only be of concern in people using sunscreens where the zinc oxide and titanium dioxide penetrated into viable skin cells. The current evidence shows that the chemicals remain on the surface of the skin and in the outer dead layer (stratum corneum) of the skin (Maynard, 2005: 42).

Figure 3: Respondents' awareness of toxic ingredients in sunscreens

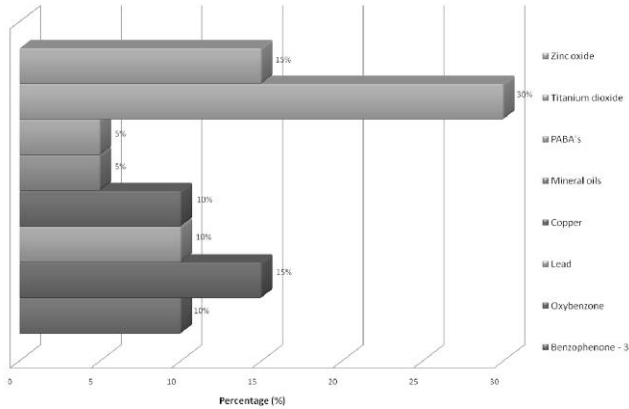




#### 4. Toxic ingredients used in sunscreens which respondents were aware of.

Figure 4 reflects on the percent of respondents that need more information regarding sunscreen ingredients, its use and further information on it. Firstly, the most prominent factor is that most of the respondents (71%) feel that they need more information regarding the ingredients used in sunscreens.

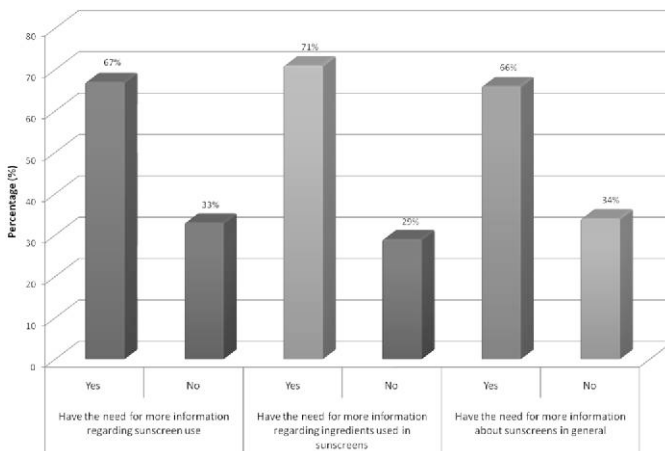
Figure 4: Toxic ingredients used in sunscreens which respondents were aware of.



#### 5. Respondents' need for more information regarding sunscreens

As shown in Fig. 5 More than half (58%) of the respondents stated that they felt that information on sunscreens was not addressed sufficiently in the Somatology curriculum, and the second highest percentage of respondents (53%) stated that inadequate product training was to blame.

Figure 5: Respondents' need for more information regarding sunscreens



## 5. CONCLUSION

Somatologists play a vital role in guiding the general public on health and well-being and in particular on skincare and the use of sun screens. Therefore, Somatologists should possess the necessary knowledge on sunscreens. The researcher's perception, in conclusion, was that the Somatologists who completed the questionnaires showed a lack of interest towards the awareness of sunscreen usage since the questions were not all completed. Furthermore, the researcher had to follow up on a daily basis to verify if the questionnaires were being completed. The results of the study showed a demand for added information on sunscreens to broaden their knowledge and to better equip themselves to make informed choices regarding the use and choice of sunscreens.

## 6. REFERENCE LIST

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