EXPERIENCES OF HEALTH PROBLEMS ASSOCIATED WITH CHEMICAL HAIR RELAXATION AMONG FEMALE MASTERS OF PUBLIC HEALTH STUDENTS COLLEGE OF MEDICINE, UNIVERSITY OF IBADAN

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DEDICATION

This work is dedicated to God Almighty, the father of our lord Jesus Christ, the most faithful, merciful and gracious, the only true and living God. The creator of the whole universe.

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CERTIFICATION

I certify that this work was carried out by Asiwaju Temitope Elizabeth in the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan, under my supervision.

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ABSTRACT

Chemical hair relaxers has found widespread use in African Negroid women given their desire to straighten their curly hair, the pressure from advertisers, fashion and contact with other cultures. This process of beautification as however been linked to health problems like; scalp infections, scalp burns/lesions, scalp irritation, hair loss; with a resulting psychosocial stresses such as worrying, fear, shame, depression, reduced self worth; which are contributory to reductions in the quality of life (QoL) of its users. Community based studies in Nigeria regarding these entities are seemingly deficient. The study was aimed at assessing the experiences of health problems associated with the use of these chemicals.

This descriptive cross-sectional study involved a total of 250 female masters of Public Health students of the University of Ibadan, randomly selected from their departmental lecture rooms using a two-stage random sampling technique. The respondents were exposed to a pre-tested self-administered questionnaire to elicit information regarding their socio-demographic characteristics, perception, health experiences, psychosocial impacts and strategies for coping with health complications as a result of chemical relaxation. Data were analysed and presented descriptively and inferentially.

Age of participants was found to be 27.0±2.6 years. Results showed health problems due to chemical relaxation ranging from mild and moderate experiences of itching scalp (71.2%), hair loss (71.4%), to severe cases of thinning/breakage (9.6%), hair discolouration (16.4%), scalp lesion/burns (12.6%), scaring/flaking of scalp (1.6%), and (4.4%) had scalp pruritus/irritation. Results also showed that (57.6%) of students had good perception regarding chemical hair relaxation. Psychosocial impacts were depression (22.4%), feeling of shame (41.2%), embarrassment (52.4%), worrying (30.4%), loss of self confidence (28.0%), hate (23.6%), reduced self worth (23.2%), frustration and sadness (22.8%). The most prevalent strategy for coping was wearing of scarfs and wigs to cover hair (83.8%). Other identified strategies for coping were; frequent oiling to manage frizzy hair (83.2%), use of anti-dandruff shampoo or creams (56.0%), biotin supplements use (48.4%), wearing traditional hair styles (52.0%), use of chemical/herbal treatments, use of leave-in conditioners (78.4%), and steaming hair every three months (43.6%). A significant association was found

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between perception regarding frequency of chemical hair relaxation and health experiences due to relaxer use (x^2=90.85, p=0.00, x^2=93.83, p=0.00, x^2=79.59, p=0.00), and perception regarding non-professional handling and health experiences due to relaxer use (x^2=26.57, p=0.00, x^2=62.51, p=0.00, x^2=42.89, p=0.00). This study also found a significant relationship between hair discolouration (x^2=154.82, p=0.00), dandruff (x^2=89.50, p=0.00), hair loss (x^2=89.55, p=0.00) and feelings of depression, a significant association between dandruff and loss of self confidence (x^2=61.41, p=0.00), and an association between hair loss and reduced self worth (x^2=74.27, p=0.00).

Female students experienced health challenges as a result of chemical relaxation with its use still widespread among them for beautification and ease of hair management. The various self-reported experiences have health implications and might call for a greater emphasis by regulatory bodies on safer modes of applications, and stiffer market regulations as regarding the active chemicals in the relaxers.

Keywords: Psychosocial experiences, Chemical hair relaxation, Health problems, Female students

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List of Acronyms

MPH	Masters of Public Health
AGA	Androgenetic Alopecia
CCCA	Central Centrifugal Cicatricial Alopecia
FPHL	Female Pattern Hair Loss
PBC	Perceived Behavioural Control
QoL	Quality of Life
TA	Traction Alopecia
TN	Trichorrhexis Nodosa
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action

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CHAPTER ONE

INTRODUCTION

1.0 BACKGROUND

For men and women of colour, a well-groomed head of hair serves as a visual marker for social affiliation and personal identity. Styling practices are determined by individual hair characteristics and preferences, but they are also influenced by prevailing social trends. For example, in the first half of the twentieth century, African-American musicians popularized slick, smooth conks and pompadours, but by the 1970s, the trend moved on to sky-high afros and beaded braids. Other factors that influence hair-care practices include convenience, ease of styling, occupation, recreational activities, and climate (Ingrid et al 2009).

The hair is an epidermally derived structure that is comprised of a follicle and a shaft. The main constituents of the hair shaft are proteins, lipids, water, melanin, and trace elements. Hair is a dead structure with no nerve connections and thus does not cause a feeling of pain when damaged. Cross-sectionally, the hair shaft consists of 3 major parts (from the outside in): the cuticle, the cortex, and the medulla (Harrison, 2003).

The unique properties of hair of African origin are conducive to the expression of personal style. The curved, elliptically-shaped hair shaft (Thibaut et al 2004, Lindelof et al 1988) lends itself to mouldable styles that retain their form and texture. When heat or chemical agents are applied to African hair, the strands temporarily or permanently release their intrinsic coil properties and can be fashioned in innumerable ways.

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This immense diversity of options for hair care is not without drawbacks as African hair is innately fragile. The inappropriate use of styling aids may weaken the hair shaft and lead to breakage, scalp inflammation, and potentially permanent hair loss (Alopecia).

A chance discovery made by Garrett Morgan (1913), an African-American tailor was the first one to discover an alkaline based chemical used to polish machine needles, which incidentally caused straightening of hair (Obukowho, 2012).

Historically, they were mainly used by Negroid woman to straighten their curly hair for easy management. However, hot comb method has since then been replaced by chemical hair relaxers that allow permanent hair straightening (Olasode 2009), and these chemical based hair relaxers are broadly classified as “Lye” relaxers, no-lye relaxers and “thio” relaxers (Rosenberg, 2007).

Scalp hair dressing in women is of major social and sexual display and importance. The African woman prides herself in her hairstyles ranging from tying with thread, weaving of hair strands and later hair straightening initially by the use of hot combs. Heating and coiling hot combs were promptly replaced by the use of chemical hair relaxers that allow for permanent hair straightening. The need for repeated applications of these relaxers has resulted in short and long term impacts on the texture and quality of the hair in users (Olasode, 2009).

Chemical relaxing straightens curly hair using chemicals that alter the hair’s natural texture. A chemical relaxer, unlike a press, prevents the hair from reverting to its natural state when exposed to water or humidity. When developed in the 1940s, chemical relaxers were crude concoctions of sodium hydroxide or potassium hydroxide (lye) mixed in potato starch (Syed, 1997).

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In the 1950s, the relaxing formulas were placed in a creamy base of petrolatum, fatty alcohols, and emulsifiers. Before relaxing the hair, a petrolatum base was applied to the scalp to protect it. Women were instructed not to shampoo or manipulate the scalp prior to applying the relaxer to avoid burning and irritating the scalp. The popular products used today in salons and at home are more advanced and do not include base or lye (formulated with guanidine hydroxide) relaxers but do include nonbase, texturing, and conditioning relaxers.

Chemical relaxing changes one third of the cysteine contents of the hair to lanthionine and hydrolyzes peptide bonds (Syed, 1997). The solution penetrates into the cortical layer and the cross bonds (sulphur and hydrogen) are broken. The chemicals are highly alkaline and can leave the hair with a pH level as high as 12.0. If left on the hair too long, the solution will digest the hair. The length of time it should remain on the hair depends on hair thickness. A neutralizer stops the chemical reaction of the relaxer. It re-forms cysteine (sulfur) cross bonds in their new position and rehardens the hair. It has been proposed that a neutralizing shampoo (PH level 4.5–6.0) brings the hair back to a pH balance of 4.0 to 6.0.

The use of chemical hair relaxers has found widespread use in African Negroid women because of the desire to straighten their curly hair. The hair texture in Negroids is essentially coily and the process of straightening makes easier to comb and style (Olasode 2009).

This beautification process, however, is not without its own hazards to the users. Several epidemiological and hospital-based studies have shown this as a significant problem in people of African descent (Child 1999, Alexis 2007, Olsen et al 2011, Kyei et al 2011, Arsouze et al 2008, Senegal et al 2005, Nnoruka 2007, Traore 2007, Khumalo 2007, Khumalo et al 2007).

In light of this, this study therefore seeks to assess the experiences of health problems associated with chemical hair relaxation among female Masters of Public Health students, University of Ibadan.

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1.1 STATEMENT OF PROBLEM

The need for repeated applications of chemical hair relaxers has resulted in short and long term impacts on the texture and quality of the hair of their users (Olasode 2009). To date, both hospital and community studies undertaken in the U.K. (Child 1999), U.S.A. (Alexis 2007, Olsen et al 2011, Kyei et al 2011), France (Arsouze et al 2008), Senegal (Senegal et al 2005), Nigeria (Nnoruka 2005, Nnoruka 2007), Burkina Faso (Traore 2007) and South Africa (Khumalo 2007, Khumalo et al 2007) have shown that hair and scalp diseases, are a significant problem in people of African descent.

Chemical hair relaxation has been linked to alopecia (hair loss), with a resulting experience of psycho-emotional stress which is a leading cause of reductions in quality of life and secondary morbidity (Swee 2000, Nicholson 1993, Bulengo-Ransby 1992).

Some patients' suffering can reach a level where the burden of hair loss is comparable with that caused by many more severe chronic or life-threatening diseases (de Koning et al, 1990; Cash, 2001).

The World Health Organization projects that by the year 2030, Unipolar Depressive Disorders that was as at 2004 third on the list of the global burden of disease will become the highest contributor to global burden of disease (WHO, 2004).

More than 33% of women worldwide have clinically significant hair loss during their lifetime (Jerry, 2007); several epidemiological and hospital-based studies have shown that hair and scalp disorders are a significant problem in people of African descent (Salam et al, 2013, Olasode, 2009).

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The majority of African American women use various methods to straighten their hair. It is estimated that 80% of these women treat their hair with chemical relaxers (Callender, 2004).

Complications of chemical hair straightening with potent chemicals include delapitation, traumatic hair breakages, and hair discolouration from bleaching, scalp abrasions, sores and burns especially with chemicals with unacceptably high pH (Authur, 1982). Other effects of chemical hair relaxation include; dandruff, itchy scalp, scalp burns, scarring of scalp, and weak breaking hair (Olasode 2009).

Hair discoloration appears to be quite high in current series of women with more than 50% occurrence rate, and this change in hair colour has serious economic implication at individual and national level (Olasode 2009).

The use of chemical hair relaxers cuts across all age groups (Olasode 2009). Body image and self esteem are not negotiable especially in students of higher learning and in career women who need co-operate appearance to make an impression in their institutions and places of work. However, it is necessary to take great care in the use of chemical hair relaxers, given its potential for adverse reactions.

In light of this, this study seeks to assess the experiences of health problems associated with the chemical hair relaxation in beautification processes and list out strategies for coping with problems of this hair straightening process.

1.2 **PURPOSE AND RATIONALE OF THE STUDY**

1.2.1 **PURPOSE OF THE STUDY**

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The purpose of this study is to assess the experiences of health problems associated with chemical hair relaxation among female Masters of Public Health students, University of Ibadan.

1.2.2 RATIONALE

Although there has been several work done on the problems of hair loss in women, there is paucity of literature regarding the negative effects of chemical hair relaxation and it's contributions to the burden of hair loss especially among women in Nigeria. Also, the level of awareness towards chemical hair relaxation and its potential complications has not been well documented or is limited. Majority of studies have focused mainly on Hair loss (Olasode 2009, Nnoruka, 2005).

Most of the prevalence data pertaining to hair and scalp disorders in people of African descent have been obtained from studies undertaken within hospital settings, and such data are often biased, not representative of the general population. For this reason, community-based studies are preferable (Salam, 2013). In view of this, the need to assess the experiences and perception of respondents (within a school community) regarding the health implications of chemical hair relaxation is warranted.

The results obtained from this study will provide valuable information to health planners to guide decisions for interventions, coordination and integration of prevention and control of health problems relating to the use of chemical hair relaxers.

1.3 RESEARCH QUESTIONS:

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1. What are the experiences of students regarding chemical relaxation of hair?

2. What is the perception of female students regarding chemical hair relaxation?

3. What are the perceived psychosocial impacts of hair complications as a result of chemical hair relaxation?

4. What are the student's strategies for coping with health problems as a result of chemical relaxation?

1.4 RESEARCH OBJECTIVE

1.4.1 BROAD OBJECTIVE:

To investigate the experiences of health problems associated with chemical hair relaxation among female Masters of Public Health students, University of Ibadan.

1.4.2 SPECIFIC OBJECTIVES

1. To examine the health experience of students as a result of chemical hair relaxation.

2. To determine the perception of students regarding chemical hair relaxation.

3. To determine the perceived psychosocial impact of hair complications due to chemical relaxation.

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4. To identify strategies for coping with complications of chemical hair relaxation.

1.5 HYPOTHESES

1. H0: There is no significant association between socio-demographic characteristics and respondents and perception regarding chemical hair relaxer use.

2. H0: There is no significant association between the experiences of health problems due to chemical hair relaxation and psychosocial impact of complications of chemical hair relaxation.

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CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

The hair styles of women of African descent can be divided broadly into two groups: natural vs. chemically treated hair (Callender et al 2004, Roseborough et al 2007). Natural hairstyles include the afro, dreadlocks, twisting and braiding. The latter can be undertaken with or without the use of human or artificial hair extensions. Hot combs can also be used to straighten afro-textured hair temporarily.

Chemical processing of afro-textured hair is a common practice, with one study reporting that 50% of black South African women 'relax' their hair (Khumalo et al 2007). The pain associated with combing natural African hair makes the long history of attempting to make African hair easier to comb, also understandable. More recently it is likely that the pressure from advertisers, fashion and contact with other cultures have contributed, in varying degrees to the preference for chemically straightened hair that is now prevalent. Prevalence ranging between 50% in South African women mostly greater than 40 years (Khumalo 2007), 78% in school children not less than 15 years (Khumalo 2007) and 80% as stated in an unpublished hair industry data, subsequently sited by Khumalo, 2007. The need for repeated applications of these relaxers has resulted in short and long term impacts on the texture and quality of the hair in users (Olasode, 2009).

2.1 Chemical Relaxation

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Chemical relaxing straightens curly hair using chemicals that alter the hair's natural texture. A chemical relaxer, unlike a press, prevents the hair from reverting to its natural state when exposed to water or humidity. When developed in the 1940s, chemical relaxers were crude concoctions of sodium hydroxide or potassium hydroxide (lye) mixed in potato starch (Syed, 1997). In the 1950s, the relaxing formulas were placed in a creamy base of petrolatum, fatty alcohols, and emulsifiers. Before relaxing the hair, a petrolatum base was applied to the scalp to protect it. Women were instructed not to shampoo or manipulate the scalp prior to applying the relaxer to avoid burning and irritating the scalp.

The popular products used today in salons and at home are more advanced and do not include base or lye (formulated with guanidine hydroxide) relaxers but do include nonbase, texturing, and conditioning relaxers. The steps involved in the chemical relaxing process are discussed in Table 1 (Roche, 2000).

Chemical relaxing changes one third of the cysteine contents of the hair to lanthionine and hydrolyzes peptide bonds (Syed, 1997). The solution penetrates into the cortical layer and the cross bonds (sulphur and hydrogen) are broken. The chemicals are highly alkaline and can leave the hair with a pH level as high as 12.0. If left on the hair too long, the solution will digest the hair. The length of time it should remain on the hair depends on hair thickness. A neutralizer stops the chemical reaction of the relaxer. It re-forms cysteine (sulfur) cross bonds in their new position and rehardens the hair. It has been proposed that a neutralizing shampoo (Ph level 4.5–6.0) brings the hair back to a pH balance of 4.0 to 6.0.

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Steps in Chemical Relaxing (Lanthionization)

- Processing: Chemical relaxer is applied to the hair, which immediately begins to soften, enabling the chemical to penetrate the hair and thus loosen and relax the natural curl

- Neutralizing: Once the hair has been sufficiently processed, the chemical relaxer is thoroughly rinsed out with warm water followed by either a built-in shampoo neutralizer or a combination product of prescribed shampoo and neutralizer

- Conditioning: Chemical relaxer opens the hair cuticle, which is unable to maintain moisture depending on a client's needs; the conditioner may be part of a series of hair treatments or may be applied to the hair after the relaxing treatment

- Retouching: Chemical relaxer is applied to the new growth of hair every 8 to 10 weeks to maintain the straight style as the hair grows

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Hair relaxation is also called straight permanent waving, as stated in an experimental study carried out in Japan using scanning electron micrographs (SEM) to show broken hairs and hair damage caused by permanent wave solutions (Tokuya and Seiji, 2013) explaining that there are methods that change curly or wavy hair into straight hair. The study also compared hair relaxation to permanent waving, and stated that; the principle of hair relaxation is exactly the same as the principle of permanent waving, and that the sole difference is that in hair relaxation the winding around the rods in permanent waving is replaced by stretching the hair out straight with a comb.

FIGURE 2.1: natural African hair that is unprocessed

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The solution 1 used for hair relaxation takes the form of a viscous cream that contains a thickener. It also has stronger reducing power than the permanent wave solution. Combing is performed as the step that corresponds to the winding step in permanent waving. More specifically, the hair is combed out straight with a rather coarse comb. The step in which the hair is stretched out with the comb after the solution 1 reaction

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causes a great deal of dam- age to the hair, and caution is required because of the risk of damaging or breaking the hair. In 2001, a method in which an iron is used was authorized as a substitute for combing, and a method in which hair is relaxed with a high-temperature hairdressing iron after the solution 1 reaction has become main- stream. In this method the hair is treated by placing bundles of hair, starting at the roots, between the flat plates of a straight iron heated to 180°C and sequentially sliding the iron to the tips of the hair. The same as in permanent waving, the hair is then treated with solution 2 and rinsed with water (Tokuya and Seiji, 2013).

De sa Dias, 2007 explained that traditional salon relaxers ('lye relaxers') are emulsions of 1.5–3.5% sodium hydroxide (pH range 12–14). Base-lye relaxers are higher pH lye relaxers that require a protective 'base' coat of petrolatum to be applied to the scalp. 'No-lye' relaxers (potassium hydroxide, lithium hydroxide or guanidine hydroxide), and 'thio' relaxers (ammonium thioglycolate) are also available for home use. During the process of chemical relaxation of afro-textured hair, these aforementioned hydroxide emulsions are applied to the hair. This leads to breakage of disulfide bonds and softening and stretching of the hair shaft (Draelos 2011). The straight shape of the hair is fixed by rinsing with an oxidizing agent. A neutralizing shampoo is then used to bring the hair back to its physiological pH. This step is imperative, as ongoing contact with the chemical relaxer will cause complete disintegration of the hair strands. Finally, a conditioning shampoo is used to restore moisture to the hair. Chemical straightening of afro-textured hair is not permanent; new growth will possess the original disulfide bonds and for this reason regular 'touch ups' are advised (preferably not more frequently than eight weekly).

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FIGURE 2.2: chemically strengthened hair

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Several individuals are beginning to go natural of recent times. For example, a significant number of respondents (40 percent) reported wearing natural (not chemically relaxed) hair in a study carried out by Gathers 2014. This number was surprising, as it contradicts prevailing beliefs and reports that between 70 to 80 percent of African American women relax their hair (Callender 2004).

However, recent marketing reports confirm that the number of African American women who do not chemically relax their hair is increasing. In 2011, 36 percent (36%) of African American women reported wearing non-chemically relaxed hair, up from 26 percent in 2010. Similarly, relaxer kit sales dropped 17 percent (17%) between 2006 and 2011 (Healy 2011). These figures may herald a welcome change, as women with natural hairstyles are more likely to engage in vigorous physical activity, and thus may enjoy a more optimal body weight.

Having a straightened hair texture may not be "exercise friendly" and may have both conscious and unconscious effects on the decision to avoid exercise (Railey 2000). Indeed, in one study, women with relaxed hair were more likely to avoid exercise because of their hair (Barnes 2007). Among hairstyling strategies reported to be a solution to exercise-related hair concerns, natural hairstyles (afro styles) have been reported viable option (Barnes 2007, Hall 2013).

One barrier to embracing natural hairstyling may be unfamiliarity. Many African American women begin having their hair chemically straightened as young girls, and thus never have the opportunity to learn to care for their hair in its natural state. Rucker-Wright reported that 41 percent of African American girls aged 1 to 15 wore relaxed hair, and 46 percent had their first relaxer between ages 4 and 8 (Rucker 2011).

2.2 Hair and Scalp Disorders Associated With Chemical Relaxation

2.2.1 Hair Shaft Abnormalities

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2.2.1.1 Acquired trichorrhexis nodosa (Hair Breakage)

Trichorrhexis nodosa is a hair shaft defect due to increased fragility (Whiting 2001). It commonly affects the hair on the scalp although there are reports of pubic, beard, and moustache involvement. It is commoner in those of Afro Caribbean descent possibly because of the hairstyling techniques (Sperling 2006). The nodes represent areas of frayed cortical fibres that bulge out through a ruptured cuticle. It is associated with fractures and splitting of the hair shaft into many small fibres giving a brush tip appearance. Commonly, the disruption is distal resulting from weathering of the hair, as a result, of chemical, physical and thermal injury while grooming.

The link between hair fragility and the use of chemical relaxers was demonstrated by the work of Khumalo et al. 2010, who undertook biochemical analysis of natural asymptomatic and symptomatic (brittle) relaxed hair. They found that there was a decrease in cystine, citrulline and arginine in all relaxed hair compared with natural hair; the cysteine levels in distal asymptomatic relaxed hair and all symptomatic (brittle) relaxed afro-textured hair were found to be similar to each other, and to those observed in the genetic hair fragility disorder, trichothiodystrophy.

Trichorrhexis nodosa (TN) has also been reported in association with Netherthon's syndrome (atopic dermatitis, icthyosis, deafness), but there is no known association with atopic dermatitis alone (Ogunbiyi et al 2014).

A case report by Ogunbiyi et al 2014 of a 28 year old Nigerian female was seen in the clinic with three episodes of universal hair loss starting at the age of seven. Each episode was associated with the use of different chemical hair straighteners.

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Mirmirani and Callender in 2010 and 2004 respectively also explained that excessive physical and chemical stresses on the hair shaft as a result of excessive brushing, combing, braiding, as well as heat, and chemical processing can result in this.

Jennifer et al 2009 also corroborated these studies. She posed that the onset of hair breakage may occur after years of straightening with chemicals and/or heat without a problem. That sometimes, excessive brushing with a stiff brush precedes the breakage. She further explained that in some patients, there is no clear history of chemical, thermal, or mechanical injury and that it is important to stress that breakage does not necessarily mean that something was improperly done; rather, the effects of these practices are *additive* and, depending on the intrinsic, genetic aspects of the hair, the cumulative result is breakage.

2.2.2 Alopecia (Hair Loss)

Alopecia is a chronic dermatological disorder in which people lose some or all of the hair on their head and sometimes on their body as well. It is a chronic inflammatory disease that affects the hair follicles. It is neither life threatening nor painful, though there can be irritation of the skin, as well as physical problems resulting from the loss of eyelashes and eyebrows.

The aetiology and subsequent development of alopecia is not fully understood, but it is an autoimmune disorder that arises from a combination of genetic and environmental influences (Madani and Shapiro 2000). Alopecia is a common disorder, with an estimated life-time prevalence of 1.7% (Kalish and Gilhar 2003), though this figure is not a reliable estimate, as few epidemiological studies have been published (Lenane et al 2005) owing partly to under-reporting.

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2.2.2.1 Traction Alopecia

Traction alopecia (TA) is a type of acquired hair loss that results from excessive tension on scalp hair, affecting predominately women (Whiting 1999), and TA is particularly common in black females; however, no gender, race, or age group is spared if hairstyling practices are highly traumatic. It is an important and common cause of alopecia in women of African descent. Early diagnosis is important as hair loss is reversible in the early stages (Samrao 2011), but over the course of months or years, scarring ensues (termed biphasic alopecia). Patients typically present with symmetrical fronto-temporal hair loss and/or occipital scalp hair loss. Closer inspection may reveal residual vellus hair follicles, erythema or folliculitis (Fox 2007).

Traction usually takes months/years to cause alopecia and is associated with hairstyles such as ponytails, tight braids, hair weaves, hair rollers or the wearing of tight headscarves. The risk of developing this condition increases with painful traction, and with traction-associated hairstyles on chemically relaxed hair (Khumalo 2008).

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FIGURE 2.2.2.1: Alopecia in a woman exposed to chemical hair relaxers

Histopathological features (Sperling 2003, Stefanato 2010) of early traction are similar (although more subtle) to those observed in trichotillomania. Features include increased number of non-anagen follicles, without significant inflammation, distorted hair follicle anatomy, trichomalacia, perifollicular and intrafollicular haemorrhage and melanin casts. In late stage TA, there is follicular dropout, with replacement of follicular units by fibrous tracts; however, sebaceous glands are generally preserved. This is a unique finding as most cases of scarring alopecia are associated with loss of sebaceous glands.

2.2.1.2 Central Centrifugal Cicatricial Alopecia

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LoPresti et al. first described this disorder as ‘hot comb alopecia’ in 1968, owing to the initial incorrect association with the use of hot combs. Other names have also been used to describe this entity (chemically induced cosmetic alopecia by Nicholson et al. in 1993; follicular degeneration syndrome; central centrifugal scarring alopecia by Sperling et al. in 2000, and finally the term ‘central centrifugal cicatricial alopecia’ used by the North American Hair Research Society in 2001. This is classified as a lymphocytic primary scarring alopecia that predominantly affects, but is not exclusive to women of African descent (Olsen et al 2003). The disease primarily affects the crown and/or vertex scalp regions, sparing the occiput.

The aetiopathogenesis of CCCA remains unknown, although hair-grooming practices have been implicated. Recent data link this disease to the use of sewn-in weaves and artificial hair extensions (Gathers 2009). There is also some evidence to suggest a genetic predisposition, with Dlova and Forder 2012 recently reporting the occurrence of families with CCCA.

Finally, there are limited data linking CCCA with type 2 diabetes mellitus (Kyei 2011). This is especially pertinent given the emerging role of peroxisome proliferator-activator receptor (PPAR)-c in the aetiopathogenesis of scarring alopecias such as LPP (Karnik 2009, Mirmirani 2009). Clinically, CCCA presents as a slow-growing area of alopecia involving the crown and/or vertex scalp regions (Shah 2010, Gathers 2009).

Khumalo et al 2007, who have conducted population studies in Africa looking at hairdressing and the prevalence of scalp diseases commonly seen in black children and adults, found a surprisingly low prevalence of CCCA (1.9%) in adults, most of whom were older than 50 years, and no CCCA in children, a surprising finding given that the common hair grooming practices, such as chemical relaxer use and braids linked to CCCA in African American women, are also used in this African population.

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In contrast, African American women in the United States commonly present with CCCA, but true prevalence data in this population are lacking (Kyei 2011). Gathers and Lim 2009 found an association between CCCA and hair weaves and braids but not relaxers. Khumalo et al 2007, however, reported 5 cases of acute chemical relaxer –associated scarring hair loss in African women.

Bulengo-Ransby and Bergfeld 1992 also reported a case of chemical relaxer –associated scarring hair loss. There are other reports of relaxers causing clinically significant chemical burns and hair loss, but it is unclear if those affected went on to develop CCCA. Thus, it is still uncertain whether hair grooming practices are a risk factor (Khumalo et al 2007, Gathers and Lim 2009, Kyei 2011).

2.2.3: Scalp Abnormalities due to chemical relaxation

2.2.3.1: Scalp burns/lesions

Hair relaxers (straighteners) have been used by millions of black women, often for long periods of time (de Sa Dias 2007). Hair relaxers can cause burns and lesions in the scalp, facilitating entry of hair relaxer constituents into the body (Dogra et al 2003, Nigam 2009). In a follow up study, Wise et al 2011 followed 23,580 premenopausal women for twelve (12) years from 1997 to 2009 for incident uterine leiomyomata. Multivariable Cox regression was used to estimate incidence rate ratios at 95% confidence intervals and the work showed that their really could be a link between chemical relaxers and increase in the risk of developing uterine leiomyomata.

The main ingredient of “lye” relaxers is sodium hydroxide; no-lye relaxers contain calcium hydroxide and guanidine carbonate, and “thio” relaxers contain thioglycolic acid salts (wickett 1987). No-lye relaxers are advertised to cause fewer scalp lesions and burns than lye relaxers, but there is little evidence to support this claim (Khumalo 2010). Products may also contain hormonally active compounds, such as phthalates, which are not required to be listed separately as ingredients and are often reported under the term “fragrances” or “perfume” (Houlihan 2002).

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Cosmetic products are not subject to premarket approval by the Food and Drug Administration, and a complete list of ingredients is not mandatory (Silver Spring 2009), making it unclear what types of chemicals they contain. However, because the vast majority of hair relaxers list "fragrance" as an ingredient, and 100% of popular fragrances tested in a 2002 study were found to contain phthalates (Houlihan 2002, Sarantis et al 2010), most hair relaxers likely contain these chemicals. In addition, some hair relaxer products directly list phthalates as one of their chemical ingredients (EasyStraight Hair Straightening System, 2010).

Figure 2.2.3: Severe cases of scalp lesion/burns due to chemical relaxation

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The Dependency of African Women on Hair Relaxers is Truly Worrisome. In the above are clear pictures of ladies whom hair relaxer have damaged their scalp. It is therefore important that African women begin to think about the need to embrace their natural curly and woolly hair.

2.3 Psycho-Social Impacts of Hair and Scalp Disorders due to Chemical Relaxation

There is a growing literature on the psychosocial implications of hair loss or alopecia. It is not surprising that hair loss distresses people, as hair – particularly but not solely for women – is a vital aspect of identity. We know that alopecia can result in emotional stress, reduced self-esteem; fear and anxiety can all impact alopecia patients' psychosocial state, social interactions and daily activities (Hunt & McHale, 2004, 2005a & b).

People with alopecia (hair loss) are at higher risk for developing psychiatric disorders, including serious depressive episode, anxiety disorder, social phobia, or paranoid disorder (Koo et al 1994). Although it is a mild dermatological disorder, psychologists and dermatologists have observed that even clinically imperceptible hair loss is capable of damaging the quality of life (QoL) of patients due to the loss of self-image and diminished self-esteem (Schmidt 2001, Williamson 2001).

Women with hair loss have reported experiencing adverse psychosocial reactions, including irritability, anger, anxiety and depression, due to the significant sexual and social functions of the appearance of their hair (Cash 1993, Camacho 2002). For example a study carried out by Chaudhury et al. (2001) studied fifty outpatients with alopecia areata and an equal number of age and sex matched controls without any physical or psychiatric disorders, and found that the patients with alopecia were significantly more anxious and depressed, and reported significantly more stressful life events compared to controls (Chaudhury et al 2001).

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The prevalence of psychiatric disorders was also significantly higher in these patients (26%) than in controls (2%). Much of the literature on the psychosocial impact of a form of alopecia (Androgenitic Alopecia) has focused on men, yet the impact may again be more pronounced in women than men, partially because of societal pressure for physical attractiveness, the greater investment of women in their appearance, and the lower prevalence in women, hence the impression of deviating from normal.

In a study of women with Androgenetic Alopecia, Girman et al. (1999) found that participants were most bothered by an inability to style their hair, dissatisfaction with their appearance, concern about their hair loss continuing, and concern about others noticing their hair loss.

Emotional aspects of hair loss also ranked highly, including self-consciousness, jealousy, embarrassment, and feeling powerless to stop the hair loss. In other studies of women with Androgenetic Alopecia, personality disorders, depression, anxiety, greater dissatisfaction with life, and negative feelings about their body image have all been shown to be associated with Androgenetic Alopecia (e.g. Cash, Price & Savin, 1993; Maffei, Fossati, Rinaldi & Riva, 1994; van der Donk et al., 1991).

Similarly, low self-esteem, reduced self-confidence and insecurity are commonly accepted as associated with Androgenetic Alopecia in women (e.g. Cash et al., 1993). Van der Donk et al. (1994) found that 72% of women with Androgenetic Alopecia reported that their hair loss affected their self-esteem in a negative way, and this was expressed in terms of decreased self-confidence, uncertainty, shame and feelings of interiority. Feeling uncomfortable around others and avoiding going out are not uncommon amongst women with AGA, and some have even suggested that these social problems may extend to marital or sexual problems (Eckert 1976).

Hair loss in males is also associated with depression, low self-esteem, neuroticism, introversion and feelings of unattractiveness, independent of age; and in the case of self-esteem, introversion and feelings of unattractiveness, the effect is especially pronounced in younger males (Wells,

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Willmoth & Russell, 1995). Most affected men cope well with androgenetic alopecia, without detriment to their psychosocial function. The most distressed balding men are those with more extensive hair loss, those who have a very early onset, and those that deem their balding as progressive (Cash, 1992).

Other studies on hair loss have shown significantly that Women are more likely to suffer from mental illness as they pay more attention to their self-image in society (Yamazaki 2001). For example, a study on treatment of Female Pattern Hair Loss (FPHL) carried out in China by Xiao et al 2013 showed a significant impairment in Quality of Life of patients due to hair loss, there are other Collective evidences suggesting that FPHL impairs the Quality of Life of female patients to the same extent as certain lifelong skin disorders such as psoriasis. Studies by Cash *et al* 1993 and van der Donk *et al* 1991 reported that those seeking treatment for FPHL experienced social anxiety disorder more severely, which is consistent with Xiao et al 2013's observation that FPHL has a greater impact on the Quality of Life and psychology in female patients than in male patients.

Research into the associated psychological problems relating to alopecia has often not been thorough and systematic. Such research is often secondary to another aim of the research (for example, effects of a treatment). Such evidence as exists supports the view that the experience of alopecia is psychologically damaging, causes intense emotional suffering, and leads to personal, social, and work related problems (Hunt and McHale 2005).

There is an important link between hair and identity, especially for women (Weitz 2004). About 40% of women with alopecia have had marital problems as a consequence, and about 63% claim to have had career related problems (Hunt and McHale 2004). The extent of alopecia is one of the predictors of psychological distress. People with severe hair loss are more likely to experience psychological distress.

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Some studies however do not fully support the notion that alopecia is distressing (Kose et al 2000), though these often still show that people with alopecia have more problems than controls. Several decades ago, alopecia was considered to be a psychosomatic disorder, but the limited research was associated with serious methodological problems, such as poor psychiatric evaluation instruments, poor diagnostic criteria, and inadequate classification systems (Ruiz et al, 2003).

Psychiatric disorders are more common in people with alopecia than in the general population, suggesting that those with alopecia may be at higher risk for developing a serious depressive episode, anxiety disorder, social phobia, or paranoid disorder (Koo et al 1994).

In an older study some alopecia patients experienced an ongoing feeling of loss, showing that for some individuals, coping with alopecia may be equated with grieving after bereavement (Egele et al 1987).

Most of the research shows that people with alopecia have higher levels of anxiety and depression than controls. They also experience lower self esteem, poorer quality of life, and poorer body image (McGarvey et al 2001). Those who lose eyebrows and eyelashes may also have problems with identity and identity change (Hunt and McHale 2005), as these features help to define a person's face.

Hair loss may be seen in terms of abnormality and as a failure to conform to the norms of physical appearance in society, which has the potential to set people apart in their own estimation and in the estimation of others. People can have serious problems with self esteem (Carpenter 1994). One limitation of the research is that the association between alopecia and depression or anxiety may be confounded by stressful life events, which may trigger both the alopecia and the depression or anxiety.

2.4 Managing Health Problems Associated with Chemical Hair Relaxers

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2.4.1 Acquired trichorrhexis nodosa (TN)

Salam et al 2013, reviewed treatment procedures and management of this condition, the review explained that the mainstay of treatment involves minimizing damaging hair care practices. In the management of TN, there is some anecdotal evidence to suggest that biotin supplementation may help (Coulter 1982). Both hypothyroidism (Lurie 1996) and zinc deficiency (Fichtel 2007) are associated with this condition; therefore levels should be assessed, if clinically indicated, and supplementation instituted if appropriate.

2.4.2 Alopecia

2.4.2.1 Psychological Therapy

Psychological treatment can positively affect how the patient adapts to his or her alopecia and perhaps can even lead to a better dermatological evolution of the alopecia. Psychological treatments may help patients by offering them hope and support to help them cope with the months of treatment that are often required. It may also be necessary to help patients adapt to the disappointment of unsuccessful treatment regimens, and adapt to a lifetime of baldness. Given the large and ever-increasing body of evidence demonstrating the profound negative impact of hair loss on psychological well-being, it is paramount that dermatologists offer relevant treatment not just for hair loss but for the accompanying psychological distress. There is very little research using randomized control trials that has examined the effectiveness of psychological treatments aimed at enabling people with alopecia to cope with the psychological consequences of the disorder (Hunt 2004).

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Using a support group for people with alopecia may reduce psychological difficulties and help individuals cope better with the disorder. More generic psychological therapies for body-image issues may be suitable for use with patients with alopecia. For example, Cash (1997) developed a self-help workbook for body image improvement, regardless of the source of the body-image discontent. Empirical evidence attests to the effectiveness of this self-directed treatment (e.g. Grant & Cash, 1995).

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2.5 CONCEPTUAL FRAME WORK

Theories and models are very important tools in health education, basically because they provide the basis for understanding individual behaviour and those factors that influence such behaviour enabling programmes to be developed to provide solutions and basis for planning appropriate intervention (Brieger, 1999).

A theory presents a systematic way of understanding events or situations. It is a set of concepts, definitions, and propositions that explain or predict these events or situations by illustrating the relationships between variables. Theories must be applicable to a broad variety of situations. They are, by nature, abstract, and don't have a specified content or topic area. Like empty coffee cups, theories have shapes and boundaries, but nothing inside. They become useful when filled with practical topics, goals, and problems (Glanz & Rimer, 2005). It is however important to note that no single theory dominates health education and promotion, nor should it; the problems, behaviours, populations, cultures, and contexts of public health practice are broad and varied. Some theories focus on individuals as the unit of change. Others examine change within families, institutions, communities, or cultures. Adequately addressing an issue may require more than one theory, and no one theory is suitable for all cases (Glanz & Rimer, 2005).

The job of a good theory is to present content in enough detail so that it describes the behaviour of a large (generalizable) group of people, but also to be simple to understand, implement, and evaluate (Green et al., 2010). Theory provides a broad roadmap that helps explain the dynamics of health behavior, identify effective interventions, select suitable target audiences, and evaluate outcomes (Glanz & Rimer, 2005).

In this study, two models/theories (PRECEDE-PROCEED, and THE THEORY OF PLANNED BEHAVIOUR) were adopted to provide a clear explanation of how the important variables in this study are linked, in other to ensure that the objectives and instruments developed for the study, captured the necessary concept.

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2.5.1 THE PRECEDE-PROCEED MODEL

The **Precede-Proceed** model provides a comprehensive structure for assessing health and quality of life needs, and for designing, implementing, and evaluating health promotion and other public health programs to meet those needs (Green and Kreuter 2005, Gielen et al 2008, Freire and Runyan, 2006). One purpose and guiding principle of the Precede-Proceed model is to direct initial attention to outcomes, rather than inputs. It guides planners through a process that starts with desired outcomes and then works backwards in the causal chain to identify a mix of strategies for achieving those objectives (Glanz and Rimer, 2005). A fundamental assumption of the model is the active participation of its intended audience – that is, that the participants ("consumers") will take an active part in defining their own problems, establishing their goals, and developing their solutions. In this framework, health behaviour is regarded as being influenced by both individual and environmental factors, and hence has two distinct parts;

First is an "educational diagnosis" - *PRECEDE*, an acronym for **P**redisposing, **R**einforcing and **E**nabling **C**onstructs in **E**ducational **D**iagnosis and **E**valuation.

Second is an "ecological diagnosis" -*PROCEED*, for **P**olicy, **R**egulatory, and **O**rganizational **C**onstructs in **E**ducational and **E**nvironmental **D**evelopment.

The model is multidimensional and is founded in the social/behavioral sciences, epidemiology, administration, and education. The systematic utilization of the framework in a series of clinical and field trials confirmed the utility and predictive validity of the model as a planning tool.

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This study will be using this model in identifying intervention strategies to address factors linked to the health problems associated with the use of Chemical Hair Relaxers among the Female Masters of Public Health Students, University of Ibadan.

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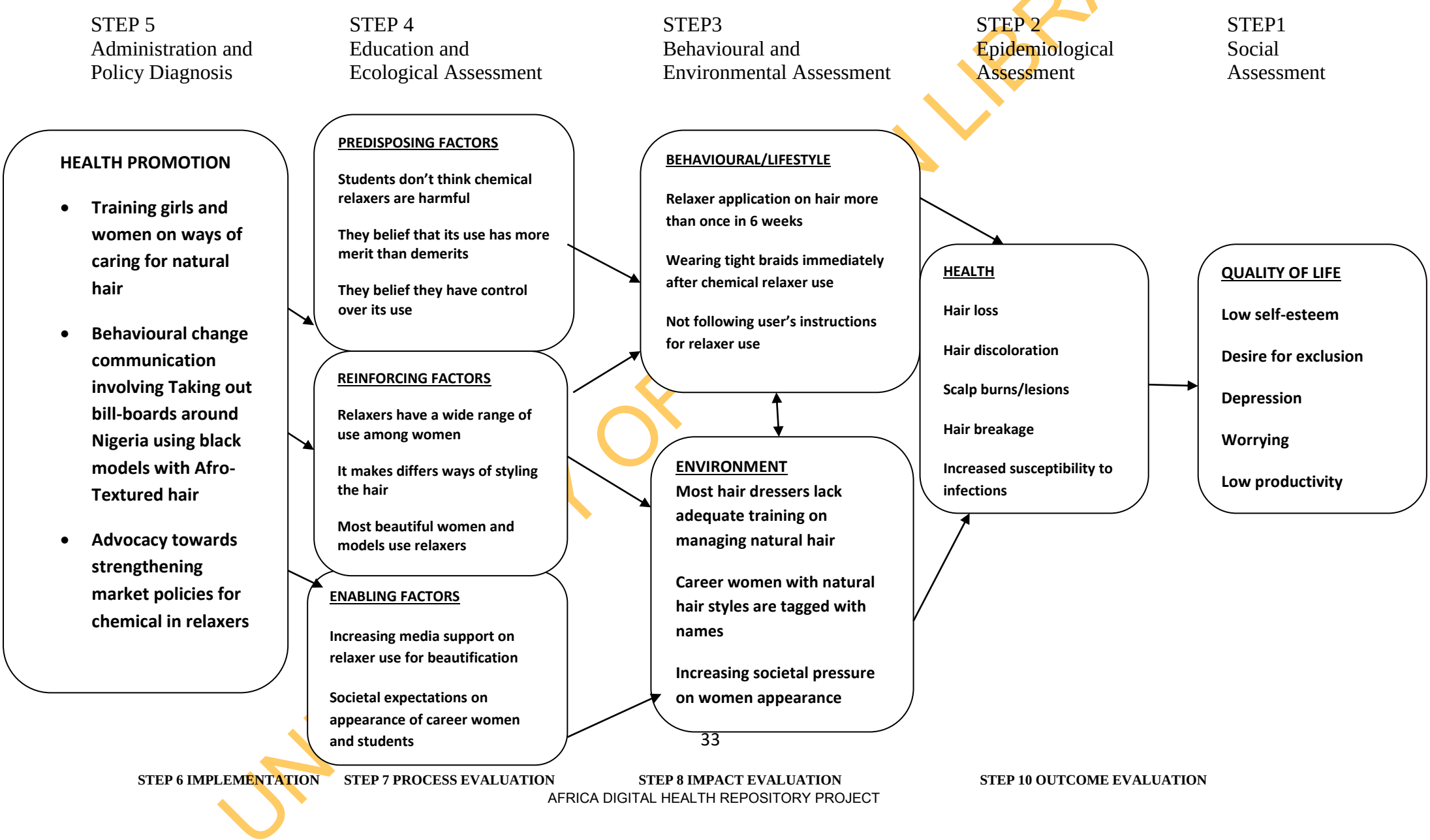
FIGURE 2.5.1 THE PRECEDE-PROCEED MODEL



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2.5.2 THE THEORY OF PLANNED BEHAVIOUR

The Theory of Reasoned Action propounded by Ajzen and Fishbein (1975, 1980) paved the path for the Theory of Planned Behaviour by Ajzen (1991). The theory of planned behaviour enables us with a complete framework for exploring the factors which influence the decision to engage in behaviour related to environmental issues such as recycling (Chan, 1998) and the same can be applied in systematically understanding different factors affecting the purchase and use of chemical relaxers among women.

According to the Theory of Reasoned Action (TRA), intention of undertaking or not undertaking the behaviour is the direct predecessor to the behaviour. The intention under discussion is often a result of actions undertaken by individual to evaluate the favourable or unfavourable performance of the behaviour. In many cases, it enunciates disposition of the attitude and the subjective norm wherein the subjective norm is basically the perception formed by the individual about undertaking or not undertaking that behaviour due to the social pressure. One prominent assumption of TRA is that behaviour under consideration is volitional in nature i.e. person can decide whether he or she performs that behaviour or not (Ajzen, 1991). Although true in many cases, behaviour may also depend on other factors such as availability of appropriate opportunities and resources which collectively correspond to the people's actual control over the behaviour (Liska, 1984). The theory of

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planned behavior (TPB) is one step ahead of the theory of reasoned action in the sense that it takes care of the original model's limitation to deal with incomplete volitional control (Ajzen, 1991). TPB includes a third variable known as perceived behavioural control (PBC) which indicates the ability of a person to undertake the behaviour under consideration under the assumption that individual behaves in a rational manner considering the ramification of his or her actions (Ramayah, Lee & Lim, 2012). In fact, perceived behavioural control manifests the difficulty and controllability to execute specific behaviour (Ajzen, 1985).

Table 2.5: Conceptual Framework for Experiences of Health Problems due to Chemical Relaxation.

CONCEPT	DEFINITION	MEASUREMENT/APPROACH
Behavioural Intention	• Perceived likelihood of following user's instructions for chemical relaxer use • Perceived likelihood of stopping the use of chemical relaxers and going natural • Perceived likelihood of not being affected by dangers of chemicals in relaxers	Asking related questions while gathering information.
Attitude	• This is explained in what the student think about chemical relaxers, do they think it is good or bad • Are they using chemical relaxers	Do they see chemical relaxation as good or bad
Subjective norms	• Friends approve of the straightened hair	Assessing psychosocial impact of hair related problems due to

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	• Curly and woolly hair is neither fashionable nor socially acceptable • Early initiation to hair straightening • Chemical relaxers are being used by respondents mother • Chemical relaxers is against my religious beliefs	chemical relaxation; as results gotten can be a predictor in accessing social effects on individuals. Assessing perception regarding chemical relaxation
Perceived behavioural control	• Trusting that they can manage their hair properly without manipulating the texture with chemical relaxers. • Believing in their ability to cope with any problems that might present with the use of the relaxers	Questions related to coping strategies, explaining how respondents manage complications of chemical relaxation.

CHAPTER THREE

METHODOLOGY

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3.1 Study Design

The descriptive cross-sectional survey was used for the study. The study was designed to assess the health experiences, perception, psychosocial impact and strategies for coping with health problems as a result of chemical hair relaxation among female masters of Public Health students, University of Ibadan.

3.2 Scope of study

The scope of the study was the female Masters of Public Health students, University of Ibadan, Ibadan, Nigeria.

3.3 Study Area

The study was carried among female Masters of Public Health students, College of Medicine, University of Ibadan. The University of Ibadan is the first University institution established in Nigeria, it was founded in 1948, as a College of the University of London with 104 students spread across three faculties: Arts, Science and Medicine. It became an autonomous, degree-granting institution in 1962. As at the time of the study, the University has a total enrolment of over 20,000 students shared among the 13 different faculties: Arts, Sciences, Basic Medical Science, Clinical Sciences, Dentistry, Public Health, Pharmacy, Agriculture and Forestry, the Social Sciences, Education, Veterinary Medicine, Technology, Law and the various institutes. The Faculty of Public Health, University of Ibadan has seven departments for postgraduate students which are; Department of Health Promotion and Education, Environmental Health Science, Health Policy and Management, Epidemiology and Basic Medical Statistics, Child Health, Nutrition, and Reproductive and Family Health.

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Although the use of chemical hair relaxers cuts across all age groups. Body image and self-esteem are not negotiable especially in students of higher learning and in career women who need co-operate appearance to make an impression in their institutions and places of work (Olasode 2009). Therefore, the need to recruit the female masters students (students of higher learning) of the Faculty of Public Health is warranted, to provide a more focused group for the study.

3.4 Sample Size Determination

In order to generate sufficient information about the health problems associated with chemical hair relaxation among female masters students of the faculty of public health university of Ibadan, a two stage random sampling method was employed. The formula shown below will be used to estimate the sample size:-

$$n = \frac{z^2 p(1-p)}{d^2}$$

Where:

P = the expected proportion of students with experiences on health problems related to chemical hair relaxation. The value for p = 80% by Khumalo 2007 in a study conducted in South Africa, other community based studies (Shetty et al, 2013, Callender 2004) carried out among African American women outside Nigeria however shows prevalence of 80% and higher.

d = degree of accuracy desired, usually set at 0.05

z=1.96 which corresponds to 95% confidence interval

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$$n = \frac{1.96^2 * 0.80\ (1-0.80)}{(0.05)^2}$$

n= 245.86. The estimated size of the sample was 246 persons; this provided an approximated value of 250.

This value 250 represents greater than half (52.6%) of the total population (475) of female masters of Public Health students registered in the faculty (Information Centre Post Graduate School, University of Ibadan).

3.5 Sampling procedure

The study population comprised of the female masters students of the Faculty of Public Health, University of Ibadan. A two-stage random sampling technique was employed in selecting the respondents.

Firstly, to ensure that all the departments in the faculty were represented in the selection procedure, greater than 50% of the seven (7) departments in the faculty of public health was randomly selected, then the list of female students in each of the selected department was complied. This was done in other to ensure that eligible respondents were given equal chances of participating in the study.

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Secondly, the sample size was proportionately selected from the randomly selected departments based on the number of registered female Masters of Public Health students in the department.

3.6 Inclusion Criteria:

Respondents must be female Masters of Public Health Student, and must have given their consent.

3.7 Exclusion Criteria:

Pregnant female and lactating mothers were excluded.

3.8 Method and Instrument of Data Collection

A pretested, structured, and self administered questionnaire was used to collect data for the study.

The questionnaire was designed after an extensive literature review and sectioned into five (5), four (4) of which were questions formed based on the specific objectives.

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Section A assessed the students' socio-demographic characteristics. Information on the students' experience regarding the health problems associated with the use of chemical relaxation was assessed in section B. Question for section C was designed to help highlight the perception of students with the use of chemical hair relaxers. Section D contained questions that assessed the psychological impacts of health experiences as a result of chemical relaxation, and finally section E contained questions relating to the students' strategies for coping with complications of chemical hair relaxation.

3.9 Validity

To validate the instrument, relevant literature was reviewed, the formulated objectives guided in the modification of the instrument. The instrument was also reviewed by research supervisor, other lecturers in Health Promotion and Education department and some senior colleagues. The comments and corrections were then used to further enhance the quality of the instrument.

3.10 Reliabiity

To ensure the reliability of the instrument, it was pre-tested among 30 female students in the Institute of Public Health, Obafemi Awolowo University (University of Ife), Ife, Osun State. The institute shared same characteristics with study population.

Reliability coefficient of the questionnaire was determined using the Cronbach's Alpha model technique of SPSS (version16). A reliability coefficient was initially gotten as 0.619, and later after some questions were reframed and the reanalysed, 0.842 was gotten which adjudged the questionnaire as being reliable.

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3.11 Training of Field Assistants

Three field assistants were recruited and trained. The training was focused on the objectives and importance of the study, the sampling processes, how to administer the study instruments, and how to secure respondents' informed consent. The field assistants were involved in the pre-testing of the study instruments, in order to create an opportunity for them to practice the process of data collection.

3.12 Data Collection Procedure

The quantitative data were collected using the pretested, semi structured and self-administered questionnaires with the help of three trained field assistants. The administration of the questionnaires was completed at the departmental lecture rooms of students. This is because Masters of Public Health students were not allotted rooms in the university's hall of residence. All participants were interviewed in their lecture rooms early in the mornings before the start of lectures between 7:45am-8:25am, in the afternoons during the lunch breaks between 1:00pm-2:00pm and in the evenings after lectures. The Consent of the participant was sought before the administration of the questionnaire. There was an explanation of the purpose of the research, the possible risks, time that would be spent, and the benefits of the research. The questionnaires were retrieved and the field assistant made some cross-check for completeness.

3.13 Data Management and Analysis

The questionnaires were collated and edited by the researcher with the help of field assistants. The questionnaires were checked for completeness and an identification number will be given to each of the questionnaire for easy identification and recall. The responses in each questionnaire were coded using a pre-designed coding guide. A template was designed on the SPSS (version 16) and the data was entered. The

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quantitative data was analysed using descriptive statistics (mean, and standard deviation). The level of significance was set at $\alpha = 0.05$ and the results of the analyzed data were presented using tables and prose.

3.14 Ethical Considerations

The proposal was submitted, reviewed and approved by the University of Ibadan/University College Hospital Ethical Review Committee, before the commencement of data collection and verbal informed consent was obtained from each respondent before the administration of the questionnaire.

3.14.1 Confidentiality:

This study ensured that all the information collected was kept confidential. Only people working in this research study had access to the information, the study also ensured that any information included in the report did not identify respondent's names or other identifying information on the records of the information they provide.

3.14.2 Translation:

The study population for this research is among students of higher learning therefore literate. There is therefore no necessity for translations. This study however made the language to be used (English) simple and clear.

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3.14.3 Beneficence:

The results obtained from this study can provide valuable information to health planners to guide decisions in planning, designing and implementation of educational interventions towards management of hair complications relating to the use of chemical hair relaxers. Also, the study can help participant identify strategies for coping with the physical, psycho-social, and psycho-emotional problems associated with chemical hair relaxation.

3.14.4 Non-maleficence:

This research ensured that no harm came on participants, apart from the time spent filling the questionnaire.

3.14.5 Voluntariness:

This research ensured that participation was strictly voluntary by ensuring that participants could withdraw from the research at any time they wanted to do so.

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CHAPTER FOUR

RESULTS

This study presents various data collected through the use of questionnaire to assess the experiences of health problems associated with chemical hair relaxation among female Masters of Public Health students, College of Medicine, University of Ibadan. The results of the data analysed were discussed as follows:

4.1 Socio-demographic Information

The characteristics of students as presented below (Table1), shows that most of the participants were students from the department of health promotion and education (38.8%), with the most prevailing age of participant being students between the ages of 21-25 years (50.0%), that greater than half of the participants were single (63.2%), that most of the participants were Yoruba (50.4%), and finally that greater than half of the participants were Christians (52.4%).

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Table 4.1: Socio-demographic characteristics of respondents (n=250)*

characteristic	Frequency	Percentage
Department		
Health Promotion and Education	97	38.8%
Epidemiology and Medical Statistics	32	12.8%
Human Nutrition	39	15.6%
Reproductive and Family Health	34	13.6%
Environmental Health	27	10.4%
Health policy and Management	21	8.4%
Age (years)		
21-25	113	45.2%
26-30	127	50.8%
30-35	10	4.0%

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Marital Status		
Single	158	63.2%
Married	87	34.8%
Divorced	1	1.6%
Widowed	4	4.0%
Tribe		
Hausa	31	12.4%
Yoruba	126	50.4%
Igbo	30	12.0%
Other	63	25.2%
Religion		
Christianity	131	52.4%
Islam	105	42.0%
Traditional	14	5.6%

***** = n represents the total number of respondents

4.2 Health Related Experiences of Students with the Use of Chemical Hair Relaxers

The results in table 3 below, shows that of the twelve (12) listed experiences due to chemical relaxation, greater than half of the respondents had had mild or moderate experiences of eight (8); MILD/MODERATE itching scalp (71.2%), hair loss (71.4%), thinning and breakage (60.4%), hair discolouration (58.0%), scalp lesion and burns (55.6%), scarring of scalp (53.6%), allergic reaction (51.0%), and impairment of hair growth

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(53.8%). The result also showed experiences of SEVERE hair thinning/breakage 9.6%, hair discolouration (16.4%), scalp lesion/burns (12.6%), 1.6% scaring/flaking of scalp, and 4.4% scalp pruritus/irritation among the respondents.

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Table 4.2: Health Related Experiences of Students with the Use of Chemical Hair Relaxers (N=250)

S/N	Experiences	Never	Mild	Mild+Moderate	Moderate	Severe
1	Dandruff	63.6%	17.6%	36.4%	18.8%	0%
2	Itching scalp	28.8%	46.0%	71.2%	25.3%	0%
3	Hair Loss	29.6%	33.6%	71.4%	36.8%	0%
4	Thinning and Breakage	30.0%	35.6%	60.4%	24.8%	9.6%
5	Hair discolouration	25.6%	33.2%	58.0%	41.2%	0%
6	Scalp lesions and burns	30.8%	31.2%	55.6%	24.4%	12.6%
7	Scarring of scalp	44.8%	34.0%	53.6%	19.6%	1.6%
8	Flaking scalp	60.8%	29.6%	37.6%	8.0%	1.6%
9	Scalp pruritus/irritation	51.6%	38.0%	44.0%	6.0%	4.4%
10	Staphylococcal infection	72.4%	27.6%	27.6%	0%	0%
11	Allergic reaction	49.8%	42.4%	51.0%	8.8%	0%

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12	Impairment of hair growth	45.2%	44.2%	53.8%	9.6%	0%

64.0% of the respondents agreed that chemical hair relaxers are useful in managing the hair, while 13.6% were undecided. Also, 58.8% of the respondents agreed that, chemical hair relaxers can cause hair loss, breakage and discoloration, while 11.6% of the respondents disagreed and 29.6% of the respondents were undecided. 75.6% of the respondents agree that, non-professional application of chemical hair relaxer can have adverse effect while 19.6% disagreed while 4.8% were undecided. More than 49.0% of the respondents disagreed that frequent relaxation (more than once in 6week) can result in severe hair burns/lesions, hair breakage and scalp irritation, while about 41.0% agreed and less than 9.0% were undecided. In the same vein, more than 52.4% of the respondents perceived that adherence to user's instructions on relaxer application is important, 38.4% disagreed while 23.0% were undecided. About 22.0% agreed that it wastes time to follow the user's instructions for relaxation as stated out in the product while, 63.2% disagreed and 14.8% were undecided. More than 68.0% of the respondents perceive that the choice of chemical relaxer selection should be dependent on the texture of the user's hair while, 22.0% disagree, 9.3% were undecided. More than 62.0% disagreed that strand test (test on a small section of hair before application relaxer is unnecessary while, 22.5% agreed and 15.0% were undecided (see table 4 for concluding results for perception).

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Table 4.3: Perception Regarding Health Problems Associated with Chemical Hair Relaxation (n=250)

S/N	Statement	Agree	Disagree	Undecided	Mean	S.D
1	Chemical hair relaxers are useful in helping me better manage my hair	64.0%	22.4%	13.6%	1.49	0.72
2	Chemical hair relaxers can cause hair loss, breakage and discoloration	58.8%	11.6%	29.6%	1.71	0.89
3	Chemical hair relaxers are not harmful	41.2%	34.4%	24.4%	1.83	0.79
4	Non-professional application of	75.6%	19.6%	4.8%	1.29	0.55

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	chemical hair relaxer can have adverse effect					
5	Frequent relaxation (more than once in 6week) can result in severe hair burns/lesions, hair breakage and scalp irritation.	40.8%	49.6%	9.6%	1.69	0.64
6	I perceive that adherence to user's instructions on relaxer application is important	52.4%	38.4%	9.2%	1.79	0.79
7	It wastes time to follow the user's instructions for relaxation as stated out in the product	22.0%	63.2%	14.8%	1.56	0.66
8	I perceive that the choice of chemical relaxer selection should be dependent on the texture of the user's hair	68.8%	22.0%	9.3%	1.41	0.65
9	Stand test (test on a small section of hair before application relaxer is unnecessary	53.6%	37.6%	8.8%	1.93	0.60
10	I think neutralizing shampoos and conditioners should always be used after relaxer application	72.5%	26.0%	6.4%	1.28	0.49
11	I believe chemical relaxation has adverse effect	33.2%	51.2%	15.6%	1.55	0.65
12	I will continue applying chemical	60.8%	30.4%	8.8%	1.48	0.65

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	relaxers to my hair even if I present with hair burns/lesion					
13	I believe children should be exempted from chemical hair relaxation	21.6%	62.4%	16.0%	1.94	0.61

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Table 4.3.1 Perception Score of Respondents (n=250)

Perception	Frequency	Percentage	Statistics
Poor (1-5)	106	42.4	Mean = 5.8
Good (6-12)	144	57.6	SD = 1.7
Total	250	100.0	

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4.4: Psychological impacts of Hair and Scalp problems due to chemical relaxation

The result in table 5 above on the perceived psychosocial impact of hair problems as a result of chemical relaxation showed lesser psychosocial impact of hair problems on the respondents as a result of chemical relaxation, as most of the respondents ticked NO in the questions regarding

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psychosocial impact of hair problems due to chemical relaxation. However, the result shows some significant values for some of the questions regarding psychosocial impact, which include figures like 41.2% for feeling of shame, 52.4% embarrassment, 30.4% worrying, 28.0% loss of self confidence, 23.6% hate, 23.2% reduced self worth, 22.8% frustration and sadness.

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Table 4.4: Psychosocial impacts of hair problems due to chemical relaxation

S/N	Impact	Yes	No	Don't Know	Mean	S.D
1	Shame	41.2%	57.2%	1.6%	1.60	0.52
2	Anger	6.8%	63.6%	29.6%	2.23	0.55
3	Embarrassment	52.4%	40.4%	7.2%	1.54	0.63
4	Disgrace	23.6%	48.8%	27.6%	2.04	0.72
5	Hate	22.8%	54.8%	22.4%	1.59	0.67
6	Disgust	17.2%	45.6%	37.2%	2.20	0.71
7	Sadness	22.8%	52.0%	25.2%	2.02	0.69
8	Depression	22.4%	53.6%	24.0%	2.02	0.68
9	Worrying	30.4%	62.4%	7.2%	1.76	0.56
10	Frustration	22.8%	61.6%	15.6%	1.93	0.62
11	Feeling uncomfortable	15.2%	74.8%	10.0%	1.95	0.50

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12	Dissatisfaction with body image	17.2%	54.0%	28.8%	2.12	0.67
13	Loss of self confidence	28.0%	40.8%	31.2%	2.03	0.77
14	Unhappy about appearance	1.6%	77.2%	21.2%	2.19	0.44
15	Reduced worth	23.2%	47.6%	39.2%	2.06	0.72
16	Reduced social acceptance	13.2%	51.2%)	35.6%	2.22	0.66

4.5 Strategies for coping with problems of chemical relaxation

71.4% of the respondent said they minimize the frequency of relaxer application whenever there are complications while less than 28.0% do not. Over 54.0% of the respond do not ensure that, they wash their hair at least twice in a week to ease scaling of scalp, while 45.8% do wash their hair at least twice in a week to ease scaling of scalp. 78.4% of the respondents apply hair leave in conditioner to their hair to prevent hair thinning and breakage. The result further revealed that, 57.0% respondents use anti-dandruff shampoo or cream to manage dandruff while

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42.8% do not. About 83.0% of the respondents ensure that their hair is properly oiled to manage frizzy hair and prevent excessive hair dryness while 17.0% do not. Over an average of about 56.0% of the respondents does not ensure that they steam their hair at least once in three(3) months to prevent hair breakage while about 43.0% of the respondents do (see table 6 for further details).

Table 4.5: Strategies for coping with health problems associated with chemical hair relaxation

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S/N	Coping Strategies	YES	NO	Mean	S.D
1	I minimize the frequency of my relaxer application whenever there is complications	71.6%	28.4%	1.28	0.45
2	I ensure that I wash my hair at least twice in a week to ease scaling of scalp	46.0%	54.0%	1.54	0.40
3	I apply hair leave in conditioner to my hair to prevent hair thinning and breakage	78.4%	21.6%	1.21	041
4	I use anti-dandruff shampoo or cream to manage dandruff	56.0%	44.0%	1.43	0.40
5	I ensure my hair is properly oiled to manage frizzy hair and prevent excessive hair dryness	83.2%	16.8%	1.17	0.37
6	I ensure that I steam my hair at least once in three(3) months to prevent hair breakage	43.6%	56.4%	1.57	0.50
7	I use medicated shampoos to manage scalps burns/lesions and to prevent scalp infection	69.6%	30.4%	1.30	0.46
8	I avoid sewn-in weaves and tight braid until m scalp is completely healed	71.2%	28.8%	1.29	0.45

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9	I wear only traditional hair styles (did, natural weaves) during complications	52.0%	48.0%	1.48	0.50
10	I wear wigs and scarfs to cover the damages to my hair	83.8%	16.8%	1.17	0.37
11	I apply chemical/herbal hair treatments to my hair to ease discomfort	48.4%	51.6%	1.52	0.50
12	In severe scalp burns/lesions, I apply anti-inflammatory creams to ease scalp inflammation	32.4%	67.6%	1.68	0.47
13	I use biotin supplements that promote hair growth	48.4%	51.6%	1.52	0.50

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4.6 Result of Hypotheses:

The Chi-Square test for association between socio-demographic characteristics (age, marital status, religion) and perception regarding chemical hair relaxation found a significant association between the Student's marital status (x^2=16.23, p=0.00) and religion (x^2=5.99, p=0.05) when

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cross tabbed with perception regarding chemical hair relaxer use. However there was no significant association between the age (x^2=1.11, p=0.57) of the students, and their perception regarding chemical hair relaxer use.

Results showed that there is a significant association between experiences of dandruff (x^2=74.29, p=0.00), hair loss (x^2=76.17, p=0.00), hair lesion/burns (x^2=90.64, p=0.00), and feelings of embarrassment. Also between hair discolouration (x^2=154.82, p=0.00), dandruff (x^2=89.50, p=0.00), hair loss (x^2=89.55, p=0.00) and feelings of depression. This study also found a significant association between dandruff and loss of self confidence (x^2=61.41, p=0.00), hair loss and reduced self worth (x^2=74.27, p=0.00).

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Table 4.6.1: Relationship between age, marital status, religion and perception regarding chemical relaxation (n=250)

Variable	**Perception regarding chemical relaxation**			**Statistics**
Age	Good	Bad	Total	
21-25 26-30 31-35 **Null Hypothesis**	70 69 5	57 44 5	127 113 10	$X^2 = 1.11$ DF = 2 P = 0.57 **Not Rejected**
Marital Status				
Single Married Divorced Widowed **Null Hypothesis**	103 36 1 4	55 51 0 0	158 87 1 4	X^2= 16.23 DF= 3 P= 0.00 **Rejected**
Religion				

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Christianity Islam Traditional **Null Hypothesis**	66 68 10	65 37 4	131 105 14	X^2= 5.99 DF= 2 P= 0.05 **Rejected**

Table 4.6.2: Relationship between Experiences due to Chemical Relaxer use and Psychosocial Impact (Embarrasment). (n=250)

Experience	**Psychosocial Impact (Embarrasment)**			**Statistics**
Dandruff	Yes	No	Don'tknow	Total
Never	102	39	18	159
Mild	35	19	0	44
Moderate	4	43	0	47
Null Hypothesis				X^2 = 74.29 DF = 4 P = 0.00 **Rejected**
Hair Loss				

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Never Mild Moderate **Null Hypothesis**	41 26 64	15 58 28	18 0 0	74 84 92	X^2= 76.17 DF= 4 P= 0.00 **Rejected**
Scalp Lesion/Burns					
Never Mild Moderate Severe **Null Hypothesis**	38 26 33 34	21 52 28 0	18 0 0 0	77 78 61 34	X^2= 90.64 DF= 6 P= 0.00 **Rejected**

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Table 4.6.3: Relationship Between Experinces of Chemical hair relaxer use and Psychosocial impact (N=250)

Experience	**Psychosocial Impact (Depression)**				**Statistics**
Dandruff	Yes	No	Don'tknow	Total	
Never	15	92	52	159	$X^2 = 89.50$
Mild	34	6	4	44	DF = 4
Moderate	7	36	4	47	P = 0.00
Null Hypothesis					**Rejected**
Hair Loss					
Never	9	22	43	74	X^2= 89.55
Mild	17	67	0	84	DF= 4
Moderate	30	45	17	92	P= 0.00
Null Hypothesis					**Rejected**
Hair Discolouration					

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Never Mild Moderate **Null Hypothesis**	34 0 22	8 83 43	22 0 38	64 83 103	X^2= 154.82 DF= 4 P= 0.00 **Rejected**

Table 4.6.4: Association between Dandruff and Loss of Self Confidence (N=250)

	Loss of self confidence				
Dandruff	**Yes**	**No**	**Don't Know**	**Total**	**Statistics**
Never	**66**	**43**	**50**	**159**	**x^2 = 5.8**
Mild	**4**	**23**	**17**	**44**	**d.f = 4**
Moderate	**0**	**36**	**11**	**47**	**p = 0.00**

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Table 4.6.5: Association between Hair loss and Reduced Self Worth.

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Reduced self worth

Hair loss	Yes	No	Don't Know	Total	Statistics
Never	24	11	39	74	x^2 =74.27
Mild	4	63	17	84	d.f = 4
Moderate	30	45	17	92	p = 0.00

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CHAPTER FIVE

DISCUSSION AND CONCLUSION

5.1 DISCUSSION

This study assessed the experience of health problems associated with chemical hair relaxation among female masters of Public Health students, University of Ibadan.

5.1.1 Health Related Experiences Regarding Chemical Relaxation

The first objective of this study was to highlight the health experiences of students with the use of chemical hair relaxers. Students experienced mild and moderate itching scalp, hair loss (alopecia), thinning and breakage, hair discolouration, scalp lesion and burns, scarring of scalp,

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allergic reaction, impairment of hair growth and severe hair thinning/breakage, hair discolouration, scalp lesion/burns, scaring/flaking of scalp, and scalp pruritus/irritation due to the use of chemical relaxers. Other studies (Olasode 2009, Khumalo 2007) show similar findings to this study although emphases were mostly laid on hair loss (alopecia).

A study by Olasode in 2009 showed hair discoloration of 50.0% which is similar to that gotten in this study. This Hair discoloration and bleaching could be as a result of some chemicals inhibiting some stages in the enzymatic synthesis of melanin resulting in depigmentation (Arthur, 1982). A study (Swee et al 2000) also reported a major outbreak of hair breakage and alopecia among users of a particular hair straightening product. The severity of the adverse effects from this particular product prompted the Food and Drug Administration (FDA) to remove it from the market (Swee et al 2000). Nicholson et al 1993 also documented chemically induced alopecia in young Afro Caribbean females related to the misuse of chemical hair straightening agents.

Other studies by Olasode 2009, Khumalo 2011, and Rucker 2011 have corroborated this study. They in their various studies carried out in south west Nigeria: Olasode 2009, South Africa: Khumalo 2011 reported a number of side effects and health implications of chemical relaxers, drawing attention to a higher emphasis on safer ways of application, as well as tougher legislation on these chemicals and stipulated that the straightening process has presents risks for users. These studies showed that the adverse results of repeated and regular professional applications of chemical hair strengtheners for a period exceeding 1 year included itching, burns and scars on the scalp, thinning and weakening of the hair shaft, discoloration and hair loss, apart from allergic reactions to chemicals [Olasode 2009, Khumalo 2011, Rucker et al 2011).

5.1.2: Perception regarding the use of chemical relaxers

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The results from this work also showed that most of the students have good perception about the use of chemical relaxers. This fact however did not affect their decisions to use chemical relaxers as its use was mainly for building their body image and self- esteem which are not negotiable especially in career women who need co-operate appearance to make an impression in their places of work, and students who are easily influenced by peer opinions. However, great care needs to be taken in the use of chemical hair relaxers.

5.1.3 Perceived Psycho-social Impact of health Problems as a result of chemical relaxation

Hair and scalp complications as a result of chemical relaxation has significant psychosocial impacts on students with responses of embarrassment, shame, disgrace, hate, frustration, sadness, worrying, reduced worth, loss of self confidence, dissatisfaction with body image. Other similar studies carried out on the psychosocial impact of hair loss corroborate these values. They found patients' self-esteem, body image, and self-confidence to be negatively impacted by hair loss (Tucker 2009, Cartwright et al 2009).

Gathers and Mahan 2014, in their study reported that (74.0%) of their respondents had at some time felt frustrated by their hair. Although hair and scalp problems as a result of chemical relaxation, is a mild dermatological disorder, psychologists and dermatologists have observed that even clinically imperceptible hair loss is capable of damaging the quality of life (QoL) of patients due to the loss of self-image and diminished self-esteem (Schmidt 2001, Williamson 2001).

Women with hair loss have reported experiencing adverse psychosocial reactions, including irritability, anger, anxiety and depression, due to the significant sexual and social functions of the appearance of their hair (Cash 1993, Camacho 2002) further corroborating findings in this study.

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Studies on hair loss have similarly shown significantly that Women are more likely to suffer from mental illness as they pay more attention to their self-image in society (Yamazaki 2001). For example, a study on treatment of Female Pattern Hair Loss (FPHL) carried out in China by Xiao et al 2013 showed a significant impairment in Quality of Life of patients due to hair loss, there are other Collective evidences suggesting that FPHL impairs the Quality of Life of female patients to the same extent as certain lifelong skin disorders such as psoriasis (Xiao et al 2013).

Another example is a study carried out by Chaudhury et al. (2001) studied fifty outpatients with alopecia areata and an equal number of age and sex matched controls without any physical or psychiatric disorders, and found that the patients with alopecia were significantly more anxious and depressed, and reported significantly more stressful life events compared to controls (Chaudhury et al 2001). The prevalence of psychiatric disorders was also significantly higher in these patients (26.0%) than in controls (2.0%). These negative impacts of hair problems on the quality of life (QoL) of women can be conveniently attributed to the constant societal pressure for female attractiveness (Chaudhury et al 2001).

5.1.4 Strategies for Coping with the problems of Chemical Relaxation

This study identified the students various strategies for coping with the hair and scalp disorders as a result of chemical relaxation, the most prevalent strategy for coping with hair and scalp disorder is with the use of wigs and scarfs (83.8%), and the least prevalent coping strategy is the use of anti-inflammatory creams in severe scalp burns (32.4%). This is probably so because most will simply wear scarfs or wigs to cover hair/scalp complications.

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A review work by Dinh and Sinclair 2007 also identified with these by suggesting Fashion accessories that can satisfactorily conceal localized or diffuse patches of hair loss as; hats, scarves, bandanas, and turbans. Hair additions and accessories include combs and headbands with hair attached to them, ponytails that easily attach to existing hair and hair scrunchies.

It was interestingly noted that some relaxer users, and even hair care practitioners, unfamiliar with race-related differences in hair structure, care, or disease, may mistakenly "trivialize" hair and scalp concerns—either in their words, body language, or attitude. Such marginalization should be strictly avoided, not only because of the psychological impact of the hair loss, but also because many causes of alopecia and scalp disease are treatable with proper medical management and patient counselling.

Women who have allergy to any of the products used should therefore endeavour to stay away from this practice. Relaxers should never be applied to already damaged hair, or on someone who has had scalp damage.

5.1.5: Association between Socio-Demographic Characteristics (Age, Marital status, religion) and Perception of chemical hair relaxation.

This study found a significant association between the marital status, religion and perception regarding chemical hair relaxer use. There was however no significant association between the ages of respondents and their perception regarding the use of chemical relaxers. The association found between religion and perception regarding the use of chemical hair relaxer could conveniently be linked to the moral teachings and doctrines associated with religious settings.

5.1.6: Association between experiences of hair related problems due to chemical relaxer use and psychosocial impact

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This research showed a significant association between dandruff, hair loss, scalp lesions/burns and embarrassment, a significant association between hair loss and reduced self worth and Dandruff and loss of self confidence. Also a significant association was found between dandruff, hair loss, hair discolouration and depression. Other studies on the psychosocial impact of hair loss, especially the ones carried out among patients have found self-esteem, body image, and self-confidence to be negatively impacted (Turker 2009, Cartwright et al 2009).

Known psychosocial complications according to Turker 2009, and Cartwright et al, 2009, include; depression, low self-esteem, altered self-image, and less frequent and enjoyable social engagement, which are similar to findings in this work. These negative effects on the quality of life may however be worse in women, due to increasing societal pressure to be attractive. Treatment from a dermatologist should be sought in order to improve their quality of life.

5.3 CONCLUSION

In view of the health problems that is associated with the use of chemical relaxers and its effects on the quality of life (QoL) of the users, there is need for increased awareness creation on the dangers of these chemicals to the health of its users, as several studies have linked chemical relaxers to early menarche which is linked to the development of diseases like fibroids in women (The Reunion Black Family, 2014). It is a truly worrisome situation as African Women are still largely dependent on the use of these chemical relaxers as hair strengtheners. It is therefore important that African women begin to think about embracing their natural curly and woolly hair. Let's go Natural!

5.3: RECOMMENDATION AND IMPLICATION FOR HEALTH PROMOTION AND EDUCATION

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- As observed in the developed countries and as documented in literature that a hair relaxer was removed from market because of consumers' complaints (Kurtzweil, 1996), advocacy towards strengthening of market policies regarding these chemicals will promote a similar strict intervention in Nigeria and this will go a long way in sanitizing the chemical hair relaxer industry, thereby promoting a healthy hair and scalp for women on these products.

- Using a support group for people with hair loss (alopecia) may reduce psychological difficulties and help individuals cope better with the disorder. More generic psychological therapies for body-image issues may be suitable for use with patients with hair loss. For example, Cash (1997) developed a self-help workbook for body image improvement, regardless of the source of the body-image discontent. Empirical evidence attests to the effectiveness of this self-directed treatment (e.g. Grant & Cash, 1995).

- Taking out billboards around Nigeria and other African nations, especially in major cities, featuring Black models with Afro textured hair on them.

- Organizing workshops for young girls and women on how to care for their natural hair will be a great start towards developing and improving the self image of African women who expose themselves to these chemicals for reasons such as ease of management, beauty and appearance. These will aid in improving the quality of life of these women

Opportunities are open for further community based studies on this entity, and interested researchers can research on the effects of the health problems associated with chemical relaxers on the academic performances of these students, or assessment of factors reinforcing the use of

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these chemical despite the increasing awareness, good perception and obvious knowledge of its adverse effects, as this study was limited in these areas.

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APPENDIXES

INFORMED CONSENT FORM

IRB Research approval number:

This approval will elapse on:

Title of the research: Experiences of health problems associated with chemical hair relaxation among female masters of Public Health students, College of Medicine, University of Ibadan.

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Names and affiliation of researcher:

This study is being conducted by **ASIWAJU** TEMITOPE ELIZABETH of the department of Health Promotion and Education, faculty of Public Health, University of Ibadan with Matric No-138377.

Sponsor(s) of research: the research is self-sponsored.

Purpose of research: The purpose of the study is to investigate the perceived health problems associated with chemical hair relaxation among female Masters of Public Health students, University of Ibadan.

Procedure of the research- A total number of 400 female Masters of Public Health students, University of Ibadan will be recruited into the study from their departmental lecture rooms. The respondents will be given the structured questionnaires which will be self-administered after giving them adequate information about the study and receiving informed consent from them. The instrument will be used to elicit information on their perception, health experiences, psycho-social impacts and coping strategies regarding health complications of chemical hair relaxation.

Expected duration of research and participants involvement:

I am expecting to spend at least 2 weeks for the data collection using the questionnaires. A participant would not spend more than 10- 20 minutes in filling the questionnaire.

Risk(s):

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There are no risks involved in this study as participants will only fill a questionnaire voluntarily in the comfort of their rooms.

Cost to the participants if any, of joining the research:

Participation in this research will not cost anything other than the time you will use in filling the questionnaire.

Benefits:

The purpose of this research is to describe the perceived health problems associated with chemical hair relaxation among females. The results obtained from this study can provide valuable information to health planners to guide decisions in planning, designing and implementation of educational interventions towards management of hair complications relating to the use of chemical hair relaxers. Also this study can help participant identify strategies for coping with the physical, psycho-social, and psycho-emotional problems associated with chemical hair relaxation and help users and legislative bodies identify with the need to make great emphasis on safer modes of application and stiffer market legislation concerning these chemicals.

Confidentiality:

All information collected in this study will be given code numbers but will ensure that your name as a participant is not recorded, and that the questionnaire cannot be linked to you in any way as your name or any identifier will not be used in any publication or reports from this study.

Voluntariness:

Participation in this research is absolutely voluntary and you have the right to withdraw at any time you wish to do so

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Alternatives to participation:

If you choose not to participate, this will not affect you in any way. Your choice will be respected.

Due inducement(s):

No compensation shall be given to the participants, but their indulgence and time spent filling the questionnaire will be highly appreciated.

Consequences of participants' decision to withdraw from the research and procedure for orderly termination of participation:

You have the right to withdraw from the research at any time you wish to do so. Please note that some information that has been obtained about you before you chose to withdraw may be modified or used in reports and publications. These cannot be removed anymore. However we shall make effort in good faith to comply with your wishes as much as is practicable.

Modality of providing treatments and actions to be taken in case of injury or adverse events:

If you suffer any injury as a result of your participation in this research, you will be treated at the university Jaja medical clinic.

What happens to research participants and communities when the research is over?

I shall inform you of the outcome of the research through journals and/or the university bulletins.

Statement about sharing of benefits among researchers and whether this includes or excludes research participants:

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I shall ensure that participate effectively in the advocacy that legislative bodies and users identify with the need to make great emphasis on safer modes of application and stiffer market legislation concerning chemicals relaxers to ensure the protection of users.

Any apparent or potential conflict of interest: NONE

Statement of person obtaining informed consent:

I have fully explained this research to……and have given sufficient information, including about risks and benefits, to make an informed decision.

DATE…….

SIGNATURE……..

NAME……..

Statement of person giving consent:

I have read the description of the research or have had it translated into language I understand. I have also talked it over with the reseacher to my satisfaction. I understand that my participation is voluntary, I know enough about the purpose, methods, risks and benefits of the research study to judge that I want to take part in it. I understand that I may freely stop being part of this study at any time. I have received a copy of this consent form and additional information sheet to keep for myself.

DATE…….

SIGNATURE……..

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NAME……..

Detailed contact information including contact address, telephone, fax, e-mail and any other contact information of researcher(s), institutional HREC and head of institution:

This research has been approved by the Ethics committee of the University of Ibadan and the chairman of this committee can be contacted at Boide Building, Room 210,2nd Floor, Institute for Advanced Medical Research and Training, College of Medicine, University of Ibadan, E-mail:**uiuchirc@yahoo.com.** In addition, if you have any question about your participation in this research, you can contact the principal investigator, Asiwaju Temitope Elizabeth, Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan, Phone Number- 08072557274, Email- asiwaju.temitope@yahoo.com.

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Our Ref. HPE/SF.

21st September, 2015

The Chairman,

UI/UCH Ethical Review Research Committee,

College of Medicine,

University of Ibadan,

Ibadan.

Supervisor's Attestation Statement

Re: **ASIWAJU**, TEMITOPE ELIZABETH

This is to certify that the bearer, **ASIWAJU TEMITOPE E.** is an MPH (Health Promotion and Education) student in the Faculty of Public Health, University of Ibadan.

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The student is under my supervision and she is to carry out a research on the project titled**: EXPERIENCES OF HEALTH PROBLEMS ASSOCIATED WITH CHEMICAL HAIR RELAXATION AMONG FEMALE MASTERS OF PUBLIC HEALTH STUDENTS COLLEGE OF MEDICINE, UNIVERSITY OF IBADAN.**

Kindly accord her all necessary assistance she may require.

Thank you.

Yours faithfully,

Dr E.O. OYEWOLE
Supervisor
Department of Health Promotion and Education
Faculty of Public Health,
University of Ibadan.

QUESTIONNAIRE DRAFT

Dear Respondent,

This questionnaire was designed to assess the experiences of health problems associated with chemical hair relaxation. items highlighted here are designed to collect information on the experiences of health problems of chemical hair relaxation. You are therefore requested to kindly provide your honest opinion. Any information supplied will be treated with utmost confidentiality. Thanks for your anticipated co-operation.

STEP 6 IMPLEMENTATION STEP 7 PROCESS EVALUATION STEP 8 IMPACT EVALUATION STEP 10 OUTCOME EVALUATION
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Can we start the interview now? (a) Yes (b) No

Questionnaire Identification Number:
Date of Interview:
Name of Interviewer:

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. Department.....
2. Age: .....years old (as at last birthday)
3. Marital status: Single ( ) Married ( )
   Widowed ( ) Divorced ( )
4. Tribe: Hausa ( ) Yoruba ( )
   Igbo ( ) Others, (pls. specify)……
5. Religious affiliation: Christianity ( ) Islam ( )
   Traditional ( ) others, (pls.specify)…....

SECTION B: HEALTH RELATED EXPERIENCES OF STUDENTS WITH THE USE OF CHEMICAL HAIR RELAXERS

STEP 6 IMPLEMENTATION STEP 7 PROCESS EVALUATION STEP 8 IMPACT EVALUATION STEP 10 OUTCOME EVALUATION
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Please insert tick (√) in the corresponding box that most appropriately reflects your response about the experiences you have had with the use of chemical hair relaxers

	EXPERIENCES	NEVER	MILD	MODERATE	SEVERE
6	Dandruff				
7	Itching scalp				
8	Hair loss				
9	Thinning and breakage				
10	Change in hair colour				
11	Scalp lesions and burns				
12	Scarring of scalp				
13	Flaking scalp				
14	Scalp pruritus/irritation				
15	Scalp infection				
16	Allergic reaction				

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17	Impairment of hair growth				

SECTION C: PERCEPTION REGARDING HEALTH PROBLEMS ASSOCIATED WITH CHEMICAL HAIR RELAXATION

Please insert tick (√) in the corresponding box that most appropriately reflects your response

NO	STATEMENT	AGREE	DISAGREE	UNDECIDED
18	Chemical hair relaxers are useful in helping me better manage my hair			
19	Chemical hair relaxers can cause hair loss, breakage and discoloration			
20	Chemical hair relaxers are generally harmful			
21	Non-professional application of chemical hair relaxer can have adverse effect			
22	Frequent relaxation (more than once in 6 week) can result in severe hair			

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	burns/lesions, hair breakage and scalp irritation.			
23	I perceive that chemical hair relaxation could be harmful, but I really do not care			
24	I believe that adherence to user's instructions on relaxer application is important			
25	It wastes time to follow the user's instruction for relaxation as stated out in the product			
26	I perceive that the choice of chemical relaxer selection should be dependent on the texture of the user's hair			
27	Strand test (test on a small section of hair) before application of relaxer is unnecessary			

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28	I think neutralizing shampoos and conditioners should always be used after relaxer application			
29	I believe chemical relaxation has adverse effect			
30	I will continue applying chemical relaxers to my hair even if I present with hair burns/lesions			
31	I believe children should be exempted from chemical hair relaxation			

SECTION D: PERCEIVED PSYCHOSOCIAL IMPACTS OF HAIR PROBLEMS DUE TO CHEMICAL RELAXATION

Please insert tick (√) in the corresponding box that most appropriately reflects your response

	IMPACTS	**Yes**	**No**	**Don't Know**
32	Shame			
33	Anger			
34	Embarrassment			

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35	Disgrace			
36	Hate			
37	Disgust			
38	Sadness			
39	Depression			
40	Worrying			
41	Frustration			
42	Feeling uncomfortable			
43	Dissatisfaction with body image			
44	Loss of self confidence			
45	Unhappy about appearance			
46	Reduced worth			
47	Reduced social acceptance			

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SECTION E: STRATEGIES FOR COPING WITH HEALTH PROBLEMS ASSOCIATED WITH CHEMICAL HAIR RELAXATION

Please insert tick (√) in the corresponding box that most appropriately reflects your response about your strategies for coping with the complication due to the use of chemical hair relaxers

	COPING STRATEGIES	YES	NO
48	I minimize the frequency of my relaxer application whenever there is complications		
49	I ensure that I wash my hair at least twice in a week to ease scaling of scalp		
50	I apply hair leave-in conditioner to my hair to prevent hair thinning and breakage		
51	I use anti-dandruff shampoo or cream to manage dandruff		
52	I ensure my hair is properly oiled to manage frizzy hair and prevent excessive hair dryness		
53	I ensure that I steam my hair at least once in three (3) months to prevent hair breakage		
54	I use medicated shampoos to manage scalp burns/lesions and to prevent scalp		

STEP 6 IMPLEMENTATION STEP 7 PROCESS EVALUATION STEP 8 IMPACT EVALUATION STEP 10 OUTCOME EVALUATION
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	infection		
55	I avoid sewn-in weaves and tight braid until my scalp is completely healed		
56	I wear only traditional hair styles (didi, natural weaves) during complications		
57	I wear wigs and scarfs to cover the damages to my hair		
58	I apply chemical/herbal hair treatments to my hair to ease discomfort		
59	In severe scalp burns/lesions, I apply anti-inflammatory creams to ease scalp inflammation		
60	I use Biotin supplements that promote hair growth		

THANK YOU FOR YOUR TIME!

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