CONSUMER BEHAVIOR REGARDING UV-PROTECTING BODY PRODUCTS OF WORKING WOMEN IN BANGKOK

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MASTER OF SCIENCE

PROGRAM IN COSMETIC SCIENCE

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ABSTRACT

The purpose of this research was to survey consumer behavior on the use of UV-protecting body products of working women in Bangkok by analysing information from questionnaires answered by 400 participants.

The result of the research indicated that most of the respondents make 15,000 to 25,000 Baht per month, are business employees and have graduated with a Bachelor's degree. The sources of UV that most respondents are exposed to are sunlight and light bulbs. Most of the participants are aware of the skin-damaging effects of UVA and UVB and consider skin darkening, freckles, skin discoloration and signs of premature ageing to be the most unwanted effects, respectively. However, only slightly more than 50% of the respondents were found to use UV-protecting products and product selections were found to be influenced mainly by the product characteristics and the quality of protection it offers.

This research also focuses on consumer behavior regarding the reasons for not using UV products at all as well as on the irregular and inconsistent consumers' reasons for the irregularity and inconsistency of product usage. Those consumers reasoned that the sticky feel on their palms, oily skin and having dust particles stick onto their skin after the application caused them to

disregard the use of the UV-protecting body products despite their awareness of the harmful effects of UV exposure. The results signified that those consumers perceive application of the products with their palms as the most undesirable but unavoidable method. This gives way to a creation of product package designed in favour of application-aid which is discussed in Chapter5 of this paper.

However, this research not only discusses consumer behaviour on the use of UV-protecting body products but also includes the varieties of the product forms available in the market, description of some of the products from popular brands, the FDA and EU allowed ingredients in UV-protecting products and reasons why the use of such products should be given importance to.

Keywords: consumer behaviour / photoageing / skin damage / skin darkening / sunlight / UVA / UVB / UV exposure / UV protecting body products / UV protection / wrinkles

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CHAPTER 1

INTRODUCTION

1.1 Origin and Importance

UV radiation is like two sides of the same coin - on one side, it has beneficial effects, and on the other side, it has detrimental effects. The sun's rays have powered life on our planet since its creation, and have made life possible for all living things. The sun is one of the most important elements of the universe. However, it has become increasingly evident that exposure to ultraviolet radiation is potentially lethal to humans. When these sunrays hit the skin, some are scattered, some reflected but much is absorbed by chromosomes and cell proteins. This absorption causes damage to the cell's deoxyribonucleic acid (DNA) which in turn triggers a response that can lead to cancer, eye damage or blindness.

Everyone is exposed to UV radiation from the sun and an increasing number of people are exposed to artificial sources used in industry, commerce and recreation. Emissions from the sun include visible light, heat and UV radiation. The UV region covers the wavelength range 100-400 nm and is divided into three bands: UVA (315-400 nm), UVB (280-315 nm) and UVC (100-280 nm).

As sunlight passes through the atmosphere, all UVC and approximately 90% of UVB radiation is absorbed by ozone, water vapour, oxygen and carbon dioxide. UVA radiation is less affected by the atmosphere. Therefore, the UV radiation reaching the Earth's surface is largely composed of UVA with a small UVB component.

UVB exposure induces the production of vitamin D in the skin. The majority of positive health effects are related to this vitamin. It has regulatory roles in calcium metabolism (which is vital for normal functioning of the nervous system, as well as for bone growth and maintenance of bone density) immunity, cell proliferation, secretion and blood pressure. Too little UVB radiation

leads to a lack of Vitamin D. Too much UVB radiation leads to direct DNA damage, sunburn, and skin cancer.

Unlike UVB rays, UVA radiation levels have small fluctuations during the day, and are present from sunrise to sunset every day, all year round, even in the winter and on cloudy days. While UVB rays remain primarily at the epidermal level of human skin and are partially blocked by the stratum corneum, UVA rays penetrate the epidermis deeper into the dermis or base layer of the skin where connective tissue and blood vessels exist. The result is a loss of elasticity that causes the skin to sag, wrinkle, and age prematurely. Furthermore, overexposure to UVA causes skin cancer.

Besides, various eye problems have been associated with overexposure to UV radiation. To sum up, in humans, prolonged exposure to solar UV radiation may result in acute and chronic health effects on the skin, eye, and immune system.

It is a popular misconception that only fair-skinned people need to be concerned about overexposure to the sun and that darker skin has more protective melanin pigment, and the incidence of skin cancer is lower in dark-skinned people. Nevertheless, skin cancers do occur within this group and unfortunately they are often detected at a later, more dangerous stage. Therefore, people of all colors should be aware that they need to protect themselves from overexposure to ultraviolet radiation.

Clinical studies have revealed that most people do not use products for UV protection on their body as regularly as on their face. Many think that UV body protection is only for days at the beach or the pool. Others dislike the greasiness that accompanies a full body application which makes them have to be careful not to brush their arms against anything in the house or if they are driving, then it's sticky all over the car seat. Applying sun lotion on the body leaves people with greasy residues on their hands that transfer onto anything they touch, be it their face, keys, bags or magazine pages.

In Thailand, some of the brands which UV-protecting body products are most popularly used by working women include Neutrogena, Nivea, Burt’s Bees, Shiseido, Aveeno, No.7 by boots, La Roche Posay and Clarins. These products are sold in the Thai market at around 4 baht per ml.

1.2 Objective

1.2.1 To study consumer behaviour regarding the irregularity and inconsistency of usage of body products for UV protection.

1.2.2 To analyze the information further development of products or products' package that orientates consumer requirements for success in marketing.

1.3 Hypotheses

1.3.1 60% of the people use UV protection products.

1.3.2 People don't use UV protection products because of the stickiness of the UV protection products that remains on the palms

1.3.3 People don't use UV protection products because it is difficult to apply UV protection products.

1.3.4 People will not change purchase decision after the characteristic of the products is altered.

1.3.5 People would be willing to pay 3 Baht/ml for new UV protection products.

1.4 Research scope

1.4.1 Study the types of UV-protecting body product forms available in the market, for instance, lotions, creams, mist, spray, moisturizers and milk.

1.4.2 Survey of UV-protecting body products knowledge and usage among working women of the age group 25-40 years using questionnaires.

1.5 Expectations

1.5.1 Know reasons for consumer behavior regarding the irregularity and inconsistency of body products for UV-protection usage.

1.5.2 Analyze the information to clearly understand reasons for disregarding the use of body products for UV-protection to develop a product or product packaging that orientates consumer requirements and meet their expectations in order to gain higher marketing success.

CHAPTER 2

LITERATURE REVIEW

2.1 UV and the skin

UV rays have a profound effect on the skin- causing premature skin aging, skin cancer, and a host of skin changes. Exposure to UVA or UVB, from sunlight and/or light bulbs, account for 90% of the symptoms of premature skin ageing. Many skin changes that were commonly believed to be due to ageing, such as easy bruising, are actually a result of prolonged exposure to UV radiation.

2.1.1 UVC Radiation- UVC radiation is almost completely absorbed by the ozone layer and does not affect the skin. UVC radiation can be found in artificial sources such as mercury arc lamps and germicidal lamps.

2.1.2 UVB Radiation- UVB affects the outer layer of skin, the epidermis, and is the primary agent responsible for sunburns. It is the most intense between the hours of 10:00 am and 2:00 pm when the sunlight is brightest. It is also more intense in the summer months accounting for 70% of a person's yearly UVB dose. UVB does not penetrate glass.

2.1.3 UVA Radiation- UVA was once thought to have a minor effect on skin damage, but now studies are showing that UVA is a major contributor to skin damage since UVA penetrates deeper into the skin. The intensity of UVA radiation is more constant than UVB without the variations during the day and throughout the year. UVA is also not filtered by glass.

2.1.4 Damaging Effects of UVA and UVB- Both UVA and UVB radiation can cause skin damage including wrinkles, lowered immunity against infection, aging skin disorders, and

cancer. Some of the possible mechanisms for UV skin damage are collagen breakdown, the formation of free radicals, interfering with DNA repair, and inhibiting the immune system.

2.1.5 Collagen Breakdown- In the dermis, UV radiation causes collagen to break down at a higher rate than with just chronologic aging. Sunlight damages collagen fibers and causes the accumulation of abnormal elastin. When this sun-induced elastin accumulates, enzymes called metalloproteinases are produced in large quantities. Normally, metalloproteinases remodel sun-injured skin by manufacturing and reforming collagen. However, this process does not always work well and some of the metalloproteinases actually break down collagen. This results in the formation of disorganized collagen fibers known as solar scars. When the skin repeats this imperfect rebuilding process over and over, wrinkles develop.

2.1.6 Free Radicals- UV radiation is one of the major creators of free radicals. Free radicals are unstable oxygen molecules that have only one electron instead of two. Because electrons are found in pairs, the molecule must scavenge other molecules for another electron. When the second molecule looses its electron to the first molecule, it must then find another electron repeating the process. This process can damage cell function and alter genetic material. Free radical damage causes wrinkles by activating the metalloproteinases that break down collagen. They can even cause cancer by changing the genetic material, RNA and DNA, of the cell.

2.1.7 DNA-repair Interference- UV radiation can affect enzymes that help repair damaged DNA. Studies are being conducted looking into the role a specific enzyme called T4 endonuclease 5 (T4N5) has in repairing DNA.

2.1.8 Immune System Effects- The body has a defense system to attack developing cancer cells. These immune system factors include white blood cells called T lymphocytes and specialized skin cells in the dermis called Langerhans cells. When the skin is exposed to sunlight, certain chemicals are released that suppress these immune factors.

2.1.9 Cell Death- The last line of defense of the immune system is a process called apoptosis. Apoptosis is a process of cell-suicide that kills severely damaged cells so they cannot

become cancerous. This cell-suicide is seen when you peel after a sunburn. There are certain factors, including UV exposure, that prevent this cell death allowing cells to continue to divide and possibly become cancerous.

2.1.10 Texture Changes Caused by the Sun- UV exposure causes thickening and thinning of the skin. Thick skin is found in coarse wrinkles especially on the back of the neck that do not disappear when the skin is stretched. A condition called solar elastosis is seen as thickened, coarse wrinkling and yellow discoloration of the skin. A common effect of UV exposure is thinning of the skin causing fine wrinkles, easy bruising, and skin tearing.

2.1.11 Blood Vessel Changes Caused by the Sun- UV radiation causes the walls of blood vessels to become thinner leading to bruising with only minor trauma in sun-exposed areas. For example, most of the bruising that occurs on sun-damaged skin occurs on the backs of the hands and forearms not on the inside of the upper arm or even the inside of the forearm. The sun also causes the appearance of “telangiectasias”, tiny blood vessels, in the skin especially on the face.

2.1.12 Pigment Changes Caused by the Sun- The most noticeable sun-induced pigment change is a freckle or solar lentigo. Light-skinned people tend to freckle more noticeably. A freckle is caused when the melanin-producing cell, or melanocyte, is damaged causing it to get bigger. Large freckles, also known as age spots or liver spots, can be seen on the backs of the hands, chest, shoulders, arms, and upper back. These are not actually age related but sun-damage related. UV exposure can also cause white spots especially on the legs, but also on the backs of the hands and arms, as melanocytes are destroyed.

2.1.13 Skin Bumps Caused by the Sun- UV radiation causes an increased number of moles in sun-exposed areas. Sun exposure also causes precancerous lesions called actinic keratoses that develop especially on the face, ears, and backs of the hands. The are small crusty bumps that can often be felt better than they can be seen. Actinic keratoses are felt to be premalignant lesions because 1 in 100 cases per year will develop into squamous cell carcinoma. UV exposure also causes seborreheic keratoses, which are warty looking lesions that appear to be "stuck on" the skin. In contrast to actinic keratoses, seborrheic keratoses do not become cancerous.

2.1.14 Skin Cancer Caused by the Sun- The ability of the sun to cause skin cancer is a well-known fact. The 3 main skin cancers are melanoma, basal cell carcinoma, and squamous cell carcinoma. Melanoma is the most deadly skin cancer because it metastasizes more readily than the other skin cancers. It is believed that the amount of exposure of the skin to the sun before the age of 20 is actually the determining risk factor for melanoma. Basal cell carcinoma is the most common skin cancer and tends to spread locally, not metastasize. Squamous cell carcinoma is the second most common skin cancer, and it can metastasize although not as commonly as melanoma. The risk of getting basal cell carcinoma or squamous cell carcinoma is determined by a person's lifetime exposure to UV radiation and the person's pigment protection.

2.2 UV Protection

2.2.1 UV-protecting products

UV-protecting products (available as milky liquid, lotions, creams, mists and aerosol sprays) contain one or a combination of active ingredients that absorb or reflect some of the (UV) radiation on the skin exposed to sunlight or other UV sources and thus helps protect the skin partially against UV rays.

There are currently 17 active ingredients allowed for use in UV-protecting products in the U.S. by the Food and Drug Administration (FDA) and in Europe 29 have been approved. These ingredients fall into two broad categories - absorbers (which create a chemical reaction to absorb UV and are used in '**sunscreen**' products) and reflectors (which are physical barriers that block, scatter or reflect UV rays away from the skin and are used in '**sunblock**' products).

2.2.2 UV-protecting products safety concern

Many companies are now introducing **safer sunscreens** extracted from plants and mineral-based ingredients, without chemical additives.

2.2.2.1 Alba Botanica Sun’s Fragrance-Free Mineral Sunscreen

2.2.2.2 Badger’s SPF 30 Sunscreen

2.2.2.3 Burt’s Bees’ Chemical-Free Sunscreen SPF 15

2.2.2.4 California Baby’s SPF 30

2.2.2.5 Juice Beauty's Green Apple SPF 15 Moisturizer, and

2.2.2.6 Kabana's Green Screen SPF 15

2.2.2.7 La Roche Posay

2.2.3 FDA allowed ingredients

Table 2.1 FDA allowed ingredients

UV-filter	Maximum concentration	Permitted in these countries
p-Aminobenzoic acid	15.00%	EC, USA, AUS
Padimate O	8% (EC,USA,AUS) 10% (JP) (Not currently supported in EU and may be delisted)	EC, USA, AUS, JP
Phenylbenzimidazole sulfonic acid	4% (US,AUS) 8% (EC) 3% (JP)	EC,USA, AUS, JP
Cinoxate	3% (US) 6% (AUS)	USA, AUS
Dioxybenzone	3%	USA, AUS
Oxybenzone	6% (US) 10% (AUS,EU) 5% (JP)	EC, USA, AUS, JP
Homosalate	10% (EC, JP) 15% (US,AUS)	EC, USA, AUS, JP
Menthyl anthranilate	5%	USA, AUS
Octocrylene	10%	EC,USA, AUS, JP
Octyl Methoxycinnamate	7.5% (US) 10% (EC,AUS) 20% (JP)	EC,USA, AUS, JP
Octyl salicylate	5% (EC,USA,AUS) 10% (JP)	EC,USA, AUS, JP
Sulisobenzone	5% (EC) 10% (US, AUS, JP)	EC,USA, AUS, JP
Trolamine salicylate	12%	USA, AUS
Avobenzone	3% (US) 5% (EC,AUS)10% (JP)	EC, USA, AUS, JP

Table 2.1 (continued)

UV-filter	Maximum concentration	Permitted in these countries
Ecamsule	10%	EC,AUS (US:Approved in certain formulations up to 3% via New Drug Application (NDA) Route)
Titanium dioxide	25% (No limit Japan)	EC,USA, AUS, JP
Zinc oxide	25% (US) 20% (AUS) (EC-25% provided particle size >100 nm) (Japan, No Limit)	EC,USA, AUS, JP

2.2.4 EU allowed ingredients

Below are other ingredients approved within the EU and other parts of the world, which have not been included in the current FDA monograph.

Table 2.2 EU allowed ingredients

UV-filter	Maximum concentration	Permitted in
4-Methylbenzylidene camphor	4%*	EC, AUS
Tinosorb M	10%*	EC, AUS, JP
Tinosorb S	10% (EC, AUS) 3% (JP)*	EC, AUS, JP
Neo Heliopan AP	10%	EC, AUS
Mexoryl XL	15%	EC, AUS
Benzophenone-9	10%	JP

Table 2.2 (continued)

UV-filter	Maximum concentration	Permitted in
Uvinul T 150	5% (EC, AUS) 3% (JP)*	EC, AUS
Uvinul A Plus	10% (EC,JP)	EC , JP
Uvasorb HEB	10% (EC) 5% (JP) *	EC, JP
Parsol SLX	10%	EC, AUS, JP
Isopentenyl-4-methoxycinnamate	10% *	EC, AUS

2.2.5 UV-products by some of the popular brands in the Thai market

Table 2.3 UV-products by some of the popular brands in the Thai market

Products	Product Details
	Neutrogena® Fresh Cooling Body Mist Sunblock - contains Helioplex® a cooling, continuous water- light mist spray that instantly refreshes as it provides skin with UVA protection. - SPF 70, Waterproof & Sweatproof - Non-comedogenic (won't clog pores) - PABA-free
	Nivea SUN - high SPF - offers immediate protection - thick lotion texture

Table 2.3 (continued)

Products	Product Details
	Burt's Bees - 98% natural ingredients - SPF - contains carrot seed extract
	Shiseido UV shield - SPF 32-50 PA+++ - Milky liquid texture - Non-sticky
	Aveeno Face and Body Sunblock - Sunblock lotion - Continuous protection due to the presence of soy extract - - SPF 55
	No.7 by boots - SPF 50 PA+++ - Active vitamin C for enhanced whitening - Lotion texture

Table 2.3 (continued)

Products	Product Details
	La Roche Posay - Anthelios - available as milky liquid, lotion & thick lotion texture - non-greasy - non-comedogenic - cosmeceutical product
	Clarins Body Veil SPF 20 - SPF 20 PA+++ - Very light weight, non greasy - Pleasant smell Immediate body glow due to the presence of light-reflecting particles

2.3 Related Research

Ultraviolet (UV) radiation in sunlight is the most prominent and ubiquitous physical carcinogen in our natural environment. It is highly genotoxic but does not penetrate the body any deeper than the skin. In the 1970s research on UV carcinogenesis received a new impetus from the arising concern about a possible future depletion of the stratospheric ozone layer: the resulting increases in ambient UV loads were expected to raise skin cancer incidences. Epidemiological studies in the last decades of the 20 th century have greatly refined our knowledge on the aetiology of skin cancers. Analyses of gene mutations in skin carcinomas have identified UV radiation as the cause. Exposition of the skin with solar ultraviolet radiation (UV) is the main cause of skin cancer development. Epidemiological data indicate that excessive or cumulative sunlight exposition takes place years before the resulting malignancies arise (De Gruji, 1999).

Ultraviolet (UV) irradiation present in sunlight is an environmental human carcinogen. The toxic effects of UV from natural sunlight and therapeutic artificial lamps are a major concern for human health. The major acute effects of UV irradiation on normal human skin comprise sunburn inflammation (erythema), tanning, and local or systemic immunosuppression. At the molecular level, UV irradiation causes DNA damage. Chronic exposure to UV irradiation leads to photoaging, immunosuppression, and ultimately photocarcinogenesis (Mason, Lind & Marchal, 1999).

Solar radiation induces acute and chronic reactions in human and animal skin. Epidemiological studies suggest that solar UV radiation is responsible for skin tumor development via gene mutations and immunosuppression, and possibly for photoaging (Ichihashi, Ueda, Budiyanto, Bito, Oka, Fukunaga, Tsuru & Horikawa, 2003).

Many surveys show that sunscreen is still not a priority: a new survey carried out by dermatologists in the US shows that consumers are still not aware, or else don't take seriously, the importance of using sunblock or sunscreen to prevent sun damage, suggesting the cosmetic industry still has work to do to get the message over. The results of the survey were gathered by the Massachusetts-based CosmeticsDesign.com (CosmeticsDesign.com, 2007). The news comes

despite the fact that countless national and international health and safety organizations have launched awareness campaigns in recent years, particularly in the light of the categorical evidence linking exposure to UVA and UVB rays with skin damage that can lead to cancer. This raises concern because it's important for people to realize that sunburned cells are associated with DNA mutations associated with skin cancer (Coups, Manne & Heckman, 2005).

A new survey by Professor Richard Marais has revealed that despite more UK consumers being worried about skin cancer than a decade ago, they are still slow on the uptake of protective sunscreens as a preventative measure against harmful UVA and UVB rays. In a research poll by the Institute of Cancer's SAFE campaign regarding their knowledge of skin cancer, and the actions they take to avoid the disease, the results showed that despite increased awareness, more action is needed to encourage consumers to apply sunscreens. The research states that over 35 per cent do not use sunscreen when exposed to the sun - greatly increasing their chances of skin cancer. Today, more than 75,000 new cases are diagnosed in the UK alone each year (Siegel & Castellan, 1988).

Most people are not sufficiently protected against skin cancer with one of the major causes being an infrequent use of sunscreen, concluded a new study. The report adds to a body of evidence that suggests there is still a long way to go before the people become fully aware of the dangers of sun exposure and the steps that can be taken to minimize them. Researchers at the Fox Chase Cancer Centre, led by Elliot J Coup, investigated the prevalence of habits that increase the risk of getting skin cancer in differing age groups using data from the 2005 National Health Interview Survey (NHIS) in the US. The survey suggests that the majority of the US population engage in more than one high risk behavior, the most prevalent of which being infrequent use of sunscreen with an SPF 15 or above and infrequent use of sun protective clothing. Young people between the ages of 18 and 29 are the least likely to frequently use sunscreens of SPF15+, according to the report, illustrating a group to be targeted by both sunscreen manufacturers and national education programs. Individuals in the 65 plus age group follow close behind and are only marginally more likely to be frequent users of high SPF sunscreens than those at the other end of the age spectrum, according to the report. Worryingly the report also noted that the same

age group was most likely to exhibit multiple high risk behaviours (Matsumu & Ananthaswamy, 2004).

A representative survey of 1,000 adults conducted in April by the Consumer Reports National Research Center asked respondents about what annoyed them about using sunscreen (Ichihashi et al., 2003) The issues included:-

Table 2.4 Sunscreen users especially bothered by sunscreen concerns

Sunscreen concerns	**Percentage of sunscreen users especially bothered by sunscreen concerns (%)**
Getting it in your eyes & remaining on your palms	45
Having sand stick to your skin	41
How much it costs	40
How the sunscreen smells	29
How often it needs to be put on	29
Rashes, pimples, or other skin irritations caused by sunscreen	27
Getting an uneven tan or burn if you miss a spot	23
How hard it is to put lotion on yourself	23

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research Method

This research required 400 women in Bangkok to answer questionnaries inorder to survey the consumer behaviour on the use of UV-protecting body products.

3.1.1 Respondents

3.1.1.1 Scope of respondents: Age of respondents is 25-40 years old and target respondents are in educational campuses, department stores and offices.

3.1.1.2 Sample size is estimated using

$$n = \frac{Z_{\frac{\alpha}{2}}^{2} PQ}{d^2}$$

Where

n = Sample size,

Z = Z score at the desired level of confidence

P = Estimated Proportion

Q = 1-P

d = Allowable error

α = Probability of type I error

In this study, the proportion is estimated to be equally distributed thus P=0.5 and Q=0.5, the confidence level chosen is 95% and the allowable error is 5%.

$$n = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} = 384.16 \approx 385$$

Using the above formula, we can estimate the sample size to be an approximate of 385 Samples, but to prevent the sampling bias or the data collection error, this study collected the 400 samples from the targeted respondents .

3.1.2 Research equipments

This study used questionnaires for the collection of data.

3.1.3 Analysis

The analysis was done by using the software SPSS/PC (Statistical Package for the Social Sciences) and Microsoft Excel. Procedures are listed below:-

3.1.3.1 Data Screening

3.1.3.2 Data Coding

3.1.3.3 Key Data

3.1.3.4 Analysis of Data

Statistics to be used for analysis of the data are “Descriptive statistics” (including the explanation in averages and percentages from the samples and “Inferential Statistics”.

3.2 Research equipments

This study used questionnaires for the collection of data. The questionnaires are divided into 4 sections as follows:

Section 1: Respondent’s background including Age, Education Level, Occupation and Personal Income Level

Section 2: Respondent’s behavior regarding the usage of UV-protecting body products.

Section 3: Factors influencing the selection and purchasing behavior of the respondents

Section 4: Respondent’s opinion regarding the currently available UV-protecting body products and expectations of future products (quality and appearance) that the respondents perceive to be important.

3.3 Survey

Procedures are as follows:-

3.3.1 Proofreading the questionnaire

3.3.2 Target respondents of the age group mentioned earlier

3.3.3 Distribution of questionnaire and monitoring while respondents answer to make sure that they address all the questions asked.

3.4 Statistical Methods used for Data Analysis

3.4.1 Binomial Test using z Approximation

Binomial Test is used to test for dichotomous data - that is, when each individual in the sample is classified in one of two categories (e.g. category A and category B) and you want to know if the proportion of individuals falling in each category differs from the chance or from some pre-specified probabilities of falling into those categories.

In this paper we have to use Binomial using z approximation because of the number of samples. Since we have larger than 35 samples it is recommended to use z approximation of binomial instead (Siegel & Castellan, 1988).

The formula to calculate is as follows:

$$z = \frac{(Y \pm 0.5) - Np}{\sqrt{Npq}}$$

Where Y is the observed value, N is the sample size, p is the expected probability, q = 1-p. Y+0.5 is used hen Y<Np, and Y-0.5 is used when Y>Np. The z statistic is then compared with the normal curve and p-value of z-distribution.

3.4.2 Sign Test

Sign Test is used when the direction of the differences between two measures rather than the quantitative measures are used to calculate the differences. With large samples of greater than 35 in total, the normal approximation to the binomial distribution can be used (Siegel & Castellan, 1988).

Given that:

Mean $= \mu_x = Np = N/2$

Variance $= \sigma^2_x = Npq = N/4$

The z-value is calculated using:

$$z = \frac{2x \pm 1 - N}{\sqrt{N}}$$

Where N is the total number of observation, and x is the number of observed variable. +1 is used when x<N/2 and -1 is used when x>N/2. The z statistic is then compared with the normal curve and p-value of z-distribution

3.4.3 One Sample T-Test

One Sample T-Test (Mason et al., 1999) is used to compare a sample mean with a hypothesized mean.

Given that

$$t = \frac{\overline{X} - \mu}{s / \sqrt{n}}$$

Where $\overline{X}$ is the sample mean and μ is the hypothesized mean, s is the standard deviation and n is the sample size. The t statistic is then compared with the value from t-distribution or z-distribution to conclude whether a sample mean has the same value as hypothesized.

CHAPTER 4

RESULTS OF THE STUDY

The study of consumer behavior on the use of UV-protecting body products of working women in Bangkok was done using questionnaire survey method on 400 respondents and the collected data was analyzed by SPSS Software and Microsoft Excel, and is presented in the following sections.

Section 1 presents the analysis of the respondents' background

Section 2 presents the analysis of the respondents' usage of UV-protecting products

Section 3 presents the analysis of the respondents' purchasing behavior of UV-protecting products

Section 4 presents the analysis of the characteristics of the UV-protecting products that respondents want

Section 5 presents hypotheses testing

4.1 The analysis of the respondents' background

The analysis of the respondent's background will present the respondent's Age Group, Career, Income Level, and their Education background. This information will later be used in hypotheses testing.

Table 4.1 The percentage of respondents classified by Age Group, Career, Income Level, and Education Level.

Respondents' Background		
	Frequency	**Percentage**
Age Group		
25-30	117	29.3
31-35	154	38.5
36-40	129	32.3
Total	**400**	**100**
Career		
Business Owner	52	13
Employee	210	52.5
Civil Worker	73	18.3
Others	65	16.3
Total	**400**	**100**
Income Level		
<8,000 Baht	21	5.3
8,000 - 15,000 Baht	106	26.5
15,000 - 25,000 Baht	206	51.5
25,000-50,000 Baht	59	14.8
>50,000 Baht	8	2
Total	**400**	**100**

Table 4.1 (continued)

Respondents' Background		
	Frequency	**Percentage**
Educational Level		
Middle School	117	29.3
High School or Equivalent	154	38.5
Diploma	129	32.3
Undergraduate	400	100
Postgraduate		
Total	**52**	**13**

From Table 4.1, it can be seen that 38.5% of the 400 respondents are 30-35 years of age, and 52.5% of the respondents are working as employees in private sectors.

51.5% of the respondents earn between 15,000 – 25,000 Baht per month while only 2% earn more than 50,000 Baht per month. 45.5% of the respondents have an undergraduate degree, while 34% are diploma graduates, followed by 13.5% postgraduates, 6% High school graduates and 1 % Middle school graduates.

4.2 The analysis of the respondents' usage of UV-protecting products

This section is analyzed using frequencies and percentage methods. It also consists of graphical presentation of the results.

This part of the questionnaire started with a screening question of whether the respondents use any kind of costemics or beauty products. If not, then those respondents would not be asked to answer later questions.

From valid respondents' information, most of the products that they use are presented in Figure 4.1

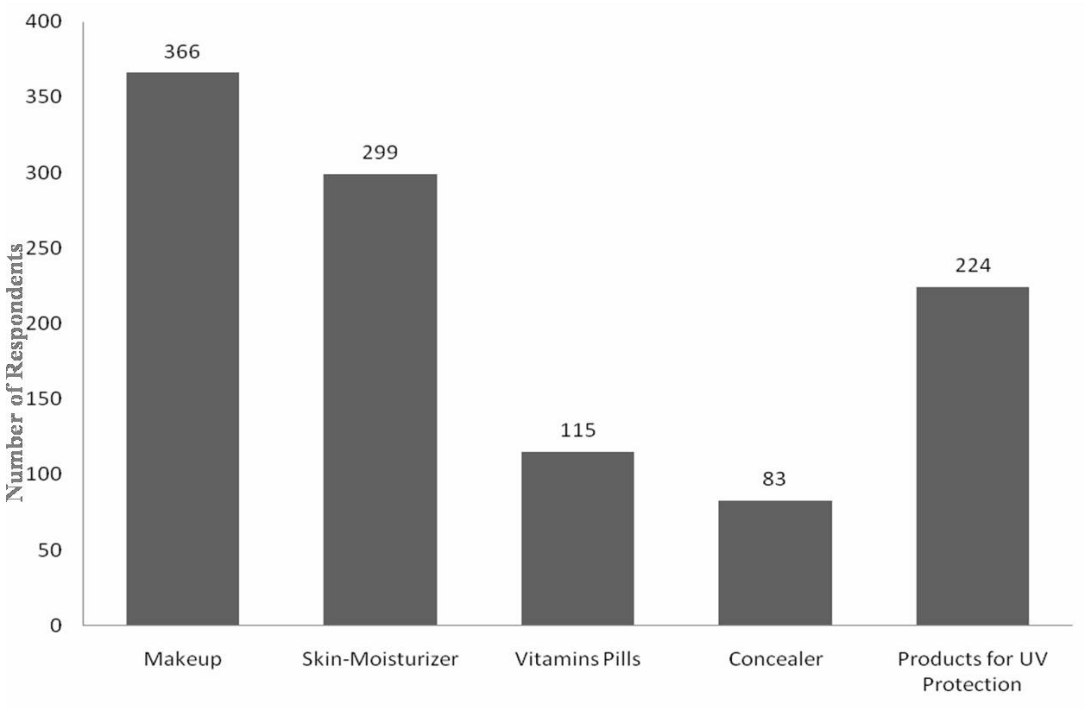

Figure 4.1 Types of products that respondents use.

It can be seen that out of 400 respondents, 366 use Makeup, 299 use Skin-Moisturizers, 224, which is slightly greater than half, use products for UV protection. Vitamins Pills and Concealers have 115 and 83 users respectively.

The respondents were then asked whether they use UV-protecting products.

Table 4.2 The percentage of respondents usage of UV-protecting products.

Do you use UV-protecting products?		
	Frequency	**Percentage**
Yes	251	62.8
No	149	37.3
Total	**400**	**100**

The results indicate that 251 respondents out of 400 (which accounted to 62.8% of the respondents) use UV-protecting products.

149 respondents were asked to skip some of the questions to the later part of the questionnaire in which they were asked about their opinions on UV-protecting products. For now the attention is on the 251 respondents who use UV-protecting products.

Table 4.3 The respondents' perception on the UV rays source in percentage.

UV Source	**Frequency**	**Percentage**
Sunlight	130	51.8
Light Bulbs	103	41
Computer Screen	18	7.2
Total	**251**	**100**

51.8% of the respondents believe that their main source of UV rays is the sun, while 41% are aware that their main source of UV rays is light bulbs and only 7.2% think that it is from computer screen.

The respondents were then asked on which part of the body they apply UV-protecting products. The results are shown in Figure 4.2

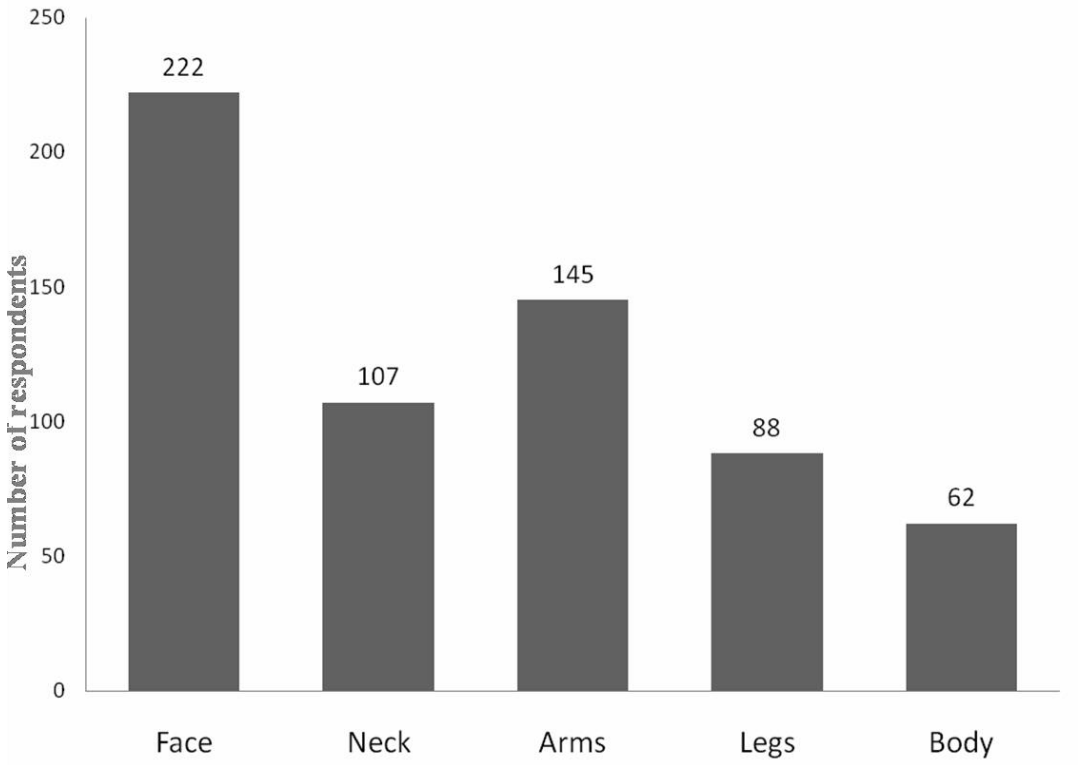

Figure 4.2 Part of the body the respondents apply UV-protecting products

The results from Figure 4.2 show that respondents apply UV-protecting products to their face the most since 222 respondents out of 251 reported this, followed by arms (145), Neck (107), Legs (88), and Whole Body (62).

This also raises another question on whether the respondents use different UV-protecting products for different parts of their body.

Table 4.4 The percentage of respondents who use different UV-protecting products for different parts of their body.

Do you use different UV-protecting products for different parts of your body?		
	Frequency	**Percentage**
Yes	217	86.5
No	34	13.5
Total	**251**	**100**

The results show that 86.5% of the respondents use different UV-protecting products on different parts of their body.

In terms of product usage, Table 4.5 reported that 80.5% of the respondents apply UV-protecting products everyday. Out of these, 82.2% apply it once a day while 16.8% reapply twice a day and only 1% reapply the products three times a day.

Table 4. How often respondents wear UV-protecting products

How often do you wear UV product?		
	Frequency	**Percentage**
Everyday	202	80.5
Only before outdoor activities	41	16.3
Only before swimming	8	3.2
Total	**251**	**100**

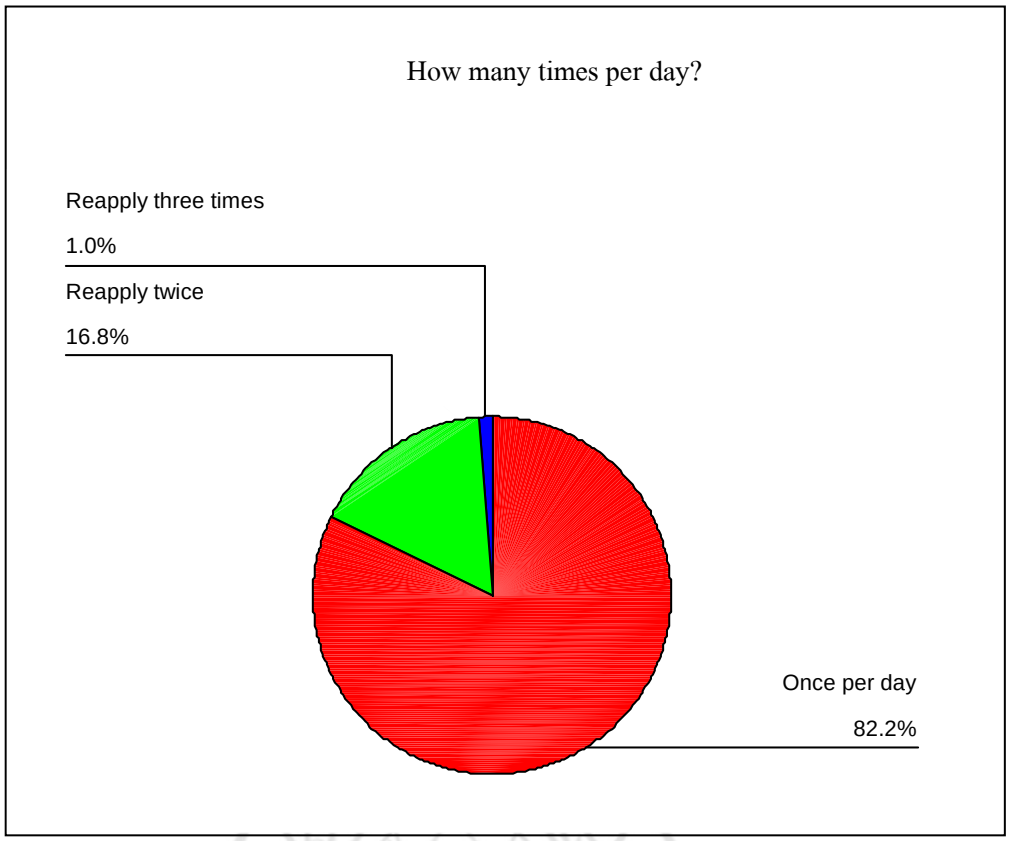

Figure 4.3 How many times respondents apply UV-protecting products in a day.

The respondents were asked about the factors that influence them to use UV-protecting products. Not surprisingly, 177 out of 251 respondents were conscious about and wanted to prevent skin darkening. 148 use UV-protecting products to prevent fleckles/skin discoloration and signs of premature ageing , while only 71 respondents out of 251 use it to prevent skin cancer.

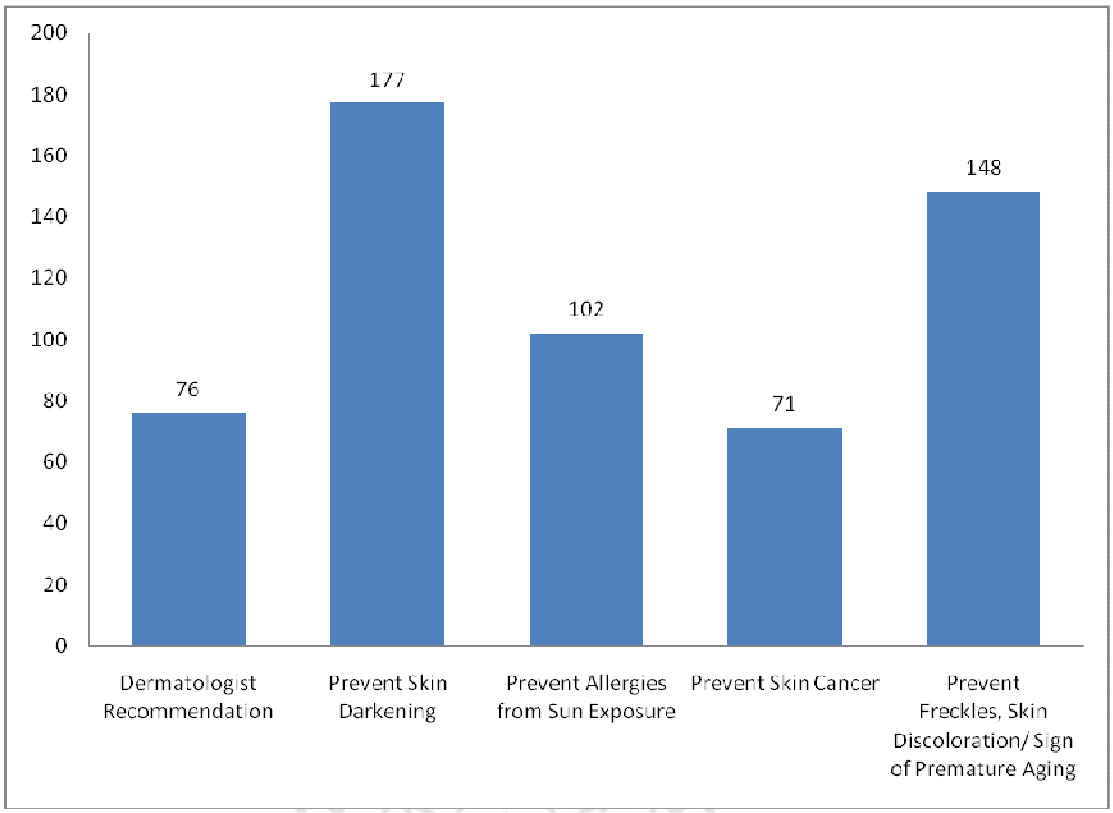

Figure 4.4 Summarizes the factors that influence respondents to use UV-protecting products.

4.3 The analysis of the respondents' purchasing behavior of UV-protecting products

This section discusses the respondent's purchasing behavior of UV-protecting products based on the analysis of frequencies and percentages.

As can be seen from table 4.6, the mostly used UV protection brand is Nivea, followed by Banana Boat, Oriental Princess, Shisedo, and Smooth E consecutively. It also shows that Eucerin and LaRoche Posay are not used by many Thais.

Table 4.6 the mostly used brands of UV-protecting products

Brands	Frequency
Nivea	100
Eucerin	21
Neutrogena	10
L'oeral	20
LaRoche Posay	7
Smooth E	40
Banana Boat	53
Oriental Princess	41
Shisedo	41
Other Brands	101

Table 4.7 the percentage of respondents who select products by themselves

Do you select products for UV Protection by yourself?		
	Frequency	**Percentage**
Yes, Everytime	231	92
Yes, Mostly	11	4.4
Yes, Sometimes	5	2
No	4	1.6
Total	**251**	**100**

The result indicates that 92% of the respondents select the products themselves, 4.4% usually select the products themselves, 2% sometimes select the product themselves, and 1.6% do not select the product themselves.

Table 4.8 the respondents are loyal to specific brands or not

Do you buy the same brand everytime?	Frequency	Percentage
Yes, Same brand everytime	82	33.2
Change sometimes	157	63.6
Different brand always	8	3.2
Total	**247**	**100**

Only 33.2% always purchase the same brand, 63.6% of the respondents change brands sometimes, while 3.2% of the respondents always purchase different brands.

Table 4.9 the main reasons that influence respondent's decision on choosing a product

What are the main reasons that influence your decision on choosing a product?	Frequency	Percentage
Brand	37	15
Product Characteristics	127	51.4
According to Recommendation	73	29.6
Price	8	3.2
Other factors	2	0.8
Total	247	100

The results indicates that 51.4% of the respondents claim that product characteristics is the main influence on their purchase of UV-protecting products, while 29.6% go with the recommendations, and 15% are influenced by brand popularity. Other factors including product price accounts for 4% of the respondents' purchasing decisions.

Table 4.10 The main locations of UV-protecting products purchase

Where do you buy products for UV protection from?	Frequency	Percentage
Supermarket	70	28.3
Drug Store	19	7.7
Department Store	81	32.8
Hospital/Dermatologist Clinic	25	10.1
Boots/Watsons	52	21.1
Total	**247**	**100**

81 out of 247 respondents who buy the products themselves buy from department stores accounting for 32.8% (the highest), followed by from supermarkets at 28.3%, Boots/Watsons 21.1%, Hospitals/Dermatologist Clinics 10.1%, and Drug Stores 7.7%.

It is interesting to note that purchases at Hospitals and Dermatologist Clinics only accounted for 10.1% when there is a large number of hospitals and dermatologist clinics in Bangkok. This shows that people still prefer buying such products through easy channels.

Table 4.11 indicates that people buy on average at 145.51 Baht with quite high Standard Deviation.

Figure 4.5 shows that almost all of the respondents use the Lotion and Cream type of UV-protecting products. However, it is not surprising that mists and spray forms are not popular in the Thai market yet, thus confirms the hypotheses behind the reason for conducting this research.

Table 4.11 Presents the descriptive statistics of the purchase behavior of UV-protecting products.

	Mean	**S.D.**
How many bottles do you buy each time?	1.21	0.595
What is the size of the product for UV protection that you buy each time?	145.51	122.269

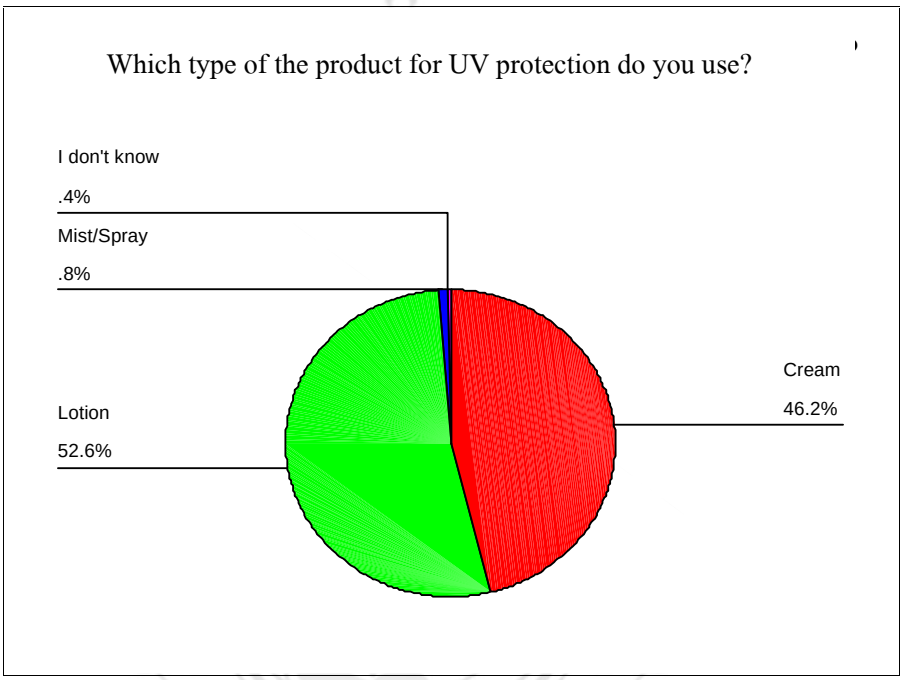

Figure 4.5 Summarizes the type of the UV-protecting products that respondents use.

Looking at table 4.12, it can be seen that 207 of the respondents claim that their UV-protecting products offer UVA protection, 181 that theirs offer UVB protection and 85 that the products they use are water-resistant. 17 respondents use UV-protecting products in the form of face foundation.

Table 4.12 Presents the characteristics of the current use UV protection product of the respondent

Characteristics	Frequency
UVA protection	207
UVB protection	181
Water-Resistance	85
With Foundation	17
Other characteristics	7
I don't know	18

The respondents were also further asked about the characteristic of UV-protecting products that they are currently using.

Table 4.13 shows that the most common SPF value that respondents use are SPF 50 by 30.3% of the users, followed by SPF 30 by 29.1% of the users, SPF 40 by 12% of the users, and SPF 15 by 7.6% of the users. 7.2% did not know the SPF value of the UV-protecting product that they are using.

Table 4.14 indicates that the most commonly used PA value is PA++ by 29.1% of the users, while PA+++ comes second since there are 24.3% of users followed by PA+ by 17.9% of the users. 28% of the respondents did not know the PA value of the UV-protecting product that they are using so they failed to answer this question. This shows that perhaps large brands could emphasize on their products' PA value advertising.

Table 4.13 The frequency of the SPF value that the respondents use

SPF	Frequency	Percentage
10	1	0.4
15	19	7.6
20	4	1.6
24	5	2
25	5	2
30	73	29.1
36	2	0.8
40	30	12
45	1	0.4
48	2	0.8
50	76	30.3
60	10	4
65	2	0.8
70	2	0.8
80	1	0.4
Subtotal	**233**	**92.8**
Missing	**18**	**7.2**
Total	**251**	**100**

Table 4.14 The frequency of the PA value that the respondents use

What is the PA value of your UV protection product?	Frequency	Percentage
PA+	45	17.9
PA++	73	29.1
PA+++	61	24.3
I don't know	72	28.7
Total	**251**	**100**

Table 4.15 The results when the respondents were asked to rate their knowledge about UV-protecting products

Rating	Frequency	Percent
I know very little	29	11.6
I know fairly little	21	8.4
Average	140	55.8
I know quite a lot	44	17.5
I know a lot	17	6.8
Total	**251**	**100**

The result of table 4.15 shows that the respondents have average knowledge about UV-protecting products and when they were asked about their information source, 168 of the respondents mentioned TV commercials , 129 product labels and 113 newspapers/magazines and salespeople.

Table 4.16 Product information sources

Information Source	Frequency
Doctor/Dermatologist	77
TV	168
Radio	28
Newspapers/Magazines	113
Salesperson	113
Products Label	129
Friends	75
Internet	20

4.4 The analysis of the characteristics of the UV-protecting products that respondents want

This section analyzes the characteristics of the UV-protecting products that respondents want using descriptive statistics, frequencies, and percentages. Graphic demonstrations are also included.

Table 4.17 Descriptive statistic showing satisfaction of the current UV-protecting products

Characteristics	Median
Price	4
Location Sold at	4
Advertisement	3
SPF value	4

Table 4.17 (continued)

Characteristics	Median
PA value	4
UVA/UVB protection characteristics	4
Product's ingredients	4
Color	3
Odour	4
Texture and Fineness	4
Viscosity	3
Skin permeability	4
Skin feel after application	4
Packaging	4
Application Method	3

Since the respondents were asked to rate their satisfaction, the ‘average’ score would not be an accurate measure. Therefore, median is used here instead. With 4 representing ‘satisfied’ and 3 representing ‘neutral feeling’ the results from table 4.17 indicates that the respondents are quite happy with the characteristics of the products that they are using, except with product details’ advertisement, Color, Viscosity, and Application method.

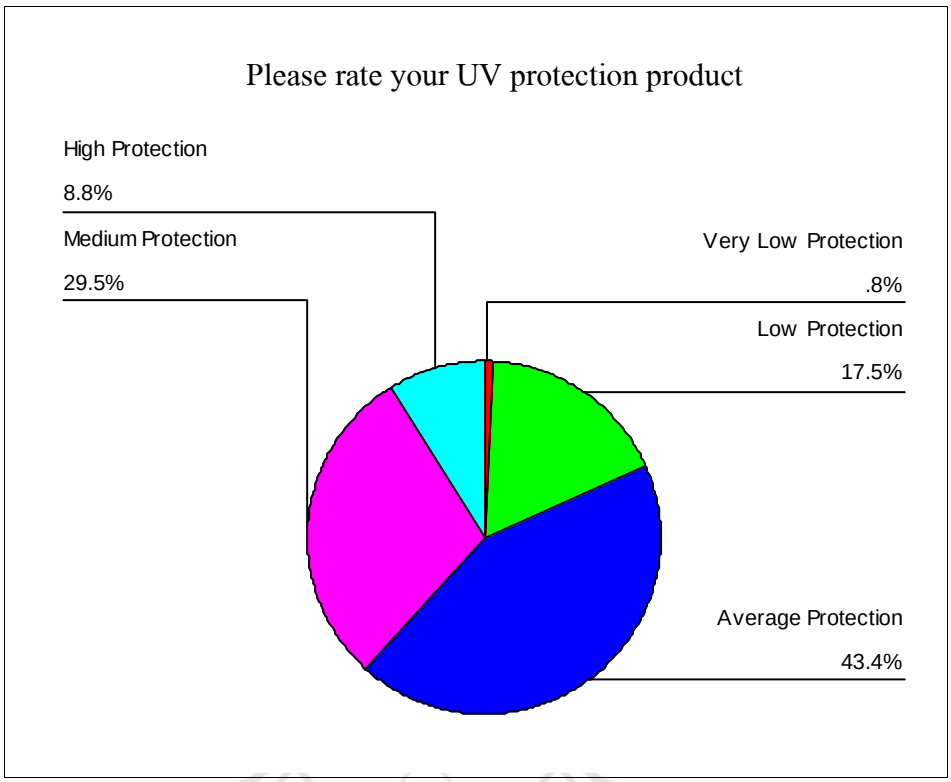

Figure 4.6 Shows the satisfaction rating that respondents gave to their current use products.

According to the survey, 43.4% of the users believe that the product they are using provides average protection, 29.5% that it provides medium protection, 17.5% that it provides low protection, 8.8% that it provides high protection, and less than 1% that it provides very low protection.

Table 4.18 Crosstabulation of the people who use and don't use UV-protecting products with the awareness of the effect of UV rays

		Sunbum	Signs of Premature Aging/Skin Darkening	Skin Cancer	Immuno suppression	Freckles	Crow's feet/ Wrinkles	Actinic Keratoser Disease	Dry Skin
		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Do you use products for UV Protection?	Yes	204	186	143	22	173	115	44	8
	No	142	51	50	0	106	74	4	84

The results show that many people are aware of sunburn, both users and non-users. People who don't use UV-protecting products are unaware of the following sun exposure effects: Signs of Premature Aging, Skin Darkening, Skin Cancer, and Actinic Keratoses disease.
This could be a focus point for marketers.

However, people who do not use UV protection are aware of dry skin resulting sun exposure.

Both the groups of respondents also reported how they feel when using UV-protecting products.

Table 4.19 Crosstabulation of the people who use and don't use UV-protecting products regarding their feeling towards the products.

		Slicky Feed	Oily Skin	Dust patides stick onto oily skin	Dries slow	White Residue on Skin	Bad Oabur	Skin Irritation	Diffcult to apply
		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Do you use products for UV Prodection?	Yes	184	167	102	115	46	78	50	93
	No	92	8	100	48	84	18	58	131

Most of the respondents who do not use UV-protecting products say that it is difficult to apply, dust particles stick onto skin that becomes oily after product application, and the sticky feel from product texture. Many of the people also felt that there is white residual left visible on the skin.

From the group of respondents that uses UV-protecting products, 184 dislike the sticky feel and many dislike the skin being left oily, the fact that the product dries slowly, dust particles sticking onto the oily skin and that it is quite difficult to apply the product onto their body with their hands.

The next step is to check whether change in product characteristics would result in a change in perception of UV-protecting products or attract new users.

Table 4.20 Crosstabulation of the people who use and don't use UV-protecting products with chances of trying new products.

		Would you try new product?		**Total**
		Yes	**No**	
Do you use products for UV Protection?	Yes	223	28	251
	No	134	15	149

What is interesting from table 4.20 is that 134 out of 149 people who are not using UV-protecting products say that they are willing to try if the characteristics of the product were different from what they know, specifically if it becomes easier to apply, is not sticky, and does not cause the skin to be oily.

While 28 respomdents show loyalty to the product that they are using, 223 are willing to try new products and 15 of the remaining still will not try new products.

Respondents were also asked to suggest the price per bottle that they are willing to pay according to how much they can afford. Here, the quantity of the product is taken into account when calculating prices.

With some manipulation of the data, price is divided by quantity to use the relative value of price/ml, the average suggested price was found to be 4.65 Baht/ml.

4.5 Hypotheses testing

4.5.1 Hypothesis 1: Test the proportion of people who use UV-protecting products.

H_0: 60% of the people use UV-protecting products

H_1: There is lesser than or greater than 60% of the people who use UV-protecting products.

Table 4.21 The results of the binomial test on the proportion of the UV-protecting products users

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (1-tailed)
Do you use products for UV Protection?	Group 1	Yes	251	.6	.6	.142(a)
	Group 2	No	149	.4		
	Total		**400**	**1.0**		

Note. *a Based on Z Approximation.

The results from above table show that the proportion of the people that use UV-protecting products is around 60% since the observed proportion is .6 and the p-value is .142

which is greater than α=0.05 thus we failed to reject the null hypothesis and conclude that the proportion of the people who use UV-protecting products is around 60%.

4.5.2 Hypothesis 2: Test the proportion of people who don't use UV-protecting products because of stickiness.

H_0: 60% of the people who don't use UV-protecting products because of the stickiness of the UV-protecting products.

H_1: There is greater than or lesser than 60% of the people who don't use UV-protecting products because of the stickiness of the UV-protecting products.

Table 4.22 The results of the binomial test on the proportion of people who don't use UV-protecting products because of stickiness. (The data is selected from only those who don't use UV-protecting products.)

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (1-tailed)
Sticky Feel	Group 1	Yes	92	.6	.6	.365(a)
	Group 2	No	57	.4		
	Total		**149**	**1.0**		

Note. *a Based on Z Approximation.

The results from above table show that the proportion of people who don't use UV-protecting products because of the stickiness is around 60% since the observed proportion is .6 and the p-value is .365 which is greater than α=0.05 thus we failed to reject the null hypothesis and conclude that the percentage is around 60%.

4.5.3 Hypothesis 3: Test the proportion of people who don't use UV-protecting products because it is difficult to apply.

H_0: 60% of the people don't use UV-protecting products because it is difficult to apply.

H_1: There is greater than or lesser than 60% of the people who don't use UV-protecting products because it is difficult to apply UV-protecting products.

Table 4.23 The results of the binomial test on the proportion of people who don't use UV-protecting products because it is difficult to apply. (The data is selected from only those who don't use UV-protecting products)

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (1-tailed)
Difficult to apply	Group 1	Yes	131	.9	.6	.000(a)
	Group 2	No	18	.1		
	Total		**149**	**1.0**		

Note. a Based on Z Approximation.

The results from above table suggested that most of the people who don't use UV products reasoned that it is difficult to apply. The null hypothesis here is rejected since p-value .000 is lesser than α=0.05 and also the observed proportion is 0.9 to 0.1 comparing to 0.6 that is being tested.

4.5.4 Hypothesis 4: Testing whether the launch of new products would attract new customers

H_0: People will not change purchase decision after the characteristic of the products is altered.

H_1: People will change purchase decision after the characteristic of the products is altered.

This hypothesis is tested using 'Two sample sign' test.

Table 4.24 The results of the Sign test whether people will change decision after the characteristic of products is altered.

Test Statistics(a)

	Would you try new product? Do you use products for UV Protection?
Z	-8.970
Asymp. Sig. (2-tailed)	.000

Table results from table indicated that the null hypothesis is rejected at 95% level of confidence since p-value 0.000 is lesser than α of 0.05 thus we rejected the null hypothesis and conclude that people will change purchase decision after the characteristic of products is altered.

4.5.5 Hypothesis 5: Testing the price willing to be spent on the UV-protecting products

H_0: People would be willing to pay 3 Baht/ml for UV-protecting products.

H_1: People would pay higher or lower than 3 Baht/ml for UV-protecting products.

This hypothesis is tested using one sample t-test.

Table 4.25 The results of the t-tests

One-Sample Test

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Baht/ml	10.498	399	.000	1.6496	1.3407	1.9585

The null hypothesis is rejected at 95% level of confidence since the average Baht/ml that people are willing to pay is 4.6496 from Table 4.21 and the significant level here is p-value here is 0.000 which is lower than α=0.05 therefore the average Baht/ml that people are willing to pay is clearly greater than 3 Baht/ml.

CHAPTER 5

CONCLUSION AND DISCUSSIONS

This research is a research to study "consumer behaviour regarding UV-protecting body products of working women in Bangkok" by using questionnaire survey from 400 female respondents aged 25-40. The results presented in Chapter 4 can be concluded as the following:

5.1 Concluding the respondents' usage of UV-protecting products

Since data from the questionnaire showed that most of the respondents use Make Up cosmetics, Skin-Moisturizers, and UV-protecting products, our obtained information is useful as we have the right target group of participants. 62.8% of the respondents use UV-protecting products which confirm our hypothesis-1. Many people reported that the main source of UV rays that they are exposed to is sunlight and light bulbs, but not many are aware of the UV rays from computer screens which directly affect their facial and neck skin).

Most of the respondents use UV-protecting products only on their face and arms and they use different products on different parts of the body. Around 80.5% of the people who use UV-protecting products apply the product everyday, and 82.2% apply just once a day.

As Thailand is in the hot zone, it is not surprising that Thais have reported to be using UV-protecting products mainly to prevent skin darkening, freckles, and premature aging.

5.2 Concluding the respondents' purchasing behavior of UV-protecting products

While 92% of the respondents select the UV-protecting products themselves, the most popular brands reported in this study are Nivea and Banana Boat. Only 33.2% of the respondents purchase the same brand every time while the remaining change sometimes and 3.2% change the brand always. Checking royalty to the brand would tell a lot about the opportunity for the new products in the market.

The main reason that respondents say influence their purchase decision is the product's characteristics and also the recommendation by the salesperson. While UV-protecting products can be bought everywhere, the majority is bought in Department store, supermarket, and Boots or Watsons store.

Product users buy on average of 145 ml per time. The type that people use are mostly creams and lotions while mists and sprays are not yet marketed thoroughly in the Thai market. This is one marketing opportunity.

The mostly commonly used products are of SPF value 50, followed by SPF 30, while more than 25% of the respondents did not know the PA value of their products. Marketers could emphasize on the PA factor to create the awareness and users can select the products that suit their needs.

Not surprisingly, the information that people obtain regarding the UV-protecting products are mainly from adverts on TV.

5.3 Concluding the analysis of the desired characteristics of the UV-protecting products

Some respondents are quite happy with the characteristics of the products that they are using. However, many claim to receive very little useful information from product advertisement. Respondents also expect better product color and viscosity, and would appreciate product packages designed to aid in application.

Majority of the respondents claim that the products they are using provides average protection, while about one third of the respondents claim that the products they are using only offers medium protection.

Then the results regarding UV-exposure from those respondents who do not use UV-protecting products and those who use UV-protecting products were presented for comparison. Many people are aware of sunburn, both UV-protecting product users and non-users. Respondents who don't use UV-protecting products are unaware of UV-exposure effects such as signs of Premature Aging, Skin Darkening, Skin Cancer, or Actinic Keratoses. Marketers of products could look into addressing this.

Most of the respondents who do not use UV-protecting products say that it is difficult to apply. They also dislike the facts that dust particles stick onto skin that becomes oily after product application, and the sticky feel on their skin all day long. The details are presented in table 5.1

If a manufacturer is able to change the characteristic of the products to exclude the undesired factors mentioned, 134 out of 149 people who are not using UV-protecting products say that they are willing to try the new products that they hope will be easy to apply, non-sticky, and leave a matte effect on the skin. The average price they are willing to purchase is at 4.65 Baht/ml or 465Baht/100 ml.

Table 5.1 The details are presented

				Sticky Feel				Oily Skin				Dust particles stick onto oily skin				Difficult to apply			
				No		Yes		No		Yes		No		Yes		No		Yes	
				Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %
Which	Cream	SPF range	<=20	0	0.00%	2	0.86%	2	0.86%	0	0.00%	2	0.86%	0	0.00%	2	0.86%	0	0.00%
type of			21-30	10	4.29%	42	18.03%	18	7.73%	34	14.59%	26	11.16%	26	11.16%	15	6.44%	37	15.88%
the			31-40	10	4.29%	3	1.29%	4	1.72%	9	3.86%	4	1.72%	9	3.86%	13	5.58%	0	0.00%
product			41-50	23	9.87%	18	7.73%	20	8.58%	21	9.01%	25	10.73%	16	6.87%	30	12.88%	11	4.72%
for UV			>50	1	0.43%	2	0.86%	2	0.86%	1	0.43%	3	1.29%	0	0.00%	3	1.29%	0	0.00%
protection		PA Value	PA+	8	3.19%	18	7.17%	10	3.98%	16	6.37%	0	0.00%	26	10.36%	10	3.98%	16	6.37%
do you			PA++	10	3.98%	12	4.78%	11	4.38%	11	4.38%	15	5.98%	7	2.79%	22	8.76%	0	0.00%
use?			PA+++	13	5.18%	23	9.16%	13	5.18%	23	9.16%	23	9.16%	13	5.18%	19	7.57%	17	6.77%
		UVA protection	No	5	1.99%	8	3.19%	7	2.79%	6	2.39%	10	3.98%	3	1.20%	8	3.19%	5	1.99%
			Yes	41	16.33%	62	24.70%	39	15.54%	64	25.50%	52	20.72%	51	20.32%	60	23.90%	43	17.13%
		UVB protection	No	10	3.98%	8	3.19%	5	1.99%	13	5.18%	14	5.58%	4	1.59%	16	6.37%	2	0.80%
			Yes	36	14.34%	62	24.70%	41	16.33%	57	22.71%	48	19.12%	50	19.92%	52	20.72%	46	18.33%
		Water-Resistance	No	19	7.57%	43	17.13%	20	7.97%	42	16.73%	37	14.74%	25	9.96%	40	15.94%	22	8.76%
			Yes	27	10.76%	27	10.76%	26	10.36%	28	11.16%	25	9.96%	29	11.55%	28	11.16%	26	10.36%
		With Foundation	No	43	17.13%	63	25.10%	37	14.74%	69	27.49%	57	22.71%	49	19.52%	58	23.11%	48	19.12%
			Yes	3	1.20%	7	2.79%	9	3.59%	1	0.40%	5	1.99%	5	1.99%	10	3.98%	0	0.00%

Table 5.1 (continued)

				Sticky Feel				Oily Skin				Dust particles stick onto oily skin				Difficult to apply			
				No		Yes		No		Yes		No		Yes		No		Yes	
				Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %
Which type of the product for UV protection do you use?	Lotion	SPF range	<=20	7	3.00%	15	6.44%	4	1.72%	18	7.73%	19	8.15%	3	1.29%	20	8.58%	2	0.86%
			21-30	4	1.72%	26	11.16%	6	2.58%	24	10.30%	21	9.01%	9	3.86%	17	7.30%	13	5.58%
			31-40	0	0.00%	19	8.15%	0	0.00%	19	8.15%	10	4.29%	9	3.86%	3	1.29%	16	6.87%
			41-50	6	2.58%	32	13.73%	16	6.87%	22	9.44%	22	9.44%	16	6.87%	30	12.88%	8	3.43%
			>50	3	1.29%	9	3.86%	4	1.72%	8	3.43%	9	3.86%	3	1.29%	10	4.29%	2	0.86%
		PA Value	PA+	0	0.00%	19	7.57%	3	1.20%	16	6.37%	11	4.38%	8	3.19%	3	1.20%	16	6.37%
			PA++	2	0.80%	49	19.52%	18	7.17%	33	13.15%	39	15.54%	12	4.78%	42	16.73%	9	3.59%
			PA+++	4	1.59%	19	7.57%	7	2.79%	16	6.37%	10	3.98%	13	5.18%	16	6.37%	7	2.79%
		UVA protection	No	6	2.39%	24	9.56%	3	1.20%	27	10.76%	15	5.98%	15	5.98%	22	8.76%	8	3.19%
			Yes	14	5.58%	88	35.06%	35	13.94%	67	26.69%	71	28.29%	31	12.35%	67	26.69%	35	13.94%
		UVB protection	No	8	3.19%	43	17.13%	14	5.58%	37	14.74%	33	13.15%	18	7.17%	38	15.14%	13	5.18%
			Yes	12	4.78%	69	27.49%	24	9.56%	57	22.71%	53	21.12%	28	11.16%	51	20.32%	30	11.95%
		Water-Resistance	No	18	7.17%	85	33.86%	33	13.15%	70	27.89%	74	29.48%	29	11.55%	73	29.08%	30	11.95%
			Yes	2	0.80%	27	10.76%	5	1.99%	24	9.56%	12	4.78%	17	6.77%	16	6.37%	13	5.18%
		With Foundation	No	18	7.17%	107	42.63%	36	14.34%	89	35.46%	80	31.87%	45	17.93%	82	32.67%	43	17.13%
			Yes	2	0.80%	5	1.99%	2	0.80%	5	1.99%	6	2.39%	1	0.40%	7	2.79%	0	0.00%

Table 5.1 (continued)

			Sticky Feel				Oily Skin				Dust particles stick onto oily skin				Difficult to apply			
			No		Yes		No		Yes		No		Yes		No		Yes	
			Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %
Which type of the product for UV protection do you use?	Mist/Spray	SPF range	<=20	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
			21-30	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
			31-40	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
			41-50	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
			>50	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		PA Value	PA+	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
			PA++	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
			PA+++	0	0.00%	2	0.80%	0	0.00%	2	0.80%	0	0.00%	2	0.80%	0	0.00%	2	0.80%
		UVA protection	No	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
			Yes	0	0.00%	2	0.80%	0	0.00%	2	0.80%	0	0.00%	2	0.80%	0	0.00%	2	0.80%
		UVB protection	No	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
			Yes	0	0.00%	2	0.80%	0	0.00%	2	0.80%	0	0.00%	2	0.80%	0	0.00%	2	0.80%
		Water-Resistance	No	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
			Yes	0	0.00%	2	0.80%	0	0.00%	2	0.80%	0	0.00%	2	0.80%	0	0.00%	2	0.80%
		With Foundation	No	0	0.00%	2	0.80%	0	0.00%	2	0.80%	0	0.00%	2	0.80%	0	0.00%	2	0.80%
			Yes	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%

5.4 Conclusion of the hypotheses testing

Table 5.2 Summary of the Hypotheses Testing

Hypotheses	Result
H_1: 60% of the people use UV-protecting products	Failed to reject
H_2: 60% of the people don't use UV-protecting products because of the stickiness of the UV-protecting products.	Failed to reject
H_3: 60% of the people who don't use UV-protecting products because it is difficult to apply.	Rejected
H_4: People will not change purchase decision after the characteristic of the products is altered.	Rejected
H_5: People would be willing to pay 3 Baht/ml for new UV-protecting products.	Rejected

5.5 Recommendations

From this study it can be seen that around 40% of Thai people are still not using UV-protecting products which is an opportunity for manufacturers to give them knowledge on why they should use UV-protecting products. Many people are not aware of skin cancer or skin diseases. Also, many are not aware of the different sources of UV rays which lead them to think that application is not necessary when remaining indoor. Therefore, I would recommend that manufacturers use informational advertisement to target new customers, to make them aware of the sources of UV rays and the harm that UV rays can cause and it is likely to result in greater sales of UV-protecting products.

Since people who do not use the UV-protecting products claim that they do not want to use because it is difficult to apply, and it makes their palm feel sticky, manufacturers should work on a way to introduce product package designed to aid in application perhaps a type very similar to deodorant bottles which have roller balls as a medium of application transferring UV milky

lotions and creams onto the body without having to pour the products onto the palm for application. This is likely to attract many new customers and also solve the problems that current users are facing. This will be a good investment since on average the respondents are willing to pay up to 4.65 Baht/ml.

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APPENDIX

APPENDIX

QUESTIONNAIRE

แบบสอบถาม

แบบสอบถามนี้จัดทำขึ้นเพื่อประกอบการศึกษาโดยอิสระเรื่อง “พฤติกรรมผู้บริโภคต่อการใช้ผลิตภัณฑ์ปกป้องผิวกายจากรังสียูวีของสตรีวัย ทำงานในกรุงเทพมหานคร” ของนักศึกษาปริญญาโท หลักสูตรวิทยาศาสตรมหาบัณฑิต สาขาวิทยาศาสตร์เครื่องสำอาง มหาวิทยาลัยแม่ฟ้าหลวง

ผู้ศึกษาขอความร่วมมือจากท่านในการตอบแบบสอบถามให้ครบทุกข้อตามความเป็นจริง ซึ่งข้อมูลที่ได้รับจากการสอบถามนี้ผู้ศึกษาจะเก็บไว้ใช้ในการศึกษานี้เท่านั้น และขอขอบพระคุณท่านไว้ ณ โอกาสนี้ด้วย

คำชี้แจง **แบบสอบถามมีทั้งหมด 4 ส่วนคือ**

ส่วนที่ 1 ข้อมูลส่วนบุคคลของผู้ตอบแบบสอบถาม

ส่วนที่ 2 ข้อมูลการใช้ผลิตภัณฑ์กันแสงUV

ส่วนที่ 3 ข้อมูลพฤติกรรมการเลือกใช้ผลิตภัณฑ์กันแสงUV

ส่วนที่ 4 ข้อมูลคุณสมบัติของผลิตภัณฑ์กันแสงUVที่ผู้บริโภคต้องการ

<u>ส่วนที่ 1</u> **ข้อมูลส่วนบุคคลของผู้ตอบแบบสอบถาม**

Q 1 อายุ

A. 0 น้อยกว่า 25 x (ปิดสัมภาษณ์)

0 25 – 30 1

0 30 – 35 2

0 35 – 40 3

0 มากกว่า 40 x (ปิดสัมภาษณ์)

Q 2 อาชีพ

0 การวิจัยตลาด x

0 โฆษณา x

0 บริษัทผู้ผลิต/ผู้ขาย/ผู้จัดจำหน่าย/ค้าส่ง/ค้าปลีกผลิตภัณฑ์ x (ปิดสัมภาษณ์)

0 ประเภทครีมหรือผลิตภัณฑ์เสริมสวย x

0 ธุรกิจส่วนตัว 1

0 พนักงานประจำ 2

0 ข้าราชการ / พนักงานรัฐวิสาหกิจ 3

0 อื่นๆ 4

Q3 รายได้

0 < 8,000 บาท 1

0 8,000 – 15,000 บาท 2

0 15,000 – 25,000 บาท 3

0 25,000 – 50,000 บาท 4

0 > 50,000 บาท 5

Q4 ระดับการศึกษา

0 ต่ำกว่ามัธยมศึกษา 1

0 มัธยมศึกษา หรือ ปวช. 2

0 อนุปริญญาตรี หรือ ปวส. 3

0 ระดับปริญญาตรี 4

0 สูงกว่าปริญญาตรี 5

<u>ส่วนที่ 2</u> ข้อมูลการใช้ผลิตภัณฑ์กันแสงUV

Q 5 คุณเป็นคนใช้ผลิตภัณฑ์สำหรับผิวหรือผลิตภัณฑ์เสริมสวย หรือไม่

0 ใช้ 1

0 ไม่ใช้ 2 (ปิดสัมภาษณ์)

Q 6 คุณใช้ผลิตภัณฑ์ประเภทใดบ้าง (เลือกได้มากกว่า 1 ข้อ)

☐ ผลิตภัณฑ์เสริมสวย (Lipstick, Lip-gloss, Blush on, Eye Shadow, Mascara, Eye Liner etc.) 1

☐ ผลิตภัณฑ์บำรุงผิวชนิดทา 2

☐ ผลิตภัณฑ์บำรุงผิวชนิดทาน 3

☐ ผลิตภัณฑ์แก้จุดบกพร่องประเภทเฉพาะทาง 4

☐ ผลิตภัณฑ์กันแสงUV 5

Q 7 ปัจจุบันคุณเป็นคนใช้ผลิตภัณฑ์กันแสงUV หรือไม่

0 ใช้ 1

0 ไม่ใช้ (โปรดข้ามไปคำถามที่ 28) 2

Q8 แหล่งที่มาของแสง UV ที่คุณได้รับนั้นมาจากสิ่งใดมากที่สุด

0 แสงแดด 1

0 หลอดไฟ 2

0 จอคอมพิวเตอร์ 3

0 อื่นๆ 4

Q9 คุณใช้ผลิตภัณฑ์กันแสงUVสำหรับส่วนไหนบ้าง (เลือกได้มากกว่า 1 ข้อ)

- ☐ ใบหน้า 1
- ☐ คอ 2
- ☐ แขน 3
- ☐ ขา 4
- ☐ ทั่วตัว 5

Q10 คุณแยกประเภทผลิตภัณฑ์กันแสงUVสำหรับทาที่ใบหน้า และส่วนอื่นๆของร่างกาย หรือไม่

- 0 แยก 1
- 0 ไม่แยก 2

Q11 คุณใช้ผลิตภัณฑ์กันแสงUVบ่อยแค่ไหน

- 0 ทุกวัน 1
- 0 นานๆที ตอนที่ต้องออกแดด (โปรดข้ามไปคำถามที่ 13) 2
- 0 เฉพาะตอนว่ายน้ำ (โปรดข้ามไปคำถามที่ 13) 3

Q12 คุณใช้ผลิตภัณฑ์กันแสงUVวันละกี่ครั้ง

- 0 1 ครั้ง 1
- 0 2 ครั้ง 2
- 0 3 ครั้ง 3
- 0 มากกว่า 3 ครั้ง 4

Q13 สาเหตุที่ทำให้คุณใช้ผลิตภัณฑ์กันแสงUV (เลือกได้มากกว่า 1 ข้อ)

- ☐ ตามคำแนะนำของแพทย์และผู้เชี่ยวชาญ 1
- ☐ ผิวคล้ำง่าย 2
- ☐ แพ้แดด 3
- ☐ ป้องกันมะเร็งผิวหนัง 4
- ☐ ป้องกัน การเกิดจุดด่างดำบนผิวหนัง/ การเกิดริ้วรอยก่อนวัย 5
- ☐ อื่น ๆ โปรดระบุ _____ 6

<u>ส่วนที่ 3</u> **ข้อมูลพฤติกรรมการเลือกใช้ผลิตภัณฑ์กันแสงUV**

Q14 ปัจจุบันคุณใช้ผลิตภัณฑ์กันแสงUVยี่ห้อใด (เลือกได้มากกว่า 1 ข้อ)

- ☐ Nivea 1
- ☐ Eucerin 2
- ☐ Neutrogena 3
- ☐ L'oreal 4
- ☐ LaRoche Posay 5
- ☐ อื่นๆ โปรดระบุ _____ 6

Q 15 คุณเป็นผู้เลือกซื้อผลิตภัณฑ์กันแสงUVด้วยตัวเองหรือไม่

- 0 เลือกซื้อด้วยตัวเองทุกครั้ง 1
- 0 เลือกซื้อเองเป็นส่วนใหญ่ 2
- 0 เลือกซื้อเองบ้าง 3
- 0 ไม่ได้เลือกซื้อเอง (โปรดข้ามไปคำถามที่ 20) 4

Q16 ส่วนใหญ่คุณเลือกใช้ผลิตภัณฑ์กันแสงUVสำหรับผิวกายยี่ห้อเดิมทุกครั้งหรือไม่

- 0 ยี่ห้อเดิมทุกครั้ง 1
- 0 เปลี่ยนยี่ห้อบางครั้ง 2
- 0 เปลี่ยนยี่ห้อตลอด 3

Q17 ปัจจัยที่ทำให้คุณเลือกซื้อผลิตภัณฑ์กันแสงUVของยี่ห้อดังกล่าวคือ

- 0 Brand 1
- 0 คุณสมบัติ 2
- 0 ตามคำแนะนำ 3
- 0 ราคา 4
- 0 อื่นๆ โปรดระบุ _____ 5

Q18 ปกติคุณซื้อผลิตภัณฑ์กันแสงUVจากที่ไหน

0 Supermarket 1

0 ร้านขายยา 2

0 Department Store 3

0 โรงพยาบาล/คลีนิกแพทย์ 4

0 อื่นๆ โปรดระบุ _____ 5

Q19 ปกติคุณซื้อครั้งละกี่ ขวด/หลอด ค่ะ และขนาดเท่าใด

ซื้อครั้งละ_____ขวด/หลอด ขนาด _____ml

Q20 ผลิตภัณฑ์กันแสงUVสำหรับผิวกายที่คุณใช้เป็นชนิด

0 ครีม 1

0 โลชั่น 2

0 สเปรย์น้ำ / สเปรย์แห้ง 3

0 ไม่ทราบ 4

Q21 ผลิตภัณฑ์กันแสงUVสำหรับผิวกายที่คุณใช้มีคุณสมบัติใดบ้างดังต่อไปนี้

☐ ป้องกัน UVA 1

☐ ป้องกัน UVB 2

☐ กันน้ำได้ 3

☐ ผสมรองพื้น 4

☐ อื่นๆ โปรดระบุ _____ 5

0ไม่ทราบ 6

Q22 ผลิตภัณฑ์กันแสงUVที่คุณใช้มีค่า SPF ประมาณเท่าไร

0 _____ 1

0ไม่ทราบ 2

Q23 ผลิตภัณฑ์กันแสงUVที่คุณใช้มีค่า PA ประมาณเท่าไร

0 PA+	1
0 PA++	2
0 PA+++	3
0 ไม่ทราบ	4

Q24 จาก Scale 5(รู้มาก) ถึง 1(รู้น้อยมาก) คุณให้คะแนนคุณในความรู้เกี่ยวกับผลิตภัณฑ์กันแสงUVเท่ากับ _____

Q25 คุณได้รับข้อมูลรายละเอียดเกี่ยวกับผลิตภัณฑ์กันแสงUVจากที่ใดบ้าง (เลือกได้มากกว่า 1 ข้อ)

☐ แพทย์	1
☐ สื่อโทรทัศน์	2
☐ สื่อวิทยุ	3
☐ สื่อสิ่งพิมพ์	4
☐ พนักงานขาย	5
☐ ฉลาก	6
☐ อื่นๆ โปรดระบุ _____	7

<u>ส่วนที่ 4</u> ข้อมูลคุณสมบัติของผลิตภัณฑ์กันแสงUVที่ผู้บริโภคต้องการ

Q26 ขอทราบความพึงพอใจต่อผลิตภัณฑ์กันแสงUVที่คุณเลือกใช้อยู่ในปัจจุบัน โดยช่วยให้คะแนนจาก 5(พอใจมาก) ถึง 1(ไม่พอใจมาก) ในปัจจัยดังต่อไปนี้

ปัจจัย	พอใจมาก	พอใจ	เฉยๆ	ไม่พอใจ	ไม่พอใจมาก
ราคา	5	4	3	2	1
สถานที่จำหน่าย	5	4	3	2	1
โฆษณาและการแนะนำสินค้า	5	4	3	2	1
ค่า SPF	5	4	3	2	1

ปัจจัย	พอใจมาก	พอใจ	เฉยๆ	ไม่พอใจ	ไม่พอใจมาก
ค่า PA	5	4	3	2	1
คุณสมบัติกัน UVA/UVB	5	4	3	2	1
ส่วนผสมของผลิตภัณฑ์กันแสงUV	5	4	3	2	1
สี	5	4	3	2	1
กลิ่น	5	4	3	2	1
ความละเอียด	5	4	3	2	7
ความเหนียว	5	4	3	2	1
การซึมเข้าผิว	5	4	3	2	1
ผิวของคุณหลังจากทาผลิตภัณฑ์กันแสงUV	5	4	3	2	1
Packaging	5	4	3	2	1
วิธีการทา	5	4	3	2	1

Q27 มองภาพรวมช่วยให้คะแนนผลิตภัณฑ์กันแสงUVสำหรับผิวกายที่คุณใช้อยู่ในปัจจุบันจาก 5(ช่วยปกป้องกันแดดได้มาก) – 1(ไม่ได้ช่วยอะไรเลย)

Q28 คุณทราบข้อเสียต่างๆของแสงแดดข้อใดบ้าง (เลือกได้มากกว่า 1 ข้อ)

- ☐ ผิวไหม้แดด 1
- ☐ ผิวหนังมีการแก่ก่อนวัย / ผิวหมองคล้ำ 2
- ☐ มะเร็งผิวหนัง 3
- ☐ ภูมิคุ้มกันของร่างกายลดลง 4
- ☐ ผิวตกกระ 5
- ☐ ตีนกา 6
- ☐ โรคผิวหนัง actinic keratoses 7
- ☐ อื่นๆ โปรดระบุ _____ 8

Q29 การใช้ผลิตภัณฑ์กันแสงUVสำหรับผิวกายแล้วทำให้คุณรู้สึกอย่างไรบ้างดังต่อไปนี้ (เลือกได้มากกว่า 1 ข้อ)

☐ มือเหนียวเหนอะหนะ	1
☐ ผิวมัน	2
☐ เศษผงและฝุ่นติดตามบริเวณที่ทาผลิตภัณฑ์กันแสงUV	3
☐ แห้งช้า	4
☐ สีหลอกตา	5
☐ กลิ่นฉุน	6
☐ คันเหมือนๆจะแพ้ผลิตภัณฑ์กันแสงUV	7
☐ ทายาก/รู้สึกรำคาญ	8
☐ อื่นๆ โปรดระบุ _____	9

Q30 จากที่คุณได้ตอบคำถามข้อ 29 ความรู้สึกใดที่ทำให้คุณรู้สึกไม่อยากใช้ผลิตภัณฑ์กันแสงUVมากที่สุด

_____

Q31 ถ้าในอนาคตมีผลิตภัณฑ์กันแสงUVยี่ห้อใหม่ที่ราคาไม่เกินท้องตลาด เป็นผลิตภัณฑ์กันแสงUVที่มีคุณภาพดี ปราศจากข้อด้อยที่คุณไม่ชอบจากข้อ 29 และเป็นผลิตภัณฑ์กันแสงUVที่มี Packaging ดี เป็นมิตรกับสิ่งแวดล้อม ไม่ทราบว่าคุณสนใจจะลองใช้ หรือไม่?

0 สนใจ	1
0ไม่สนใจ	2

Q32 คุณคิดว่าราคาที่เหมาะสม ควรจะอยู่ที่

_____บาท ต่อ ขวด/หลอด ขนาด _____ml

**********ขอขอบคุณสำหรับเวลาที่คุณช่วยตอบแบบสอบถาม**********

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