

**OCCUPATIONAL HEALTH HAZARDS AMONG EMPLOYEES OF
REGISTERED HAIR SALONS IN WINDHOEK**

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Of

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By

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DECLARATION

I, the undersigned, hereby declare that the work contained in this thesis is a true reflection of my own research and has not been submitted for a degree in any other institution of higher learning.

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ABSTRACT

A hair salon is a shop where a person can have hair cut and styled in order to look more attractive. The employees in the hair salons are exposed to many irritative and allergenic substances, which may cause health problems. This study was conducted to assess the occupational health risks among various employees in hair salons in Windhoek.

The main purpose of the study was to determine and describe health problems among employees in Windhoek hair salons, in order to provide important information to national health services, municipality, owners and workers of the hair salons to enable them to introduce protective measures related to occupational health and safety in hair salons.

The study design was a descriptive cross-sectional survey. Thirty-one hair salons with the total number of 128 employees, were included in the study. A questionnaire and checklist were used as the data collection instrument. A pilot study was also conducted in Mariental to test the practical aspects of the actual research study.

The results indicated that the prevalence of musculo-skeletal symptoms such as: hand, back, neck, upper body and lower body pain are common among the employees in hair salons. Other health problems due to chemical exposure such as: skin damage/irritation, allergic reactions and eye irritation are also common in hair salons. It appears that most of the health problems related to respiratory symptoms is not caused by smoking, because health problems appear to be high among non-smokers. There was an increase in health problems with duration of employment. The employees mostly used aprons, latex or rubber gloves as protective measures. All products listed in annexure 2, except henna are widely used in hair salons.

The workplace environment should be optimized to make the environment as safe as possible. Employees should be kept aware of occupational hazards through continuous training and education of good work practices and procedures, and of the potential hazards related to product use, such as dermatitis, eye irritation and respiratory complaints.

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ABBREVIATIONS

AANA –	American Association of Nurse Anaesthetists
ACD –	Allergic Contact Dermatitis
AMP –	Amino-ethyl propanol
APS –	Ammonium persulfates
GERD –	Gastroesophageal reflux disease
GMTG –	Glyceryl monothioglycolate
ICD –	Irritant Contact Dermatitis
IHS -	Immediate Hypersensitivity
NRL –	Natural rubber latex
PPD –	Para-phenylenediamine
PPE –	Personal Protective Equipment
PVC –	Polyvinyl Chloride
PVP –	Polyvinyl pyrrolidone

CHAPTER ONE: ORIENTATION TO THE STUDY

1.1. INTRODUCTION AND BACKGROUND INFORMATION

A hair salon is a shop where a person can have a hair cut and styled in order to look more attractive. The employees in hair salons are exposed to many irritative and allergenic substances, which may cause occupational respiratory symptoms and hand eczema. Occupational dermatitis is an extensive problem and has been shown to be high amongst hairdressers, because of the wide range of products they work with. Chemicals in products used by employees may cause irritation, sensitivity of the airways and may affect mucociliary transport in the nose and trachea (Fourie, Kiel Kowski & Lebudi, 2001, p.87; Leino, Tammilehto, Luukkonen & Nordman, 1997, p.453; Leino, Hendrick-Eckerman, Kahkonen, Saarinen & Paakkulanien, 1999, p.26).

Persulfate salts in hair bleaches are known not only to cause occupational asthma and other respiratory symptoms, but also allergic dermatitis and urticaria in employees. Potential agents causing asthma are resin and phthalate in hair sprays, monoethanolamine in colorants and perms, and henna, a plant extract used to tint hair, is also a potential risk factor for asthma. Irritants include soaps, shampoos, conditioners, detergents, water bleaches and rinse solutions. Prolonged contact with water and shampoos is a major cause of irritation and skin damage. Allergic contact dermatitis may result from the number of exposures to substances, such as glyceryl monothoglycolate, ammonium persulfate and p-phenylenediamine (Fourie et al, 2001, p.87, Leino et al, 1997, p.453, Leino et al, 1999, p.26).

Previous studies conducted in other countries such as South Africa, Finland and Australia indicated that employees in hair salons are at risk of developing occupational hazards such as: hand occupational contact dermatitis, eyes and nose irritation and respiratory symptoms (Fourie et al, 2001, p.87, Leino et al, 1995, p.536, Leino et al 1997, p.453, Lee & Nixon 2001, p.3, Schwanitz & Uter, 2000, p.1011-1012).

The study was conducted in registered hair salons in Windhoek with various employees from 6-10 March 2006.

Windhoek is the capital city of Namibia with a total number of 233 529 residents (Republic of Namibia, 2003, p.3). It is situated ± 1720 m above sea level, surrounded by high hills, the Auas mountains, the Eros mountains and the blue hills of the Khomas Hochland (City of Windhoek, 2006).

Windhoek is situated in a semi-desert climatic region. Rainfall occurs in the summer months from October to April with an average rainfall of 370mm per year. Minimum temperatures range from 5°C - 18°C. Wind is not a troublesome feature of the Windhoek climate. Mean speeds of less than 7 knots (3.3m/s) prevail 70% of the year. August and September are the windiest months, and June through August is cloudless (City of Windhoek, 2006).

Traditionally, Windhoek is known by two names: /Ai-//Gams, from the Nama people, literally referring to the hot springs that were once part of Windhoek, while the second name: Otjomuise, meaning a place of steam, given by the Herero people. The name Windhoek came from the Afrikaans of Namibia's European Dutch descendants, meaning wint-hoek, a windy corner. It is also thought that the Afrikaners named Windhoek after the Windhoek mountains at Tulbagh in South Africa, where the early Afrikaner settlers had lived. The present Windhoek was founded in 18 October 1890 when Von Francois laid the foundation stone of the fort, which is known as the Alte Feste, Old Fortress (City of Windhoek, 2006).

1.2. STATEMENT OF PROBLEM

Occupational health and safety regulations in hairdressing industries have been poorly coordinated and implemented. Telephone interviews were conducted to know about problems experienced in the hair salons and 13 managers of hair salons were interviewed

in Windhoek in March 2006. According to this informal survey over the telephone with the senior staff member in the division of occupational health and safety at Windhoek municipality and the 13 hair salons in Windhoek, it became clear that no proper policies and guidelines are in place to improve and ensure the safety of employees in hair salons.

It can be speculated that people running these salons have minimal training and are unaware of the health problems which might occur in hair salons. The research questions are therefore as follows: Which health problems are experienced among workers in Windhoek hair salons? What types of chemicals or equipments cause these health problems? What preventative measures are in place to ensure health and safety of employees in hair salons?

1.3. PURPOSE

The purpose of the study was to determine and describe health problems among employees in hair salons in Windhoek, in order to provide information to the National health services, municipality, owners of the hair salons and the workers to enable them to introduce protective measures related to occupational health and safety in hair salons.

1.3.1 Specific Objectives

The specific objectives of this study are

- To determine the prevalence of health problems among workers in the hair salons.
- To determine the type of chemicals used which might cause health problems among the employees in hair salons.
- To assess the protective measures taken by the workers in the hair salons.
- To make appropriate recommendations for preventative measures.

1.3.2. Significance of the study

According to studies conducted in other countries, such as South Africa, Finland and Australia, there is a positive relationship between chemical exposure and health problems (Fourie et al, 2001, p.89, Leino et al, 1997, p.453, Schwanitz & Uter 2000, p.1012, Lee & Nixon 2001, p.2-3). It seems that no study has previously been conducted addressing the

health problems associated with working conditions in Namibian hair salons. Therefore, research is vital to know the extent of the health problems associated with the working environment among employees in Namibian hair salons.

The findings of the study may be used as guidelines to develop preventative and protective measures to limit health problems among employees in hair salons in Windhoek.

1.4. RESEARCH METHODOLOGY

1.4.1. Research Design

A descriptive cross-sectional survey was conducted using a quantitative approach. The study set out to determine the extent of the occupational hazards in hair salons in Windhoek. A survey is used in order to determine the size of the problem: who is affected, which part of the body is affected, where it is found, or when it occurs (Abdool, Joubert & Katzennellenbogen, 1997, pg.66).

1.4.2. Population and sampling

The study was done only in registered hair salons in Windhoek. Windhoek is the capital city of Namibia with a total number of 233 529 residents (Republic of Namibia, 2003:3).

A list of 76 hair salon and barbershop names with relevant addresses was drawn from the health department of the City of Windhoek (City of Windhoek, 2005). Barbershops usually for men, are places where hair is cut with minimal use of chemical products to make the hair more attractive, therefore barbershops were excluded. Those hair salons which were closed at the time of the study were also excluded. These hair salons are places where people are cutting and styling hair by applying various chemicals to hair to make it more attractive.

It is often stated that the larger the sample, the better. It is often desirable to have a large sample in quantitative studies, because a large sample can give better results and is more reliable (Brink, 1996, p.142).

The population for the study was all the employees between the ages of 21-45 years who work with hair products in registered hair salons. Thirty-one hair salons with a total number of 128 employees, who were willing to participate were included in the study.

1.4.3. Data collection

Structured questionnaire was used to obtain data through face-to-face interviews.

A checklist was also used to observe which chemicals are used in the various hair salons.

The data collection methods were therefore individual face-to-face interviews and observations. The researcher collected the data himself over a period of five days.

All the employees on duty at the time and who were willing to participate in the study were interviewed.

1.4.4. Pilot study

A pilot study is a small-scale study, which is conducted before the main study on a limited number of subjects from the same population as that intended for the eventual project (Brink, 1996, p.174). Instruments were tested in Mariental on 17 January 2006 to ascertain the practical aspects. Only one hair salon in Mariental was used to investigate the feasibility of the proposed study and to detect possible flaws in the data-collecting instruments, such as wording, language use, amount of time and information needed for the study. The purpose was to see whether the variables are actually observable and measurable. The questionnaire was pre-tested for reliability and validity.

1.4.4.1. Validity

Validity refers to the degree to which a measure assesses what it purports to measure. It refers to the extent to which a measure thoroughly and appropriately assesses the skills or characteristics it is intended to measure. How the measure appears on the surface: does it seem to ask all needed questions? Does it use the appropriate language and language

level to do so (Fink, 1998, p.113)? In this study the questionnaire was pre-tested and corrected after the pilot study. Some questions were added and unnecessary questions were deleted from the questionnaire.

1.4.4.2. Reliability

Reliability can be defined as the extent to which measures are consistent or repeatable over time. When we speak of reliability, we mean the likelihood of obtaining the same answer when we measure the same thing more than once or when more than one person measures the same thing (Brink, 1987, p. 157-158).

A reliable data collection method is one that is relatively free from measurement error. In some cases the error results from the measure itself. For, example reading level may be too high to understand or it may be on target but the directions are unclear, the measure will be unreliable (Fink, 1998, p.110).

To ensure reliability, accurate information may be obtained by asking direct questions (Bell & Opie, 2002, p.15). In this study, four employees were interviewed during the pre-testing of the questionnaire to assess if they give the same answers to the same questions. The repeatability of the data could be ensured through this process. In conclusion the researcher collected the data himself, because some participants found some questions difficult to understand during the pilot study.

1.4.5. Data analysis

Data was analyzed by using Microsoft Excel and SAS computer software with the assistance of a statistician. Descriptive statistics are presented in tables and graphs in chapter 4. Prevalence of diseases was calculated and the outcome is continuous variables, because it is expressed in numbers of percentages. All the variables were coded.

1.4.6. Ethical Consideration

Ethical clearance was obtained from the Ethic Committee of the University of Namibia, the Windhoek municipality, owners of the hair salons and individual respondents (see annexure 3 & 4). All the employees in hair salons were informed in advance of the study and everything possible was done to minimize any inconvenience to the respondents. Confidentiality was assured since the identity of the study participants was protected and information remained anonymous. The data was reported as aggregate and in groups. Participation was voluntary and respondents were allowed to withdraw without being victimized.

1.5. OPERATIONAL DEFINITIONS

Occupational health: is a multifaceted activity concerned with the prevention of ill health in employed populations. This involves a consideration of the two-way relationship between work and health. It is as much related to the effects of working environment on the health of workers as to the influence of the workers' state of health on their ability to perform the tasks for which they were employed (Aw, Harrington, Gill & Gardener, 1998, p.3).

Chemicals: are divided in two types namely; organic, e.g. methanol, ethylene, benzene, vinyl chloride, alcohol and organophosphate and inorganic chemicals such as nickel and phosphorus. Chemicals may have a detrimental health effect on humans (Aw et al, 1998, p.73).

Protective equipment: can be defined as products that are used in industry to protect a worker from the dangers of a workplace. It includes equipment or clothing that protect workers from dangers (Schoeman & Schroder, 1994, p.358).

1.6. SUMMARY

This chapter gives the definition of a hair salon, background information on the occupational hazards in a hair salon, the problem statement, the purpose of the study, operational definitions and a brief description of the research methodology.

CHAPTER TWO: LITERATURE REVIEW

2.1. INTRODUCTION

The aim of the literature review was to identify limitations in the existing research area in order to justify the proposed research and also:

- To study different theories related to the research topic.
- To find out what has been done and needs to be done on the research topic.
- To determine connections with other research results by comparing the findings.
- To select the best research methods used for the proposed study (Bless & Higson Smith, 2000, p.20).
- To describe common occupational health problems such as occupational respiratory symptoms, skin problems, eye problems, musculo-skeletal symptoms, the other health problems related to the working conditions and the product as reported in the literature.

2.2. COMMON OCCUPATIONAL HEALTH PROBLEMS AMONG EMPLOYEES IN HAIR SALONS

In the passage below common occupational health problems identified from literature, are described.

2.2.1. Occupational respiratory symptoms

Hairdressers are exposed to many irritative and allergic substances capable of causing occupational respiratory symptoms. Brown (1989) as quoted in Fourie et al (2001, p.87) states that approximately 20% of hairdressers leave the profession due to respiratory problems, such as asthma, rhinitis and chronic bronchitis. Chemicals in products used by hairdressers may cause irritation, sensitization of the airways and may affect mucociliary transport in the nose and trachea (Fourie et al, 2001, p.87).

The prevalence of cough with phlegm and dyspnoea accompanied by a cough is usually higher among hairdressers. Hair lacquers and permanent wave solutions can irritate airways and worsen the symptoms of those with reactive airways or asthma. It is unlikely that the increased prevalence of respiratory symptoms results from the occupational

exposure to hairdressing chemicals only. The prevalence of respiratory diseases and symptoms are unacceptably high according to a study done in Finland (Leino et. al, 1997, p.452-454).

Persulphate salts have occasionally been reported to cause occupational asthma in hairdressers (Ferrando, Parra, Igea, Quirce, Martin & Losada, 1992, p.656). In a study done in London, seven subjects complained of symptoms consistent with a diagnosis of current asthma (more than one attack of wheezing, cough, or shortness of breath within the last year). Symptoms appeared work related in four subjects – that is, they deteriorated at work during the day and improved over weekends or during holidays. All those who reported work related respiratory symptoms had been exposed to similar compounds before working in this salon (Blainey, Olivier, Cundell, Smith & Davies, 1986, p.45). Four out of 23 staff employed at a hairdressing salon developed occupational asthma due to inhalation of bleach powders containing persulphate salts. All those with work-related asthma were tinters, and directly involved in mixing bleach powders; while none of the stylists had developed work related asthma (Blainey et al, 1986, p.48).

The use of hair preparations can lead to respiratory disease. The relative risk for asthma and chronic bronchitis among hairdressers in Finland was already almost twice that of those in control groups in 1980, and it remained similar in 1995 (Leino et al, 1995, p.536). Hairdressers who most often performed hair bleaching treatments or used hairspray, had a slight, but not significantly higher incidence of asthma compared with the most infrequent users in Sweden (Albin, Rylander, Mickonzy, Lillienberg, Dahlman Hoglund, Brisman, Toren, Meding, Kronholm Diab & Nielsen 2002, p.119). A 16-year old girl had been employed in a hairdressing salon for about one year before she began to notice a non-productive cough, sneezing, nasal itching and hydrorrhea, which were diagnosed as recurrent sinusitis. A few months later she developed chest tightness, wheezing and dyspnea. She also developed dermatitis on her hands. The girl associated these respiratory and cutaneous symptoms with the handling of hair bleaches and hairbleaches containing hair dyes. Respiratory symptoms began within a few hours after she left for work and became worse later in the afternoon and early in the morning.

She improved during weekends and was free of symptoms during vacation periods (Ferrando et al, 1992, p.659).

An immediate hypersensitivity may develop from actual latex proteins. Immediate hypersensitivity includes two subgroups: hives, itchy and watery eyes, runny nose, sneezing, wheezing, asthma, abdominal pain, nausea, diarrhoea and skin rashes. The second subgroup is more serious – anaphylaxis (Allergy Prevention Center: 2004).

2.2.2. Skin problems

Hairdressers are exposed to many irritative and allergic substances capable of causing hand eczema. Occupational contact dermatitis (eczema due to work) is an extensive problem in many occupations, and has been shown to be high amongst hairdressers because of the wide range of products they work with (Fourie et al, 2001, p.87). The patient developed an allergic contact dermatitis caused by isothiazolinone, which is commonly found as a preservative in shampoos and cosmetics (Ferrando et al, 1992, p.659). Contact dermatitis may develop through continuous exposure to latex. Regular skin contact with gloves made of natural rubber gloves or latex blends represent one of the easiest ways to develop an allergy (Allergy Prevention Centre, 2004). The highest annual incidence rates of irritant contact dermatitis were found in hairdressers who were exposed to extensive wet work in Northern Bavaria, Germany (Dickel, Kuss, Schmidt, Kretz & Diepgen, 2002, p.288).

Interdigital dermatitis in hairdressers can be regarded as a potential precursor of more severe hand dermatitis in hairdressers and probably of irritant hand dermatitis in wet work occupations in general. Pathophysiologically, a thin epidermis and intermittent occlusion of the skin area may explain the vulnerability to irritants such as; water, shampoo, waving and bleaching solutions. Insufficient rinsing off of remnants of these irritants and insufficient application of emollients, which is often observed, will contribute to skin damage (Schwanitz & Uter, 2000, p.1011-1012).

Hand dermatitis is caused by a number of factors related to product ingredients, metal instruments, application procedures and lack of protection. Prolonged contact with water and shampoos is a major cause of irritant skin damage (Fourie et al, 2001, p.87). In 1990, it was estimated that the financial impact of those formally diagnosed with occupational contact dermatitis, cost more than 12 million US dollars in Europe annually, of which hairdressers were the largest occupation represented. Hand dermatitis has been described as endemic in this occupation and most hairdressers feel it is “part of the job”. In the studies in Europe, hairdressing consistently ranked in the top five occupations associated with occupational skin diseases in women (the others included health care workers, cleaners, food handlers and those involved in home duties). Skin pathology begins early in the career of hairdressers, often within the first or second year. More than 70% of those affected are apprentices. This reflected the large amount of wet work that these apprentices performed. The researchers in Europe found that irritant changes occurred early, while sensitization tended to occur later. Contact urticaria has been reported to a number of chemicals to which hairdressers are exposed. The contact urticaria syndrome includes localized rash, generalized urticaria, asthma and anaphylaxis. Occupational skin disease in hairdressers primarily affects the hands in almost all cases. Clinical examination may reveal a range of changes, including erythema and scaling over the metacarpophalangeal joints and vesicles at the site of contact of the allergen. Affected areas may fissure, crack and bleed (Lee & Nixon, 2001, p.1-3).

2.2.3. Eye problems

The prevalence of eye irritation was found to be similar in salons with black clientele and those with white clientele according to the study done in the Gauteng area, South Africa (Fourie et al, 2001, p.89). The prevalence of rhinitis with eye symptoms was also found to increase among hairdressers. Rhinitis is sneezing, a stuffy nose or a runny nose, which has not been caused by common cold (Leino et al, 1997, p.453).

2.2.4. Products used and their effects

Hairdressers are exposed to many different chemicals in the workplace, which can result in health problems, such as respiratory and skin disorders (Estrada, 1998). The frequent

high peak concentration of chemicals during dyeing, bleaching, permanenting, and aerosol spraying still causes significant health problems (Leino et al, 1999, p.26). Insufficient rinsing off of remnants of irritants such as; water, shampoo, waving, bleaching solutions and insufficient application of emollients, which is often observed will contribute to skin damage. Remnants of shampoo are particularly harmful if occlusive gloves are worn after exposure to the detergent (Schwanitz & Uter, 2000, p.1012).

Individuals who are repeatedly exposed to hairspray may be at risk of developing lung disease. Polyvinyl pyrrolidone is used as a non lacquer hairspray base (Estrada, 1980). Polyvinyl pyrrolidone (PVP) and polyacrylates mixed with alcohol and hydrocarbons in hairsprays and other hairstyling aids can cause irritation of airways and affect the mucociliary transport in the nose and trachea (Leino et al, 1995, p.534).

Hairdressers are exposed to persulfates through inhalation and through skin contact when mixing the bleaching powders with an oxidizing agent. Persulphate salts in hair bleaches are known to cause occupational asthma as well as respiratory symptoms, allergic dermatitis and urticaria in hairdressers and workers in the chemical industry (Estrada, 1998). Persulphate salts are widely used in hair bleach formulas because they have strong oxidizing action that accelerates the hair-bleaching process (Ferrando et al, 1992, p.659). Persulphate salts, which are widely used as constituents of hair bleaches, have been shown to cause asthma in hairdressers and chemical workers. Henna and other hair dyes containing paraphenylenediamine are also thought to be capable of producing asthma in some individuals (Blainey et al, 1986, p.42). Henna is found in some commercial hair coloring products and nail dyes. Exposure to henna occurs while mixing or preparing the hair dye. Para-phenylene diamine in permanent hair color has been documented to cause occupational asthma. It is also a known skin irritant and sensitizer (Estrada, 1998).

The American Association of Nurse Anaesthetists (AANA) advises the wearers of latex gloves to beware of the occupational health hazards posed by exposure to products made

of natural rubber latex. Postal workers, office mail handlers and airport security personnel run the risk of developing skin irritations, sneezing, wheezing, coughing and breathing difficulties (Allergy Prevention Center, 2004). Hairdressers in Europe use protective gloves more frequently, some of which are latex. Immediate hypersensitivity (IHS) reactions to latex, though uncommon, have been reported in hairdressers. Rarely, allergic reactions to other thiuram, mercapto or carbamate components of disposable latex and rubber gloves may be found. Persulfate salts in hair bleaches are known to cause occupational asthma, other respiratory symptoms, allergic dermatitis and urticaria in hairdressers. Potential agents causing asthma are resin and phthalate in hairsprays, monoethanolamine in colorants and perms, and henna, a plant extract used to tint hair. It has been stated that ingredients such as glyceryl monoglycolate, p-phenylenediamine and ammonium persulphate are the most frequent sensitizers and the most relevant allergens associated with occupational dermatitis in hairdressers. It has been established that nickel may be leached from wet, nickel-plated surfaces and instruments by thioglycolic acid in permanent wave solutions and that this could contribute to the increased rates of sensitization.

The most common contributing factor to dermatitis is frequent, repetitive water exposure or wet work. The most commonly found allergens in hairdressing are the para-benzenediamine and ortho-benzene diamine dyes in particular para-phenylene, which has been reported to cause up to 60% of the cases of allergic contact dermatitis in hairdressers. Ammonium persulfate is one of many compounds, which has been shown to produce an immediate urticarial reactions (Lee & Nixon, 2001, p.2-3).

2.2.5. Musculo-skeletal symptoms

Cashiers are at increased risk for developing upper limb disorders, neck and back pain due to the nature of their work in Cape Peninsula, South Africa e.g. standing for longer periods (De Wet & Koh, 2000, p.20). One third of members working in food and grocery markets reported regular symptoms in some part of their body in 1989. The lower back and lower limbs were the body areas with the highest rates of symptoms. A positive and significant correlation was found between the proportion of the time spent standing and

symptoms in the lower limbs, especially in the department of a supermarket where 90% of the time was spent standing in one place (Ryan, 1989, p.359). The number of hours spent on repeated activities at work was associated with the prevalence of back pain in the United States (Guo, 2002, p.680).

There was a strong association between duration of employment and complaints in the hands of women in assembly work. For the younger women, but not the older ones, there was an increase in pain in the shoulders, neck, and upper back with duration of employment. The odds ratio for pain in the shoulders and neck increased with an increasing work pace (Attewell, Ohlson & Skerfving 1989, p.75).

2.2.6. Working conditions

Good general ventilation decreases the health complaints caused by hairdressing chemicals, but causes discomfort as a result of draughts. Complaints about the poor indoor air quality in hairdressing salons and nonspecific symptoms of the eyes, nose, throat, lungs and skin are common among hairdressers and their clients. The study done by Leino et al in Helsinki, Finland demonstrated that chemical and ergonomic work factors cause significant discomfort and work-related diseases for the workers in the salons. The hands, respiratory organs and musculo-skeletal system are at greatest risk (1999, p.32).

2.3. SUMMARY

The literature review gave a description of occupational respiratory symptoms, skin problems, eye problems, musculo-skeletal symptoms and working conditions. Occupational respiratory symptoms such as asthma, rhinitis, chronic bronchitis, irritation of airways, coughing and immediate hypersensitivity; skin problems such as; dermatitis, urticaria and skin damage; eye problems such as eye irritation and rhinitis; different products such as shampoos, dye, bleaches, perms, hairsprays, gloves, colorants, chemical ingredients; musculo-skeletal symptoms such as; neck, back, upper body, lower body pain and also the working conditions which might influence the health problems are discussed. The research design and methodology is presented in the next chapter.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. INTRODUCTION

This chapter aims at describing the research methodology that was applied to find answers to the research questions, which are: *Which health problems are experienced amongst workers in Windhoek hair salons? What types of chemicals might cause these health problems? What preventative measures are in place to ensure health and safety of employees in hair salons?*

The fundamental purpose of this study was to determine and describe health problems among employees in hair salons in Windhoek, in order to provide important information to the National Health Services, the Windhoek Municipality, owners of the hair salons and the workers to enable them to introduce protective measures related to occupational health and safety in hair salons.

The specific objectives of this study were:

- To determine the prevalence of health problems among workers in hair salons.
- To determine the type of chemicals used which might cause health problems among the employees in hair salons.
- To assess the protective measures taken by the workers in hair salons.
- To make appropriate recommendations for preventative measures.

3.2. RESEARCH DESIGN

A descriptive cross-sectional survey was conducted in Windhoek from 6-10 March 2006. Quantitative research design was applied, because the study is to determine the extent of the occupational hazards in hair salons. A survey is used in order to determine the size of the problem: who is affected, where it is found, or when it occurs? The descriptive research presents a complete picture of the specific details of a situation, social settings, relationships and it focuses on the “how” and “why” questions (De Vos, Strydom, Fouche & Delport, 2002, p.109).

3.3. RESEARCH METHODS

A quantitative research approach was used. Quantitative data are those types of information that are measured or analyzed numerically and this usually involves computerization of statistical measures. Quantitative research allows for easy comparisons and reproduction of the results (Brink, 1996, p.120). In this study, a quantitative approach would help to quantify the health problems that would signify the magnitude of their prevalence.

3.4. STUDY POPULATION

Study population includes all the members or units of a clearly defined group of people, objects or events (Basson & Uys, 1991, p.86). The population for the study includes all the employees working with hair products in registered hair salons in Windhoek between the ages of 21-45 years.

3.4.1. Inclusion:

There are 76 hair salons in Windhoek of which 31 hair salons were included in the study. It is often stated that the larger sample, the better. It is often desirable to have a large sample in quantitative studies (Brink, 1996, p.142). All the employees working with hair products in the chosen registered hair salons between the ages of 21-45 years were included, because employees in this age group are commonly found in hair salons.

3.4.2. Exclusion:

This study excluded those employees who were less than twenty-one and those who were more than forty-five years. Those who worked outside Windhoek were also excluded as well as Barbershop employees. Those hair salons, which were closed at the time of the study was also excluded.

3.5. SAMPLING

A sample is a small portion of the total set of population, which together form the subjects of the study. In a study, a sample is selected because it is not feasible in terms of resources, time and finances to study the whole population. Therefore, time and effort are

concentrated on a small group in order to produce better results (De Vos et al, 2002, p.199). The sample was conveniently selected because all the hair salons, which were found open and all the employees ≥ 21 and ≤ 45 years in the hair salons were included in the study. Convenience sampling is used where the sample is drawn from the section of the population that is easily accessible. The emphasis in this kind of sampling is on the convenience of the researcher, and not all elements of the population are given an equal chance of being included in the sample (Uys & Basson, 1991, p.93). Non-probability sampling was used because the researcher has to rely on employees who are present at work and are willing to participate.

A list of 76 hair salon names with relevant addresses was drawn from the health department of City of Windhoek. The hair salons' managers were informed in advance about the proposed research by telephone calls. Only 31 hair salons with the total number of 128 employees could be included in the study, because they were accessible. A total number of 117 (91.4%) females and 11 (8.6%) males were interviewed.

3.6. DATA COLLECTION METHODS AND INSTRUMENTS

Data was collected from employees in the identified registered hair salons in Windhoek. A structured questionnaire was used to collect data from the employees. A checklist was also used to determine the type of chemical products in the hair salons.

The data collection took place between 6 – 10 March 2006. The data was collected from hair salons, which were open during the time of interview and from all the employees in hair salons who were willing to participate.

Face-to face interviews were conducted with the employees in the hair salons using the questionnaire. Observation was done with regard to products in hair salons by using a checklist.

3.7. PILOT STUDY

A pilot study is a small study conducted prior to a larger piece of research to determine whether the methodology, sampling, instruments and analysis are adequate and appropriate (Bless & Higson Smith, 2000, p.155). The pilot study was conducted in Mariental to test the practical aspects of the research study. There was only one hair salon, which could be found for the pilot study. Only four employees could be interviewed to investigate the feasibility of the proposed questionnaire and to detect possible flaws in the data-collecting instruments, such as wording, language use, amount of time and information needed for the study. The purpose was to see whether the variables are observable and measurable.

Based on the pilot study the following changes were made to the instrument; the categories of eye irritation, chest pain, aching of the whole arm and gastroesophageal reflux disease were added as they were not included originally to the questionnaire. The type of hair products and the ingredients were removed from the questionnaire and a checklist was developed to cover the product and product ingredients aspects.

3.8. DATA ANALYSIS

The data was analyzed using Microsoft Excel and SAS computer software with the assistance of a statistician. In this study tables, percentages and graphs are used to describe the data. Descriptive statistics are presented in tables and graphs. Prevalence of health problems was calculated in percentages. The prevalence was continuous variables, because it is expressed in numbers of percentages. The outcome variable was binary: having a health problem or not having a health problem. All the variables were coded and analyzed with the help of Microsoft Excel and the statistician.

3.9. ETHICAL CONSIDERATION

The researcher has a responsibility to provide benefits to people in general and to stay within law. The researcher should ensure that methods and approaches are legally and ethically acceptable in his/ her study. The ethics followed in the study are discussed below.

3.9.1. Permission

Permission to conduct the study was obtained from the City of Windhoek, owners of the hair salons as well as individual participants, namely the hair salon managers and employees (see annexure 4). Permission was also obtained from UNAM Post Graduate Studies Committee, where the proposal was reviewed by the Ethical Committee to ensure that it adheres to the standards of scientific research (see annexure 3). The City of Windhoek gave their permission to conduct the study (see annexure 4).

3.9.2. Informed consent

The participants gave their permission to participate after the purpose and importance of the study was explained to them. The researcher explained the usefulness of such data in helping to improve the occupational health of the hair salon industry. They were assured that there would be no harm resulting from participation

3.9.3. Voluntary participation

Participation in this research was voluntary. Co-operation was negotiated. The participants were allowed to withdraw from the interviews at any time without being victimized.

3.9.4. Anonymity and confidentiality

Anonymity is where someone does or says something, but no one can trace back the identity of who said or did something (Le Beau, 1998, p.33). In this study, confidentiality was assured whereby the identity of the study participants was protected and information remained anonymous, as no names were used, only codes. The researcher also ensured that the anonymity of participants were protected in the report by ensuring that it is not possible to relate particular data to a particular person.

3.9.5. Benefits

The benefits of the research were explained to the participants, which allows them to give honest and correct information. The participants were informed that the findings would be forwarded to the relevant parties to acknowledge the health problems and possible solutions and will be utilized to improve occupational health in the hair salon industry in general.

3.10. SUMMARY

In this chapter, the research methodology was discussed in depth. A descriptive cross-sectional survey was conducted. A quantitative research approach was used. The study population, sampling, data collection methods, pilot study and data analysis were described. Ethical issues that were adhered to by the researcher were also discussed.

CHAPTER FOUR: FINDINGS AND DISCUSSION OF RESEARCH FINDINGS

4.1. INTRODUCTION

This chapter focuses on the findings and interpretations of data obtained from interviews with the participants and checklists completed for different chemical products found in hair salons. Thirty-one registered hair salons in Windhoek with the total number 128 employees were included in the study. Section A contains results from structured interviews, while Section B is about different hair products and chemical ingredients found in hair salons.

4.2. SECTION A: RESULTS FROM THE STRUCTURED INTERVIEWS

4.2.1. PERSONAL DETAILS

The information to be discussed is: the gender, age, smoking status and employment history, nature of activities and working period in hair salons of employees.

4.2.1.1. Gender

The study was designed to see the proportion of females and males in the hair salons in Windhoek as set out in table 4.1 below.

Gender	Frequency	Percent
Male	11	8.6
Female	117	91.4
Total	128	100

Table 4.1: Gender

The population with the total number of 128 participants was interviewed. There were 11 males and 117 females who participated in the study. The majority was female at 91.4% whilst male was 8.4%. According to my observation and in general the number of females is higher than males in the hairdressing profession. On the whole, hairdressing is undertaken by females.

4.2.1.2. Age groups

The study was designed to see the proportion of different age groups in the hair salons in Windhoek as set out in table 4.2.

Age groups	Frequency	Percent
≥21-<26	50	39.1
≥26-<31	43	33.6
≥31-<36	19	14.8
≥36-<41	8	6.3
≥41-<46	8	6.3
Total	128	100

Table 4.2: Age groups

Age was divided in groups of five: ≥21 - <26, ≥26 - <31, ≥31 - <36, ≥36 - <41 and ≥41 - <46. The age group of ≥21 - <26 had an age distribution of 39.1% with a total number of 50 respondents. The age group of ≥26 - <31 was the second highest with an age distribution of 33.6% and total respondents of 43. The age group of ≥31 - <36 ranked third with the age distribution of 14.8% and the total respondents of 19. The two age groups: ≥36 - <41 and ≥41 - <46 had age distribution of 6.3% and a total of eight respondents respectively. The employees in hair salons in Windhoek seems to be youthful which is typical of generally Namibia where youth age goes up to 35 years. Age may play a very significant role on developing health problems. Literature state that the hairdressers over 40 years of age reported more symptoms – such as wheezing and breathlessness than the younger hairdressers according to a study done in Bergen, Norway. However, this study could not conform to this findings (Florvaag, Hollund, Moen, Lygre & Omenaas, 2001, p.785). The literature states that for the younger women, there was a higher rate in shoulders, neck, and upper back pains which correlated with the duration of employment (Attewell et al, 1989, p.75).

4.2.1.3. Smoking status

This question was designed to see the proportion of smokers, non-smokers and also previous smokers amongst employees in hair salons in Windhoek as seen in figure 4.1.

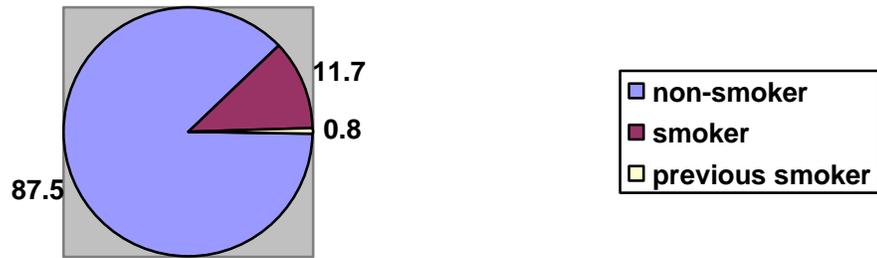


Figure 4.1: Smoking status

The employees of 87.5% were non-smokers, 11.7% were currently smoking and 0.8% had smoked before. Smoking may cause various health problems. Although cigarette smoking is generally recognized as a respiratory irritant, other researchers found that cigarette smoking is common among adults with acute asthma (Boudreaux, Silverman, Woodruff, Clark & Carmargo 2003, p.1472). The tar in cigarettes causes terrible damage to the lungs. Many young smokers develop chesty cough (Bryan, 1995, p.7-9). The most common cause of chronic bronchitis is heavy smoking. Tobacco smoke is a bronchial irritant and increases the production of mucus (Oakes, 1994, p.103-105).

According to the literature smoking can cause respiratory symptoms, therefore smoking status was also questioned to see whether smoking was a contributing factor to respiratory symptoms. It was found that there was no link between smoking status of employees and respiratory symptoms. Although smoking is a health hazard, in this study the fact that an employee smoked, did not have any contribution to respiratory symptoms. The respiratory problems, which were experienced among the employees in hair salons might be caused by chemicals with which they are working. Smoking in itself is a voluntary act of the respondent and though a health hazard, it is not one caused by employment in a hair salon.

4.2.2. EMPLOYMENT HISTORY

4.2.2.1. Nature of activities

One hundred and thirteen hairdressers (88,3%) and fifteen (11.7%) unspecified employees were interviewed. The unspecified employees were general assistants who worked also with hair products, but were not employed as hairdressers. The hairdressers and employees working in hair salons are exposed to many irritative and allergic substances capable of causing occupational respiratory symptoms and hand eczema. Exposure to the work environment of hair salon can result in hand eczema and respiratory symptoms. The prevalence of these symptoms in the working population varies widely because environmental and occupational exposures are not the same (Fourie et al, 2001, p.87).

4.2.2.2. Working period in hair salons

The duration of employment in the hair salons was also studied as seen in table 4.3.

Working period in hair salons	Frequency	Percentage
Not more than six months.	31	24.2
More than six months up to 1 year.	35	27.3
More than 1 year.	62	48.4
Total	128	99.9

Table 4.3: Working period in hair salons

Sixty-two subjects (48.4%) had worked for more than one year, while thirty-five subjects (27.3%) had been employed for a period between six months to one year. Duration of exposure or employment in hair salons may play a very significant role concerning the development of health problems. There is a strong association between occupational health problems such as hand, neck, back, upper body, and lower body pain and duration of employment (Attewell et al, 1989, p.75).

4.2.3. HEALTH STATUS

Employees were asked if they had experienced any of the following occupational health problems and their responses were as follows:

4.2.3.1. Occupational dermatitis

The prevalence of occupational dermatitis in hair salons in Windhoek is given in figure 4.2.

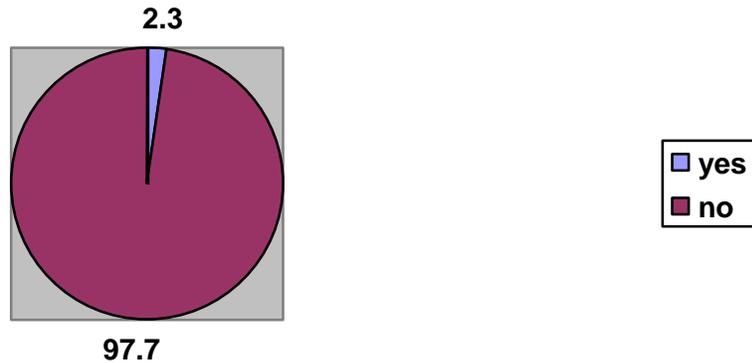


Figure 4.2: Occupational dermatitis

Three participants (2.3%) responded that they do have occupational dermatitis and one hundred and twenty-five participants (97.7%) responded that they do not have occupational dermatitis. Occupational dermatitis is an extensive problem in many occupations, which involve chemicals and has been shown to be high amongst hairdressers because of the wide range of products they work with (Fourie et al, 2001, p.87). The highest annual incidence rates of irritant contact dermatitis were found in hairdressers who were exposed to extensive wet work in Northern Bavaria, Germany (Dickel et al, 2002, p.288). Occupational contact dermatitis often affects hands and may result in a severe rash. Contact dermatitis can be extremely painful and unpleasant (Leino et al 1997, p.87).

4.2.3.2. Irritation and sensitivity of airways

The prevalence of irritation and sensitivity of airways was found in the hair salons in Windhoek as seen in figure 4.3.

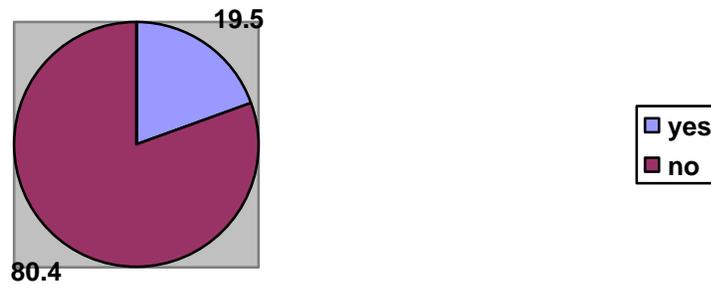


Figure 4.3: Irritation and sensitivity of airways

Literature states that hairdressers are exposed to many irritative and allergic substances capable of causing occupational respiratory symptoms. Chemicals in products used by hairdressers may cause irritation, sensitivity of the airways and may affect mucociliary transport in the nose and trachea (Fourie et al, 2001, p.87). In this study, twenty-five participants (19.5%) responded that they experience irritation and sensitivity of airways and one hundred and three participants (80.4%) did not experience this problem. It is unlikely that the increased prevalence of respiratory symptoms results from the occupational exposure to hairdressing chemicals. However, some literature states that the prevalence of respiratory diseases and symptoms are unacceptably high among hairdressers according to study done in Finland (Leino et al, 1997, p.452-454).

4.2.3.3. Asthma

The prevalence of asthma in hair salons in Windhoek is shown in figure 4.4.

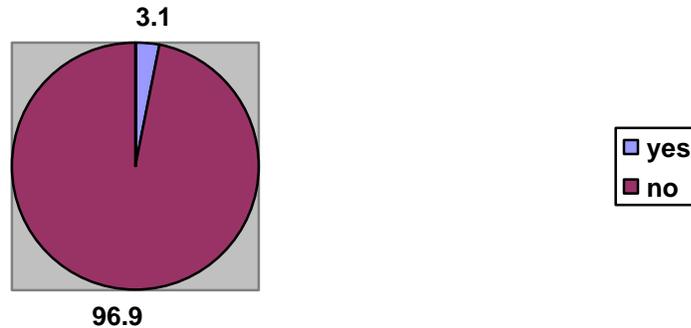


Figure 4.4: Asthma

Four participants (3.1%) were diagnosed with asthma and one hundred and twenty-four participants (96.9%) were not diagnosed with asthma. Fourie et al (2001, p.87 cited Brown, 1989) state that approximately 20% of hairdressers leave the profession due to respiratory problems, such as asthma. Persulfate salts have occasionally been reported to cause occupational asthma in hairdressers (Ferrando et al, 1992, p.656). According to a study done in London, four out of 23 staff employed at a hairdressing salon developed occupational asthma due to inhalation of bleach powders containing persulfate salts (Blainey et al, 1986, p.48).

4.2.3.4. Contact urticaria

The prevalence of contact urticaria in hair salons in Windhoek was found as shown in figure 4.5.

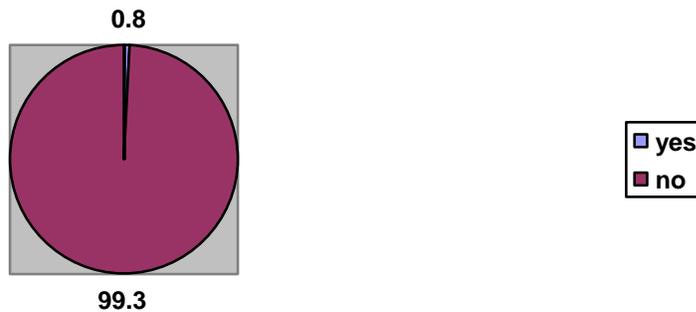


Figure 4.5: Contact urticaria

Only one participant (0.8%) was diagnosed with contact urticaria and one hundred and twenty-seven participants (99.3%) were not diagnosed with contact urticaria. Contact urticaria has been linked to number of chemicals to which hairdressers are exposed including APS, PPD, henna and recently latex. The contact urticaria syndrome includes localized rash and generalized urticaria (Lee & Nixon, 2001, p.1-3).

4.2.3.5. Skin damage/irritation

The prevalence of skin damage or irritation in hair salons in Windhoek is shown in figure 4.6.

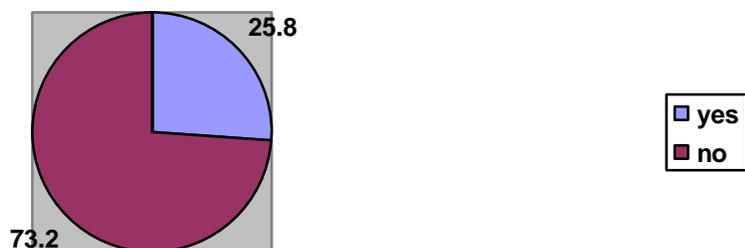


Figure 4.6: Skin damage/ irritation

A relatively large proportion of thirty-three participants (25.8%) responded that they experience skin damage or skin irritation and ninety-five participants (73.2%) responded that they do not experience any skin damage or irritation. This could be due to insufficient rinsing after handling chemicals. Insufficient rinsing off of remnants of these irritants and insufficient application of emollients, which is often observed could contribute to skin damage (Swanitz and Uter 2000, p.1011). Prolonged contact with water and shampoos is also a major cause of irritant skin damage (Fourie et al, 2001, p.87).

4.2.3.6. Chronic bronchitis

The prevalence of chronic bronchitis in hair salons in Windhoek was found as seen in figure 4.7.

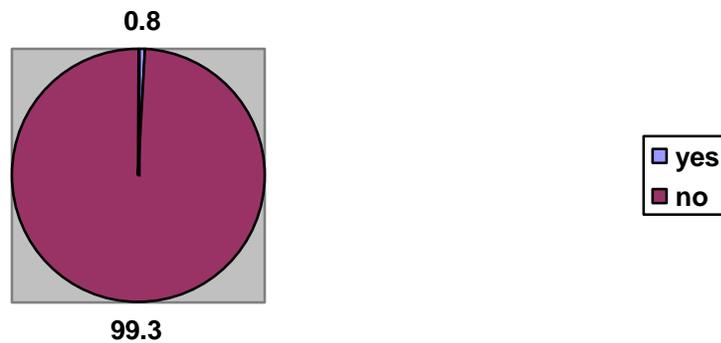


Figure 4.7: Chronic bronchitis

Only one participant (0.8%) was diagnosed with chronic bronchitis and one hundred and twenty-seven participants (99.3%) were not diagnosed with chronic bronchitis. Hairdressers are prone to develop chronic bronchitis especially if they do not use any protective masks while handling chemicals. The relative risk for chronic bronchitis among hairdressers in Finland was already almost twice of that the referents in 1980, and it remained similar in 1995 (Leino et al, 1980-1995, p.536).

4.2.3.7. Cough with phlegm and dyspnoea

The prevalence of cough with phlegm and dyspnoea in hair salons in Windhoek was found as seen in figure 4.8.

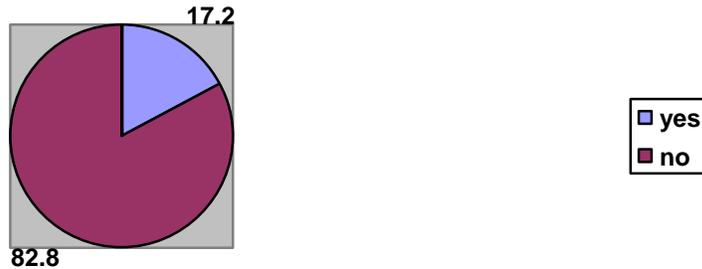


Figure 4.8: Cough with phlegm and dyspnoea

Twenty-two participants (17.2%) reported cough with phlegm and dyspnoea and one hundred and six participants (82.8%) did not experience any cough. Cough with phlegm and dyspnoea is usually related to the irritants from chemicals. It is found that the prevalence of cough with phlegm and dyspnoea has increased among hairdressers according to the study done in Finland by Leino et al (Leino et al, 1997, p.452).

4.2.3.8. Hand eczema

The prevalence of hand eczema in hair salons in Windhoek is shown in figure 4.9.

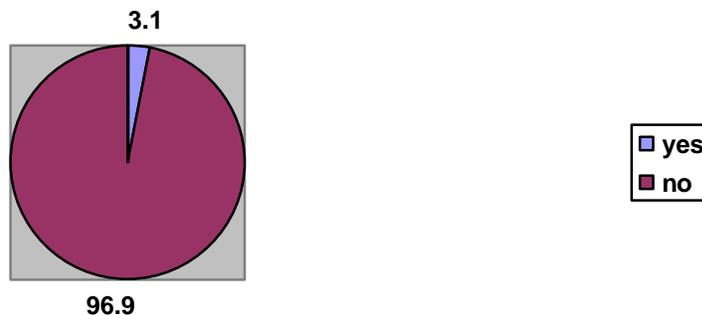


Figure 4.9: Hand eczema

Four participants (3.1%) reported hand eczema while one hundred and twenty-four participants (96.9%) did not experience any hand eczema. According to a study done in South Africa, the overall prevalence of reported hand eczema was 29% and 59% stated that the hand eczema was related to products at work. A total of six (11.1%) said that problems were caused by domestic products, e.g. bleach and washing powder (Fourie et al, 2001, p.89). Eczema was defined as skin irritation, with signs of erythema, scaling and cracked or erythema, scaling and blistered (Leino et al, 1997, p.89).

4.2.3.9. Rhinitis

The prevalence of rhinitis in hair salons in Windhoek is shown in figure 4.10.

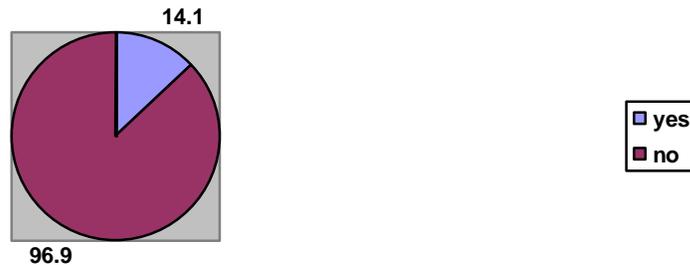


Figure 4.10: Rhinitis

About eighteen participants (14.1%) reported rhinitis and one hundred and ten (96.9%) subjects did not experience any rhinitis. It was found that the prevalence of rhinitis with eye symptoms has increased among hairdressers in Finland. Rhinitis is sneezing, a stuffy nose, which has not been caused by common cold (Leino et al, 1997, p.453).

4.2.3.10. Allergic reactions

The prevalence of allergic reactions in hair salons in Windhoek is shown in figure 4.11.



Figure 4.11: Allergic reactions

Twenty-nine participants (22.7%) reported allergic reactions while ninety-nine participants (77.4%) did not experience any allergic reactions. Allergic reactions could be due to direct contact with chemicals. Regular skin contact with gloves made of natural rubber gloves or latex blends is one of the easiest ways to develop an allergy (Allergy Prevention Center, 2004). Allergic reactions to disposable latex and rubber gloves may be found on the skin according to a study done in Europe (Lee & Nixon, 2001, p.2-3).

4.2.3.11. Immediate hypersensitivity (IHS)

Immediate hypersensitivity includes hives, itchy or watery eyes, runny nose, sneezing and wheezing (Allergic Prevention Center, 2004). The prevalence of immediate hypersensitivity in hair salons in Windhoek is shown in figure 4.12.

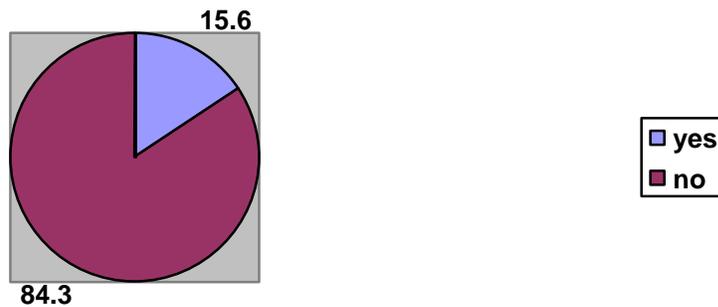


Figure 4.12: Immediate hypersensitivity

Twenty participants (15.6%) reported immediate hypersensitivity to latex and chemicals while hundred and eight participants (84.3%) did not experience immediate hypersensitivity. IHS reactions to latex have been reported in hairdressers according to a study done in Europe (Lee & Nixon, 2001, p.2-3). This finding is supported by this study.

4.2.3.12. Gastroesophageal reflux disease (GERD)

The prevalence of GERD in hair salons in Windhoek is shown in figure 4.13.

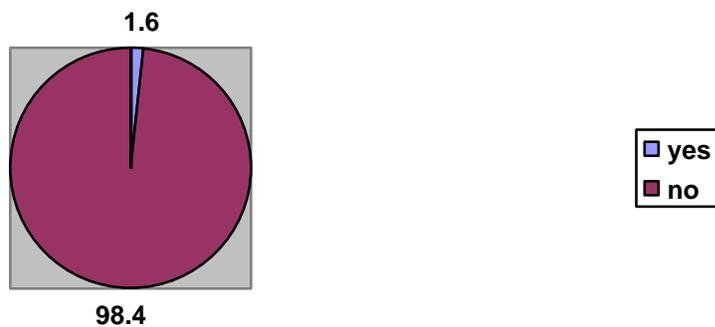


Figure 4.13: Gastroesophageal reflux disease

There was no literature found on gastroesophageal reflux disease related to chemical exposure in hair salons. During the pilot study, the researcher was informed by one of the

hairdressers that she was suffering from the GERD due to chemical exposure in the hair salons. The researcher decided to include it in the actual study. Two participants (1.6%) were diagnosed with GERD during their employment in hair salons while hundred and twenty-six participants (98.4%) were not diagnosed.

4.2.3.13. Chest pain

The prevalence of chest pain among participants in hair salons in Windhoek is shown in figure 4.14.

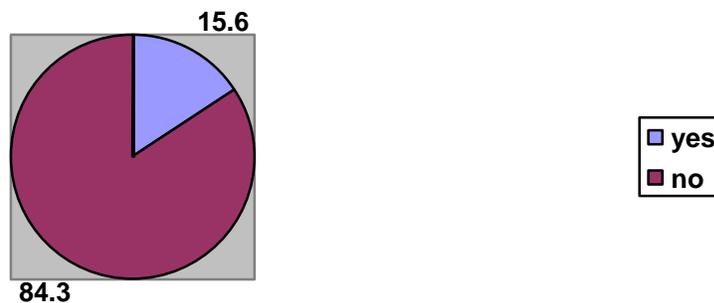


Figure 4.14: Chest pain

Twenty participants (15.6%) reported chest pain and one hundred and eight participants (84.3%) did not experience any chest pain. A study done in Finland reported an unacceptably high prevalence of respiratory diseases and symptoms among hairdressers (Leino et al, 1997, p.452). Ferrando et al (1992, p.659) reported a girl who was employed in a hairdressing salon and developed chest tightness, wheezing and dyspnea.

4.2.3.14. Eye irritation

The prevalence of eye irritation among participants in hair salons in Windhoek is shown in figure 4.15.

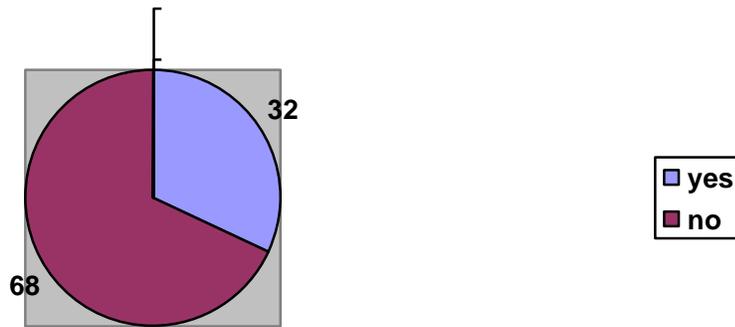


Figure 4.15: Eye irritation

A large proportion of forty-one participants (32%) reported eye irritation while eighty-seven subjects (68%) did not experience any eye irritation. Eye irritation caused by the chemical irritants in the hair products could be common among hairdressers. The prevalence of eye irritation was reported to be similar in black and white hairdressers according to the study done in the Gauteng area, South Africa (Fourie et al, 2001, p.89). Prevalence of rhinitis with eye symptoms was found to be increased among hairdressers in Finland (Leino et al, 1997, p.453). The study also found that complaints about the poor indoor air quality in hairdressing salons and nonspecific symptoms of the eyes are common among hairdressers and their clients (Leino et al, 1999, p.32).

4.2.3.15. Hand pain

The prevalence of hand pain among participants in hair salons in Windhoek is shown in figure 4.16.

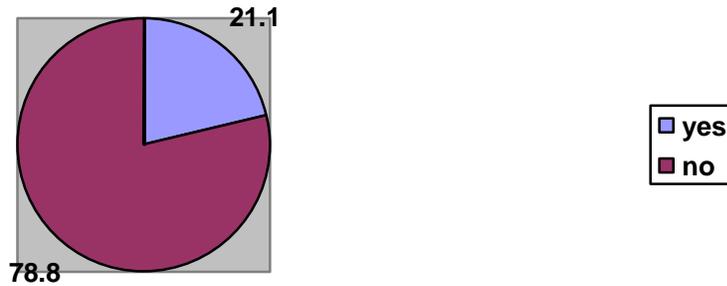


Figure 4.16: Hand pain

About twenty-seven participants (21.1%) complained about hand pain while one hundred and one participants (78.8%) did not experience any pain in their hands. Such pains could be related to the nature of work of employees in hair salons. The number of hours spent on repeated activities at work was found to be associated with the prevalence of musculo-skeletal pain in the United States (Guo, 2002, p.680). It was also reported that there was a strong association between duration of employment and complaints in the hands of women doing assembly work in Europe (Attewell et al, 1989, p.75).

4.2.3.16. Back pain

The prevalence of back pain among participants in hair salons in Windhoek is shown in figure 4.17.

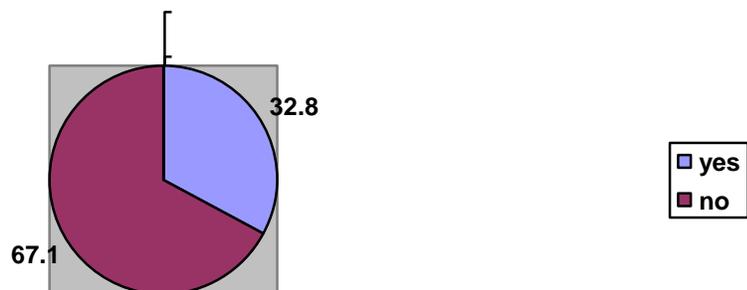


Figure 4.17: Back pain

A large proportion of forty-two subjects (32.8%) complained about back pain and eighty-six subjects (67.1%) did not experience any back pain. Back pain could be due to standing for long periods while on duty in the hair salons just like cashiers who experience the same problem. It was reported that cashiers are at increased risk of developing back pain due to the nature of their work in Cape Peninsula, namely, standing for longer periods (De Wet and Koh, 2000, p.20). The number of hours spent on repeated activities at work was associated with the prevalence of back pain in the United States (Guo, 2002, p.680).

4.2.3.17. Neck pain

The prevalence of neck pain among participants in hair salons in Windhoek is shown in figure 4.18.

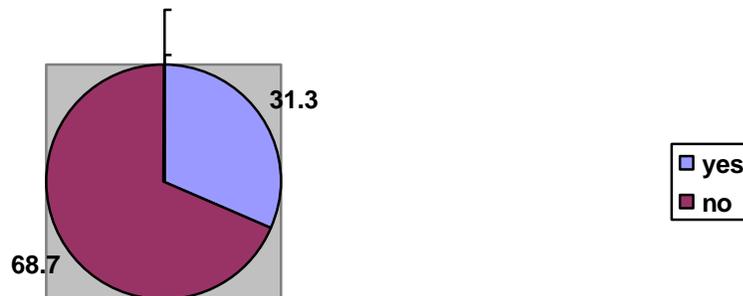


Figure 4.18: Neck pain

A relatively large proportion of forty participants (31.3%) reported neck pain while eighty-eight participants (68.7%) did not experience any neck pain. Such complaints of neck pain related to repeated activities in one position. Just like cashiers in Cape Peninsula, hairdressers are at increased risk for developing neck pain due to the nature of work, namely standing for long periods (De Wet & Koh, 2000, p.20). The same type of work, e.g. standing for long periods is experienced by employees in hair salons in general. For the younger women, there was an increase in neck pain with duration of employment. The likelihood of pain in the neck increased with a faster work pace (Attewell et al, 1989, p.75). The younger women like to stand for longer hours.

4.2.3.18. Upper body pain

The prevalence of upper body pain among participants in hair salons in Windhoek is shown in figure 4.19.

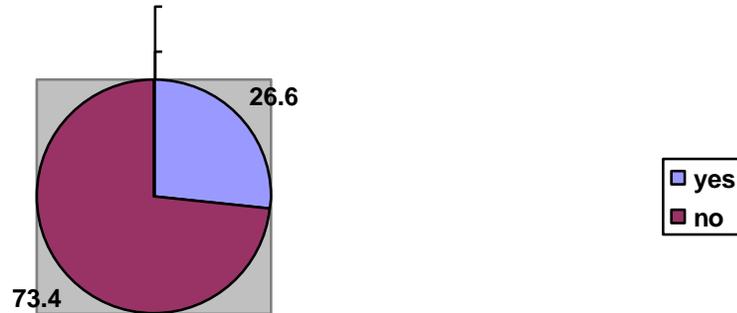


Figure 4.19: Upper body pain

Thirty-four participants (26.6%) reported upper body pain and ninety-four subjects (73.4%) did not experience this. The pain could be attributed to the upper body movements the employees in hair salons do while working on their clients. It was reported that for the younger women, there was an increase in pain in the shoulders and upper back with the duration of employment. The likelihood of pain in the shoulders increased with a faster work pace (Attewell et al, 1989, p.75).

4.2.3.19. Lower body pain

The prevalence of lower body pain among participants in hair salons in Windhoek was also assessed as seen in figure 4.20.

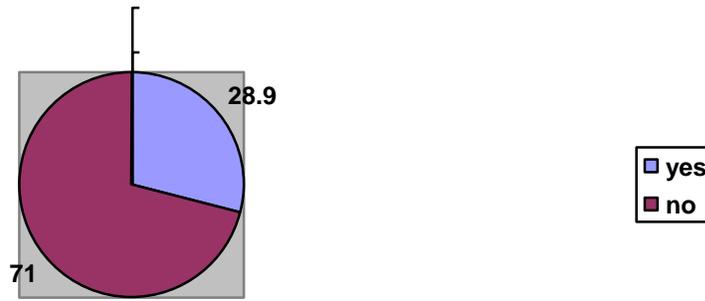


Figure 4.20: lower body pain

A relatively large proportion of thirty-seven participants (28.9%) complained about lower body pain while ninety-one participants (71%) did not experience lower body pain. The lower body pain could be attributed to long hours of standing with minimal movement. Ryan et al (1989, p.359) reported that the lower back and lower limbs were the body areas with highest pain rates in supermarket workers. Ryan (1989, p.359) reported a positive and a significant correlation between the proportion of the time spent standing and symptoms in the lower limbs, especially in the department where 90% of the time was spent standing in one place.

4.2.3.20. Aching of the whole arm

The prevalence of aching of the whole arm among participants in hair salons in Windhoek is shown in figure 4.21.

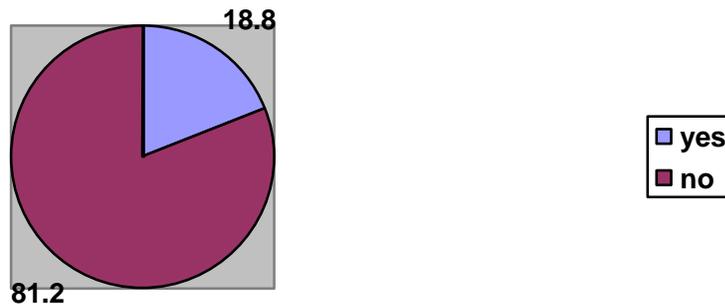


Figure 4.21: Aching of the whole arm

There was no literature found on the aching of the whole arm. The researcher was informed during the pilot study by three of the hairdressers that their whole arms were aching. The researcher decided to investigate the health problem in the actual study. A large proportion of twenty-four participants (18.8%) reported aching of the whole arm while hundred and four participants (81.2%) did not experience any arm pain. The number of hours spent on repeated activities at work was associated with the prevalence of musculo-skeletal pain in the United States (Guo 2002, p.680). The literature supported the findings of the study, because due to repeated activities with no resting period, the employees might experience the aching of whole arm.

4.2.4. STATUS – SMOKING AND EMPLOYMENT

4.2.4.1. Relationship between smoking status and occupational health problems

Smoking was also investigated in the study, because it may cause respiratory problems. Although cigarette smoking is generally recognized as an irritant, other researchers found that cigarette smoking is common among adults with acute asthma. Cigarette smoking is a short-term respiratory irritant, and smoking has been linked to a decline in pulmonary function and to the development of chronic respiratory disease. Patients with acute asthma actively smoke cigarettes (Boudreaux et al 2003, p.1472). Cigarette smoking among United States high school seniors is associated with respiratory tract symptoms (Arday, Giovino, Schulman, Nelson, Mowcry & Samet, 1995, p.111). The tar in

cigarettes causes terrible damage to the lungs. Carbon monoxide from cigarettes makes the blood less healthy and can lead to the tubes that carry blood, becoming blocked. Many young smokers develop chesty cough (Bryan, 1995, p.7-9). The most common cause of chronic bronchitis is heavy smoking. Tobacco smoke is a bronchial irritant and increases the production of mucus (Oakes, 1994, p.103-105). The postoperative deterioration in blood gas measurements of smokers was statistically significant compared with nonsmokers. In addition, the incidence of pulmonary complications in smokers was twice that of nonsmokers and was related to the number of cigarettes consumed daily (Arabaci, Aktur & Yigit, 2003, p.61). Smokers reported episodes of wheezing or breathlessness twice as often as who had never smoked and prevalence increased by smoking burden in Nord-Trondelag, Norway. The prevalence of current asthma increased with the increasing number of cigarettes per day. Persistent coughing was reported more than twice among smokers compared with those who never smoked throughout all age groups except in the oldest group of women (Bjermer, Gulsvik, Holmen, Johnsen & Langhammer, 2000, p.918-920). The researchers found that the crude incidence of physician's diagnosed chronic bronchitis to be highest in current smokers and lowest in non-smokers. The relative risk of chronic bronchitis in smokers increased significantly with the increasing number of cigarette smoked per day (Troisi, 1995, p.1559).

In this study smoking was also investigated, because smoking may cause respiratory problems. According to the above literature, there was no linked between the smoking status and hairdressers. The respiratory symptoms, which were experience among employees in hair salons could be caused by the chemicals with which they worked. From the study the researcher found that smoking was not contributing to this health problem as seen in table 4.4.

Health problems	Frequency	Non-smoker (%)	Current smoker (%)	previous smoker (%)
Irritation and sensation of airways	25	88	12	0
Asthma	4	100	0	0
Chronic bronchitis	1	100	0	0
Cough with phlegm and dyspnoea	22	90.9	4.5	4.5
Chest pain	20	85	10	5

Table 4.4: Relationship between smoking status and health problems

4.2.4.1.1. Irritation and sensitivity of airways.

The study found that 25 participants (19.5%) had complained about irritation and sensitivity of airways. From the 25 participants with these complaints, the majority of 88% was not smoking and only 12% of participants were current smokers. Cigarette smoking is a short-term respiratory irritant (Boudreaux et al, 2003, p.1472). Tobacco smoke is a bronchial irritant and increases the production of mucus (Oakes, 1994, p.103-105, which could also be worsened by the irritants in the hair products.

4.2.4.1.2. Asthma.

The study found that 4 participants (3.1%) were diagnosed with asthma and 100% of participants with this health problem never smoked. Researchers found that cigarette smoking is common among adults with acute asthma. The prevalence of current asthma increased with increasing number of cigarettes smoked per day (Bjermer et al, 2000, p.918-920). This study, therefore contradicts this finding. The study could not link the current asthma experienced by the participants to smoking, but possibly to the chemicals in the hair products.

4.2.4.1.3. Chronic bronchitis.

The study found that 1 participant (0.8%) who was diagnosed with chronic bronchitis was a non-smoker. The most common cause of chronic bronchitis is heavy smoking (Oakes, 1994, p.103-105). It was found that the crude incidence of physician's diagnosed chronic

bronchitis is highest in current smokers and lowest in non-smokers. The relative risk of chronic bronchitis in smokers increased significantly with the increasing number of cigarettes smoked per day (Troisi, 1995, p.1559). This study contradict Troisi's findings.

4.2.4.1.4. Cough with phlegm and dyspnoea.

The study found that 22 participants (17.2%) complained about a cough with phlegm and dyspnoea. From the 22 participants with these complaints, the majority of 90.9% was not smoking, only 4.5% of the participants were current smokers and the other 4.5% of participants had smoked previously. Literature states that many young smokers develop a chesty cough (Bryan, 1995, p.7-9). Persistent coughing was reported to be twice as high among smokers throughout all age group of women working in hair salons than among those participants who did not smoke (Bjermer et al, 2000, p.918-920). Such findings were confirmed by this study.

4.2.4.1.5. Chest pain.

The study found that 20 participants (15.6%) had complained about chest pain. From the 20 participants, the majority of 85% did not smoke while 10% of the participants were current smokers and another 5% of the participants had smoked before. Smoking has been linked to a decline in pulmonary function and to the development of chronic respiratory disease (Boudreaux, 2003, p.1472). Cigarette smoking among United States high school seniors is associated with respiratory tract symptoms (Arday et al, 1995, p.111). In addition, the incidence of pulmonary complications in smokers was twice as much as in nonsmokers and was related to the number of cigarettes consumed daily (Arabaci, 2003, p.61). Smoking could be linked to chest pain or symptoms according to the literature, but in this study chest pain could be experienced owing to the chemicals that the employees in the hair salons inhale and not by smoking.

4.2.4.2. Relationship between employment status and health problems

The employment period was also investigated in the study, because exposure time may play a very significant role concerning the occupational health problems. Ryan (1989, p.359) found a positive and significant correlation between proportion of time spent

standing and symptoms in the lower limbs, especially in the department where 90% of the time was spent standing in one place. The number of hours spent on repeated activities at work was associated with the prevalence of musculo-skeletal pain in the United States (Guo, 2002, p.680). There was a strong association between duration of employment and complaints of pains in the hands. For the younger women, there was an increase in pain in the shoulders, neck, and upper back with duration of employment (Attewell et al, 1989, p.75). The prevalence of occupational health problems associated with duration of employment can be seen in table 4.5.

Health problems	Frequency	Not more than six months (%)	More than six months up to 1 year (%)	More than 1 year (%)
Occupational dermatitis	3	0	33.3	66.7
Irritation and sensation of airways	25	0	32	68
Asthma	4	0	50	50
Cough with plegms and dyspnoea	22	9.1	45.5	45.5
Allergic reactions	29	10.3	24.1	65.5
Hand pain	27	7.4	33.3	59.3
Back pain	42	4.8	23.8	71.4
Neck pain	40	10	25	65
Upper body pain	34	11.8	32.4	54.1
Lower body pain	37	13.5	32.4	54.1
Aching of the whole arm	24	12.5	25	62.5

Table 4.5: Relationship between employment duration and occupational health problems

According to table 4.5 above, the prevalence of occupational health problems among participants working in hair salons in Windhoek are as follows:

4.2.4.2.1. Occupational dermatitis.

According to the study, 3 participants (2.3%) were diagnosed with occupational dermatitis. Of the 3 participants, 66.7% worked for more than one year and 33.3%

worked for a period between six months to one year. Other researchers have shown that frequent hand washing and cleaning of products, has been reported to play a significant role in Irritant Contact Dermatitis (ICD) in hairdressers (Dickel et al, 2002, p.287).

Prolonged contact with water and shampoos is a major cause of irritant skin damage (Fourie et al, 2001, p.87). A study in London found that 30 of 33 junior hairdressers had hand dermatitis, two-thirds had developed it by the end of their second year of work (Lee & Nixon, 2001, p.1). This study confirms this finding.

4.2.4.2.2. Irritation and sensitivity of airways.

In the study 25 participants (19.5%) had complained about irritation and sensitivity of airways. Of the 25 participants, the majority (68%) worked for more than one year and 32% participants worked for between six months and one year. This finding implies that the longer the person worked in the hair salon the higher the chances for an employee to experience irritation and sensitivity of airways. It was also reported that all tinters exposed to bleaches and dyes, who reported work related respiratory symptoms had been exposed to bleach powders for at least six months before the onset of symptoms (Blainey et al, 1986, p.45). A 16 year old girl, a nonsmoker had been employed in a hairdressing salon for about one year before she began to notice a non productive cough, sneezing, nasal itching and hydorrhoea (Ferrando et al, 1992, p.68).

4.2.4.2.3. Asthma.

According to the study, 4 participants (3.1%) were diagnosed with asthma. Of the 4 participants, 50% worked for more than one year and 50% had worked between six months to one year. According to a case report, a 16-year old girl required emergency treatment on three occasions due to asthma attacks after being employed for one year and a few months (Ferrando et al, 1992, p.656). One may conclude that the duration of exposure to hair products can be associated with the development of asthma among the employees in the hair salons.

4.2.4.2.4. Cough with phlegm and dypnoea.

In the study, 22 participants (17.2%) had complained about a cough with phlegm and dypnoea. Of the 22 participants, 45.5% had worked for more than one year, 45.5% of participants had worked for the period of six months to one year and 9.1% had worked for not more than six months. This study confirms the findings of other studies. It was reported that a 16-year old girl who was employed for more than one year in a hairdressing salon developed chest tightness, wheezing and dyspnea (Ferrando et al, 1992, p.656).

4.2.4.2.5. Allergic reactions.

In the study 29 participants (22.7%) had complaint about allergic reactions. Of the 29 participants, the majority (65.5%) of participants worked for more than one year, 24.1% worked for the period of six months to one year and 10.3% worked for not more than six months. In the study employees who worked for longer periods were at a higher risk of developing allergic reactions. Regular skin contact with gloves made of natural or latex blends represents one of the easiest ways to develop an allergy. Ongoing exposure to products made of Natural Rubber Latex (NRL), especially contact with gloves, causes most allergic reactions (Allergy Prevention Center, 2004).

4.2.4.2.6. Hand pain.

In the study 27 participants (21.1%) had complained about hand pain. Of the 27 participants, the majority (59.3%) worked for more than one year, 33.3% for the period of six months to one year and 7.4% not more than six months. In the study employees who worked longer periods in hair salons did experience pain in their hands. The number of hours spent on repeated activities at work was associated with the prevalence of musculoskeletal pain in the United States (Guo, 2002, p.680). There was a strong association between duration of employment and complaints in the hands in supermarket employees (Attewell et al, 1989, p.75).

4.2.4.2.7. Back pain.

In the study 42 participants (32.8%) had complained about back pain. Of the 42 participants, the majority (71.4%) worked for more than one year, 23.8% worked for the period of six months up to one year and 4.8% of participants worked for not more than six months. In the study employees who worked for longer periods in hair salons did experience pain in the back. For the younger women there was an increase in back pain in proportion to the duration of employment (Attewell et al, 1989, p.75). The younger women can stand for longer periods than older women.

4.2.4.2.8. Neck pain.

In the study 40 participants (31.3%) had complained about neck pain. Of the 40 participants, the majority (65%) worked for more than one year, 25% for the period of six months up to one year and 10% for not more than six months. In the study employees who worked for longer periods did experience pain in the neck. For the younger women, there was an increased neck pain in proportion to the duration of employment (Attewell et al, 1989, p.75).

4.2.4.2.9. Upper body pain.

The study found that 34 participants (26.6%) had complained about upper body pain. Of the 34 participants, the majority (55.9%) worked for more than one year, 32.4% for the period of six months up to one year and 11.8% for not more than six months. In the study upper body pain was more common in employees who worked for more than six months. For the younger women, there was an increase in pain in the shoulders and upper back in proportion to the duration of employment (Attewell et al, 1989, p.75).

4.2.4.2.10. Lower body pain.

The study found that 37 participants (28.9%) had complained about lower body pain. Of the 37 participants, the majority (54.1%) worked for more than one year, 32.4% for the period of six months up to one year and 13.5% for not more than six months. Ryan (1989, p.359) found a positive and significant correlation between proportion of time spent

standing and symptoms in the lower limbs, especially in the department where 90% of the time was spent standing in one place.

4.2.4.2.11. Aching of the whole arm.

The study found that 24 participants (18.8%) had complained about aching of whole arm. Of the 24 participants, the majority (62.5%) worked for more than one year, 25% for the period of six months up to one year and 12.5% for not more than six months. The number of hours spent on repeated activities at work was associated with the prevalence of musculoskeletal pain in the study conducted in the United States (Guo, 2002, p.680).

4.2.5. TIME OF EXPERIENCING THE OCCUPATIONAL HEALTH PROBLEMS

The following three questions were asked: Do you experience these health problems during working hours only, do you experience these health problems during holidays and working hours or do you experience these health problems during holidays only?

Time of Experiencing health problems	Frequency	Percent
During working hours only	29	22.7
During holidays & working hours	54	42.2
During holidays only	0	0
Not applicable	45	35.1
Total	128	100

Table 4.6: Time of experiencing the occupational health problems

Twenty-nine participants (22.7%) experienced the occupational health problems during working hours only, fifty-four participants (42.2%) experienced the health problems during holidays and also during working hours, no participant experienced the health problems during holidays only and forty-five participants (35.1%) responded not applicable. Some of the participants who responded “not applicable” did not experience any occupational health problem and other participants did not take the occupational health problem as serious. A 16-year old girl employed in hairdressing salon, with respiratory symptoms, improved during weekends and was free of symptoms during vacation periods (Ferrando et al, 1992: 656). The study found that in 42.2% of the

participants the situation became so severe that they experienced the occupational health problems during holidays and working hours.

4.2.6. HOSPITAL OR DOCTOR VISIT DUE TO OCCUPATIONAL HEALTH PROBLEMS EXPERIENCED

The participants were asked whether they had visited a hospital or a doctor concerning these occupational health problems.

Hospital or doctor visit	Frequency	Percent
No	57	44.5
Yes	33	25.8
Not applicable	38	29.7
Total	128	100

Table 4.7: Hospital or doctor visit due to occupational health problems experienced

Fifty-seven participants (44.5%) had occupational health problems but did not visit a hospital or doctor, thirty-three participants (25.8%) visited the hospital or doctor and thirty-eight participants (29.7%) responded not applicable. Some of the participants who responded not applicable did not experience any occupational health problem and others did not see it as a serious problem. The hospital or doctor visits may tell us about the severity of the health problem.

4.2.7. MEDICATION USED FOR THE OCCUPATIONAL HEALTH PROBLEMS EXPERIENCED

The participants were asked whether they used any medication for these health problems.

Medication	Frequency	Percent
Yes	53	41.4
No	38	29.7
Not applicable	37	29
Total	128	100.1

Table 4.8: Medication used for the occupational health problems experienced

Fifty-three participants (41.4%) responded that they used medication for the occupational health problems that they were experiencing, thirty-eight participants (29.7%) responded that they did not get any medication for the occupational health problems and thirty-seven subjects (29%) responded not applicable. Some participants responded not

applicable, because they did not experience any occupational health problem and others did not take it as a serious health problem.

4.2.8. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Participants were asked whether they made use of protective equipment such as apron, overall, mask, goggles, latex gloves and rubber gloves.

The organs of the human body that are vulnerable to chemicals from external sources are eyes, ears, skin and respiratory system, therefore, protection for these organs is needed (Aw, Harrington, Gill & Gardiner, 1998: 297). The study found usage of personal protective equipment as seen in table 4.9.

PPE	Frequency	Percentage
Apron		
Yes	94	73.4
No	34	26.6
Overall		
Yes	34	26.6
No	94	73.5
Mask		
Yes	10	7.8
No	118	92.2
Goggles		
Yes	7	5.5
No	121	94.6
Latex gloves		
Yes	79	61.7
No	49	38.3
Rubber gloves		
Yes	70	54.7
No	58	45.4

Table 4.9: Use of personal protective equipment

4.2.8.1. Apron

Ninety-four participants (73.4%) responded that they made use of an apron and thirty-four participants (26.6%) did not make use of an apron. Protective clothing for chemical hazards ranges from a PVC-apron to full body coverage (Waldron, 1989, p.401).

4.2.8.2. Overall

Only thirty-four participants (26.6%) responded that they had used overalls and ninety-four participants (73.5%) did not use overalls. Skin protection includes guarding the body against damage from dermatitic or corrosive agents (Aw et al, 1998, p.301).

4.2.8.3. Mask

Ten participants (7.8%) responded that they used masks while one hundred and eighteen participants (92.2%) did not use masks. A mask is designed to cover the nose and mouth and it is suitable against dust, gas or vapour (Aw et al, 1998, p.307). Where chemical risks includes a vapour hazard it will be necessary to provide a mask (Waldron, 1989, p.401).

4.2.8.4. Goggles

Seven participants (5.5%) did use goggles while one hundred and twenty-one participants (94.6%) did not use goggles. Goggles are suitable for a wide range of hazards such as: chemical, dust, gas, welding gas and for general purposes. Protection must be provided to guard against the contact of eyes with an irritating gas or vapour (Aw et al, 1998, p.300), especially in hair salons where products could spill into the eyes. However, only a small proportion (5.5%) of hairdressers made use of goggles.

4.2.8.5. Latex gloves

Seventy-nine participants (61.7%) did use latex gloves and forty-nine participants (38.3%) did not use latex gloves. Hand protection includes wearing of gloves to protect against chemicals and micro-organisms. AANA advises the wearers of latex gloves to be aware of occupational hazards posed by exposure to products made of natural rubber

latex (NRL). Hairdressers who wear latex gloves to process and color hair may develop skin rashes (Allergy Prevention Center, 2004).

4.2.8.6. Rubber gloves

Seventy participants (54.7%) did make use of rubber gloves and fifty-eight participants (45.4%) did not make use of rubber gloves. Hand protection includes wearing of gloves to protect against chemicals and micro-organisms. Rubber workers can develop latex allergies during manufacturing. NRL allergies which affect 8% and 25% of health workers may adversely affects individuals in other companies (Allergy Prevention Center, 2004).

4.3. SECTION B: CHECKLIST

This section deals with the checklist, which contains the information about chemical products. A wide range of cosmetic products, consisting of hundreds of chemicals, is used in hairdressing salons. Many are synthetic organic chemicals, and natural substances derived from plant, animal, and mineral sources are used as well. Hair preparations are used for shampooing, conditioning, bleaching, dyeing, permanent waving, hairspraying, and styling of hair (Leino et al, 1999, p.26). Only one checklist was used for each hair salon to collect data. Thirty-one hair salons were included in the study.

4.3.1. Chemical Products

Table 4.10: Types of chemical products

Chemical products	Frequency	Percent
Relaxer	29	93.5
Perm	24	77.4
Hair dye powder	26	83.9
Shampoo	31	100
Hairspray	31	100
Henna	11	35.5
Hair bleaches	23	74.2
Deep conditioner	31	100
Colorants	29	93.5

4.3.1.1. Relaxants

Twenty-nine hair salons (93.5%) were using relaxants and two hair salons (6.5%) were not using relaxants.

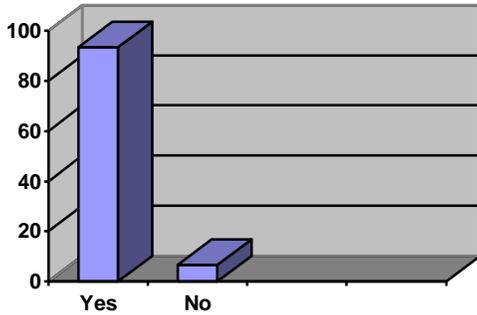


Figure 4.22: Hair salons using relaxants

It is likely that hand eczema could result from relaxants (Fourie et al, 2001, p.90).

4.3.1.2. Perm

Twenty-four hair salons (77.4%) were using perm and seven hair salons (22.6%) were not using perm.

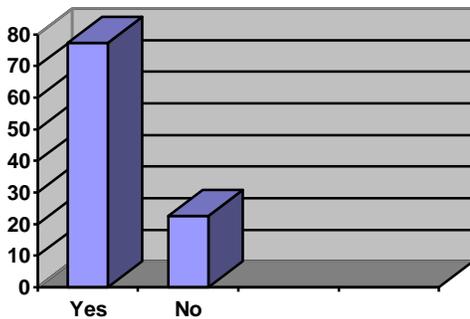


Figure 4.23: Hair salons using perm

Permanent waving chemicals found in perm were alkaline and acidic water solutions. The active ingredients were salts or esters of thioglycolic acid such as ammonium thioglycolate or glyceryl monothioglycolate (GMTG) in quantities of less than 11 percent. Hair lacquers and permanent wave solutions can irritate airways and worsen the symptoms of people with reactive airways or asthma (Leino et al, 1997, p.452-454). GMTG is found in acid permanent wave solutions, and is a frequent sensitizer, although it may also be an irritant, causing up to 30% of cases of allergic contact dermatitis (ACD)

in hairdressers (Lee & Nixon, 2001, p.2). A potential agent causing asthma is monoethanolamine in perms. This agent can irritate airways and worsen the symptoms of people with reactive airways or asthma (Fourie et al, 2001, p.16).

4.3.1.3. Hair dye.

Twenty-six hair salons (83.9%) were using hair dye powder and five hair salons (16.1%) were not using hair dye.

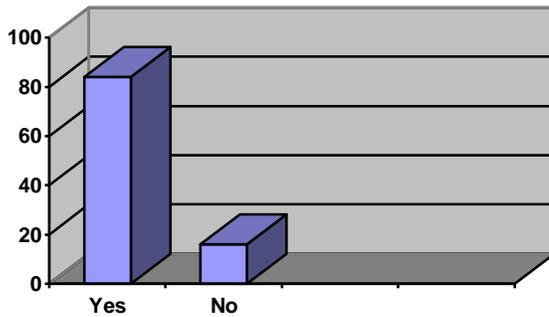


Figure 4.24: Hair salons using hair dye

Hair dye allergens are frequent causes of occupational skin diseases among hairdressers (Fautz, Fuchs, van der Walle, Henny & Smits, 2002, p.319). The most common allergens in hairdressing are the para-benzenediamine and ortho-benzenediamine dyes in particular para-phenylene, which has been reported to cause up to 60% of the cases of allergic dermatitis in hairdressers (Lee & Nixon, 2001, p.2-3).

4.3.1.4. Shampoo

All hair salons (100%) were using shampoo.

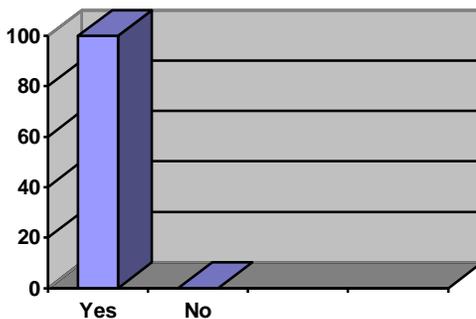


Figure 4.25: Hair salons using shampoo

The shampoos were mostly neutral or slightly acidic water solutions or detergents. The common preservatives were para-benzenediamine, but formaldehyde releasers and methylisothiazolinone were also used. Many shampoos contained small amounts of fragrances and pigments. Other additives were B-vitamins, anti-dandruff agents, and protein hydrolysis products (Leino et al, 1999, p.28). Prolonged contact with water and shampoos is a major cause of irritant skin damage (Fourie et al, 2001, p.87). The patient developed an allergic contact dermatitis caused by isothiazolinone, which is a commonly found preservative in shampoos and cosmetics (Ferrando et al, 1992, p.659).

4.3.1.5. Hair styling products

All hair salons (100%) were using hair styling products.

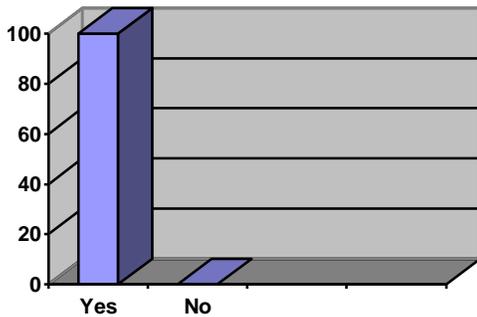


Figure 4.26: Hair salons using hair styling products

The hair styling products were used as gels, lotions, emulsions, and sprays. They contained polymeric resins such as polyvinylpyrrolidone (PVP), vinylacetate copolymers, or polyquarterm-4 in alcohol solutions. The aerosol sprays contained butane or dimethylether as propellants and sometimes acetone as an additional solvent (Leino et al, 1999, p.28). Individuals who are exposed to hairspray repeatedly may be at risk of developing lung disease. Polyvinyl pyrrolidone and polyacrylates mixed with alcohol and hydrocarbons in hairsprays and other hairstyling aids can cause irritation of airways and affect the mucociliary transport in the nose and trachea (Leino et al, 1995, p.534).

4.3.1.6. Henna

Only eleven hair salons (35.5%) were using henna and twenty hair salons (64.6%) were not using henna.

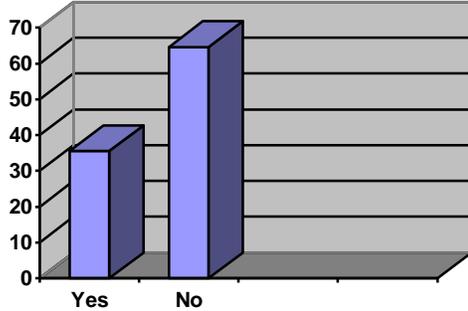


Figure 4.27: Hair salons using henna

Henna and other hair dyes which contain paraphenylenediamine (PPD) are thought to be capable of producing asthma in individuals (Blainey et al, 1986, p.42).

Exposure to henna occurs while mixing or preparing the hair dye (Estrada, 1998). The vegetable henna has been associated with immediate-type hypersensitivity reactions in hairdressers presenting as asthma, urticaria and even anaphylaxis, but has been reported only to cause contact dermatitis when used as a skin dye rather than a hair dye (Lee & Nixon, 2001, p.3).

4.3.1.7. Hair bleaches

Twenty-three hair salons (74.2%) were using hair bleaches and eight hair salons (25.8%) were not using hair bleaches.

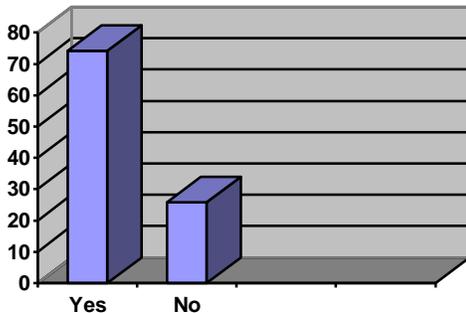


Figure 4.28: Hair salons using hair bleaches

The active ingredients in the hair bleaching products were persulfates. They were used mostly as powders containing ammonium, sodium and potassium persulfate in a concentration of 30-70% (Leino et al, 1999, p.29). The hairdressers most often performing hair bleaching treatments or using hairspray had, compared with most infrequent users, a slightly, but not significantly higher incidence of asthma in study in Sweden (Albin et al, 2002, p.119). Four out of 23 staff employed at a hairdressing salon developed occupational asthma due to inhalation of bleach powders containing persulfate salts (Blainey et al, 1986, p.48). Persulphate salts in hair bleaches are known to cause occupational asthma as well as respiratory symptoms, allergic dermatitis and urticaria in hairdressers and workers in the chemical industry (Estrada, 1998). Persulphate salts are widely used in hair bleach formulas because of the strong oxidizing action that accelerates the hair-bleaching process (Ferrando et al, 1992, p.659).

Ammonium persulfate is an accelerant used in bleaching agents that may cause both allergic contact dermatitis (ACD) and irritant contact dermatitis (ICD) and, less commonly, urticarial reactions (Lee & Nixon, 2001, p.2-3).

4.3.1.8. Hair conditioner

Thirty-one hair salons (100%) were using hair conditioner.

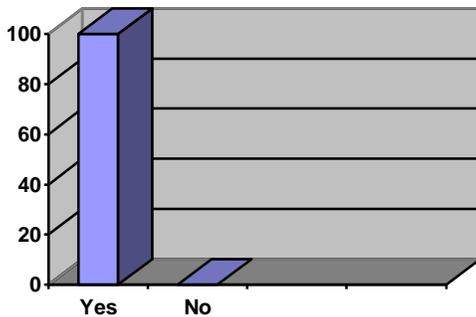


Figure 4.29: Hair salons using hair conditioner

Hair conditioners contained mineral or vegetable oils, silicon compounds, or fatty alcohols. Most contained alcohols such as ethanol, glycerol, and propylene glycol. The following additives were also common in hair conditioner: emulsifiers, polymeric resins, protein hydrolysis products, sunscreen chemicals, pigments, fragrances, and preservatives (Leino et al, 1999, p.28).

4.3.1.9. Colorants

Twenty-nine hair salons (93.5%) were using colorants, two hair salons (6.4%) was not using colorants.

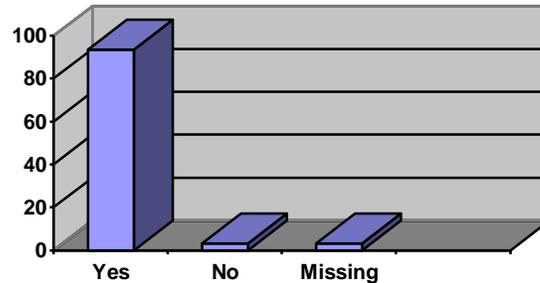


Figure 4.30: Hair salons using colorants

Para-phenylenediamine in permanent hair color has been documented to cause occupational asthma. It is also a known skin irritant and sensitizer (Estrada, 1998). Potential agent causing asthma is in colorants monoethanolamine. This agent potentially can irritate airways and worsen the symptoms of people with reactive airways or asthma (Fourie et al, 2001, p.16).

4.4. SUMMARY.

This chapter gives the findings and discussion of the results of the study. The occupational health problems have been listed together with the chemical products found in hair salons in Windhoek and any personal protective equipment used. The discussion of the results of the study has been set in the context of existing literature in the field of occupational health.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS.

5.1. INTRODUCTION.

In the previous chapter, the findings and the discussions of the results were presented. In this chapter the conclusions and recommendations emanating from the findings of this study are given.

The purpose of the study was to determine and describe health problems among employees in Windhoek registered hair salons, in order to provide important information to the national health services, municipality, and owners and workers of the hair salons to enable them to introduce protective measures related to occupational health and safety in hair salons.

The specific objectives of the study were:

To determine the prevalence of health problems among workers in the hair salons.

To determine the type of the chemicals used which might cause health problems among the employees in the hair salons;

To assess the protective measures taken by the workers in the hair salons.

To make appropriate recommendations for preventative measures.

5.2. CONCLUSIONS.

The conclusions of this study are based on and linked to its purpose and objectives. A high rate of certain health problems and chemical usage were experienced in the hair salons.

Objective 1: To determine the prevalence of health problems among workers in the hair salons.

The musculo-skeletal symptoms such as: hand, back, neck, upper body and lower body pain were proven by statistical data to be very high in Windhoek registered hair salons (back pain – 32.8% with neck pain – 31.3%). The health problems due to chemical exposure such as: eye irritation, allergic reactions and skin damage or irritation were

proven by statistical data to be also very high in Windhoek registered hair salons (eye irritation – 32%). The health problems such as: gastroesophageal reflux disease, hand eczema, chronic bronchitis, contact urticaria and occupational dermatitis were proven by the statistical data to have a very low occurrence rate in Windhoek registered hair salons. The prevalence of health problems were as follows: Occupational dermatitis = 2.3%, irritation and sensitivity of airways = 19.5%, asthma = 3.1%, contact urticaria = 0.8%, skin damage or irritation = 25.8%, chronic bronchitis = 0.8%, cough with phlegm and dyspnoea = 17.2%, hand eczema = 3.1%, rhinitis = 14.1%, allergic reactions = 22.7%, immediate hypersensitivity = 15.6%, gastroeophageal reflux disease = 1.6%, chest pain = 15.6%, eye irritation = 32%, hand pain = 21.1%, back pain = 32.8%, neck pain = 31.3%, upper body pain = 26.6%, lower body pain = 28.9% and aching of the whole arm = 18.8%. One could conclude that eye irritation, neck pain and back pain are the most common health problems reported in Windhoek hair salons. The study also concluded that the longer one works in a hair salon the more likely one is to develop some health problems such as musculo-skeletal problems and allergic reactions. The study also concluded that there is no link between smoking and the development of respiratory symptoms among employees in the hair salons. The severity of these problems forced the employees in hair salons to look for medical help. The employees in the hair salons are prone to develop musculo-skeletal pains just as cashiers as these are related to the type of activities they do daily.

Objective 2: To determine the type of chemicals used which might cause health problems among the employees in hair salons.

The study concluded that the occurrence of chemical products were as follows: relaxer = 93.5%, perm = 77.4%, hair dye = 83.9%, shampoo = 100%, hairstyling products = 100%, henna = 35.5%, hair bleaches = 74.2%, hair conditioner = 100% and colorants = 93.5%. Literature states that a wide range of cosmetic products, consisting of hundreds of chemicals is used in hairdressing salons. Hairdressing activities include shampooing, conditioning, bleaching, dyeing, permanent waving, hair spraying, and styling of hair (Leino et al, 1999, p.26). The most frequently used chemical products include shampoo, hair styling products and hair conditioner, relaxant, colorant and hair dyes.

Objective 3: To assess the protective measures taken by the workers in the hair salons.

The majority of the employees in the hair salons did make use of only aprons, latex, and rubber gloves. The usage of the protective equipments in the Windhoek registered hair salons were as follows according to the study: aprons = 73.4%, overalls = 26.6%, masks = 7.8%, goggles = 5.5%, latex gloves = 61.7% and rubber gloves = 54.7%. The organs of the human body that are vulnerable to attack from external sources are the eyes, skin and the respiratory system, therefore protection for these organs is needed (Aw et al, 1998: 297). The chemicals may affect the eyes, arms and also the respiratory system, therefore mask, overalls and goggles should be provided in the hair salons. These personal protective equipments are only minimally used, which might be caused by the ignorance of managers to provide the personal protective equipment.

Objective 4: To make appropriate recommendations for preventative measures.

5.3. RECOMMENDATIONS.

Hazardous substances and dangerous goods: Employers must make sure that employees use hazardous substances and dangerous goods according to the manufacturers' or suppliers' written instructions (Material Safety Data Sheet or MSDS). Hairdressers or employees working with hair products should be advised to request the Material Safety Data Sheet for a listing of the product's health hazards, hazardous ingredients and the control measures, such as the type of gloves recommended. When handling perm solutions, dyes and cleaning products the employees should always wear personal protective equipment always to reduce the risk of harm to their health.

Ventilation: The use of extraction hoods to mix bleaches and hair colors would reduce inhalation of dust. Poor ventilation can create a risk to the safety of employees in hair salons. Good ventilation should be provided to control fumes and odours from the hazardous substances used in hair salons. Ventilation can be provided through windows that open, air conditioning or extract fans.

Skin problems: Employer should provide special protective gloves and barrier creams to reduce the risk of skin damage. Employees should always wear protective gloves when applying shampoo and it should be rinsed from hands which should be dried carefully.

Latex sensitivity: Cornstarch powder is often used in latex gloves to make them easier to put on. The powder then irritates the skin causing an allergic reaction. When gloves are removed the powder can be released into the air and may be inhaled. Employers may provide powder free, low allergen gloves to reduce the risk of a reaction to latex. Inhalation of airborne proteins, released when powdered gloves get taken off, can enter the eyes or mucous membranes and can also cause a reaction. Air filtration and ventilation systems, which maintain a dust-free environment, can help prevent exposure to aerosolized latex proteins.

Ergonomics: Where possible, employees should sit down for work tasks, preferably on adjustable or ergonomically designed stools or chairs to avoid musculo-skeletal problems. Employer should allocate time for rests breaks and vary an employee's task throughout the day.

Training: Approaches to the prevention of occupational hazards should begin in training. Education and early prevention is the best and most useful approach. Employees should be kept aware of good practices and procedures as well as of the potential hazards related to the product use through continuous training and education. All the employees should have access to Material Safety Data Sheets that will increase their knowledge on the chemicals they use daily and their health risks. The workplace environment should be optimized to make it as safe as possible.

Regular inspection and monitoring: Regular inspections and monitoring of reported cases should be conducted by relevant authorities to improve the situations in the hairdressing industry.

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ANNEXURE 1: QUESTIONNAIRE.

Number of hair salon _____

1. Personal details

1.1. Gender

Male	Female

1.2 Age:

1. ≥ 21 -<26
2. ≥ 26 -<31
3. ≥ 31 -<36
4. ≥ 36 -<41
5. ≥ 41 -<46

1.3. Smoking status

0. Non smoker
1. Smoking
2. Previous smoker

1.4. Employment history

1.4.1. Nature of activities _____

1.4.2. Working period in hair salons:

1. Not more than six months
2. >Six months up to one year
3. >One year

2. Health status:

2.1. Do you experience any of the following work related health problems

Health problems	Yes	No
1. Occupational dermatitis		
2. Irritation, sensitivity of airways		
3. Asthma		
4. Contact Urticaria		
5. Skin damage/ irritation		
6. Chronic bronchitis		
7. Cough with phlegm and dyspnoea		
8. Hand eczema		
9. Rhinitis		
10. Allergic reactions		
11. Immediate hypersensitivity		
12. Gastroesophageal reflux disease		
13. Chest pain		
14. Eye irritation		
15. Hand pain		
16. Back pain		
17. Neck pain		
18. Upper body pain		
19. Lower body pain		
20. Aching of whole arm		

2.2. When do you experience this health problem?

1. During working hours only
2. During holidays and working hours
3. During holidays only
4. Not applicable

2.3. Did you ever visit a doctor or a hospital concerning this problem?

0. No
1. Yes

2.4. Do you get any medication for this health problem?

- 0. No
- 1. Yes

3. Personal protective equipment

4.1. Do you make use of any of the following?

Protective equipment	Yes	No
Apron		
Overall		
Mask		
Goggles		
Latex gloves		
Rubber gloves		

ANNEXURE 2: CHECKLIST.

Number of hair salon _____

Chemical Products

Chemical products	Yes	No
1. Relaxants		
2. Perm		
3. Hair dye		
4. Shampoo		
5. Hairstyling products		
6. Henna		
7. Hair bleaches		
8. Hair conditioner		
9. Colorants		