"A STUDY TO ASSESS THE EFFECTIVENESS OF NEEM PASTE APPLICATION ON HEAD LICE INFESTATION AMONG RESIDENTIAL STUDENTS IN TWO SELECTED HOSTELS, AT COIMBATORE".

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"A study to assess the Effectiveness of Neem Paste Application on Head Lice Infestation among Residential Students in two Selected hostels, at Coimbatore."

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"A Study to assess the Effectiveness of Neem Paste Application

On Head Lice Infestation among Residential Students

in two Selected Hostels at Coimbatore".

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ABSTRACT

A study to assess the Effectiveness of Neem Paste Application on Head Lice Infestation among Residential Students in two Selected Hostels at Coimbatore.

The aim of the study was to examine the efficacy of neem paste application as against regular shampoo application in controlling head lice infestation.

A quasi–experimental multiple treatment time series with control group design was adopted for this study. This study was conducted on 15 students with head lice infestation from one hostel assigned to the experimental group and 15 students with head lice infestation from another hostel were assigned to the control group. Before intervention data on signs and symptoms of head lice infestation was collected from both the groups.

For the experimental group neem paste was applied on every 7th day followed by hair wash over a period of 30 days, a total of five applications. Control group continued to use regular shampoo. Both the groups were observed for head lice infestation using the check list and presence of discomfort by self report on every 7th day, a total of six observations. The data were analyzed using descriptive and inferential statistics.

The findings of the study showed that after two applications of neem paste on 15th day there was a significant reduction in the signs of pediculosis infestation such as lice in the hair, red bumps in the scalp, excoriation of scalp, scalp redness and presence of lice and nits behind the ear and back of the neck in the experimental group compared to control group.

There was a significant further reduction in the degree of head lice infestation in the experimental group. (t = 15.93, df – 14, p < 0.01) compared to the control group on the 30th day. The experimental group had only mild level of lice infestation where as the control group continued to remain with moderate or severe degree of lice infestation. Presence of nymphs and nits remained the same in both the groups on the 30th day.

There was significant reduction in the level of discomfort ($t = 13.35$, df – 28, $p < 0.01$) in experimental group on 30th day compared to control group. In experimental group all showed mild discomfort where as the control group showed moderate or severe discomfort. The difference in experimental group was seen as early as on the 15th day.

The study concluded that the marked reduction seen in the degree of lice infestation and discomfort was as a result of neem paste application as no change was seen on the control group with regular use of shampoo.

ACKNOWLEDGEMENT

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INTRODUCTION

CHAPTER –I

INTRODUCTION

Nine tenths of our sickness can be prevented by
right thinking plus right hygiene

- (**Henry Miller 1980).**

Back ground of the study

The word hygiene is derived from 'Hygeia' the goddess of health in Greek Mythology. Hygiene is the science of health and its preservation. The term also refers to practices that are conducive to good health**. (Dugas 1998)**

Hygiene is defined as 'The science of health and embraces all factors which contribute to healthful living'-(**K.Park 2007)**

Good personal hygiene usually means those measures a person takes to keep his skin and appendages like hair, finger nails, toe nails, teeth and mouth clean and in good condition. Good hygiene is an important barrier to prevent many infectious diseases and it promotes a better human health and well being. Looking after one's personal hygiene and grooming are important independent functions both for children and for adults. Training in personal hygiene should begin at a very early age and must be carried through school age.

Hair hygiene is important to every one in order to keep the hair clean and healthy. It promotes growth of hair, and prevents loss of hair, itching, infection, accumulation of dirt, dandruff, oil, and tangles and helps to destroy pediculi.

The appearance of one's hair and the skin reflects the general health of a person. The cleanliness and grooming of hair is frequently related to one's sense of wellbeing. Cleanliness of hair is essential for good hygiene. Neat and clean hair is a factor in making a good impression on another person. For a girl, hair is her crowning glory.

Hair hygiene practices vary in different cultures. In Kerala people wash their hair daily after applying oil. In Tamilnadu the practice of washing hair is weekly once and some people once in 3 days and application of oil before bath is done only during festivals.

Stimulation of circulation by massage and brushing, shampooing, and combing are essential to maintain the hair clean and healthy. Unclean hair containing dirt, dandruff, excessive sebum and sweat will allow the growth of microorganisms and parasites on the scalp. Scabies, ringworms, dandruff and **pediculi** are seen when hair hygiene is neglected.

Lice were prevalent even before the recording of history had begun. The earliest recorded presence of head lice dates back over one million years ago. **(Joann Fletcher1999)**

Head lice became less prevalent during the period of World War II (mid 1900's). This was due to the use of a chemical agent dichloro-diphenyl-trichloro-ethane (DDT). This chemical agent was a powerful pesticide that was utilized to destroy mosquitoes that spread malaria. It also had effects on decreasing the populations of lice. Historically lice were common and extended to all people belonging to both the lower socioeconomic strata and high socioeconomic strata people**. (Montague Yudelman 2000)** .

Head lice infestation caused by pediculus humanus capitis is a worldwide public health concern (**Ko& Elston 2004**).The number of cases of human louse infestation has increased worldwide, since the mid 1960s reaching hundreds of millions annually (**Janis Hoot man 2002).** It has been estimated that 1.6% to13% of elementary school children are affected with head lice (**Roberts &Burgess 2005).**

(Falagus.M, Matthaiou.DK, Rafailidis.D, Panish.G, Pappas.G IN 2000) Searched the available evidence regarding the worldwide prevalence of lice infestation, from the year 2000 to 2008. In most studies conducted in **Asia**, the prevalence varied from 0.7% to 59% and was higher in girls and women. Of twenty nine studies twenty four involved school children. Other studies involved child

laborers, refugee children, general population, jail inmates and children accompanying their mothers in prison. In **Europe** prevalence varied from 0.48% to 22.4%. Out of a total of seven studies, six studies involved school children.

In **South Africa** the prevalence varied from 0% to 58.9% and was higher in females and it was accepted that head lice infestation was mostly found in people from lower socioeconomic strata. In most studies conducted in America the prevalence varied from 3.6% to 61.4% and was higher in females. Of seven studies conducted four involved school children

In **Oceania** one study reported the prevalence of 13% of infestation and that girls were more likely to have active infestation. A recent study in Turkey compared two neighbouring villages with different socioeconomic status. The only factor that was statistically significant related to pediculosis capitis was the size of the house hold. More than six inhabitants were associated with increased prevalence.

A study in **Australia** showed that although parents prefer to play a major role in prevention and treatment, they may lack insight to recent advances and dilemmas regarding measures to treat head lice. Although socioeconomic status seems to be an indicator of the magnitude of lice infestation, more specific determinants are the dynamic process of hygienic status and over crowding.

Lice are tiny insects that live on the human scalp and suck blood to nourish themselves. Head lice develop in three forms- nits, nymphs, and adults. Nits are head lice eggs and it takes about one week to hatch under optimum conditions of 30°C .The warmth and moisture of the scalp help incubate the eggs. Nits hatch into nymphs. Nymphs are immature adult head lice. To live, nymphs must feed on blood. Nymphs mature into adults by 3 stages over 12 days. Adult lice will look darker. Adult lice can live up to 30 days on a person's head. Adult female may lay 150 eggs within 1 month (3-10/day)**.** The life cycle of lice repeats every 3 weeks. If a louse falls off a person, it dies within 48 hours. Lice can crawl and   climb but cannot jump or fly.

Person-to-person contact is responsible for most louse infestations. Transmission from one   head to another is possible via fomites soon after infestation of

the object such as brushes, hats, scarves, combs, upholstered furniture, pillows, cushions, towels, bed linens, clothing, costumes, masks, stuffed animals, and even dolls.

The earliest records of head lice treatment in the United States from the early 1800's is the Wisconsin historical museum which has a bone lice comb from the frontier days. Fort Craw Ford was the location of a bone lice comb excavated in the early 1930's. It has been known that Fort Craw Ford was not the healthiest of environments. Among the more exotic (and certainly novel) methods of dealing with head lice is using trained monkeys for the onerous task. **(Jairaj Kumar 2005)**

Observation by others which takes more time, vigorous combing by the wooden comb, nit comb metal or plastic combs, pulling the nits off the hair strand with finger nails with the use of natural light, and home remedies like application of Vaseline, Mayonnaise, Olive oil, Vinegar, Gasoline, Kerosene, aromatherapy, cutting and shaving the hair, were methods used during the earlier period in the rural area to get rid of head lice. Nit picking, fine tooth combing are daily activities which cause irritation and harm to the head, therefore pharmacological agents were discovered.

Pharmacological agents invented were pediculicides such as medicare, 1% permethrin, pyrethrin-based products, lindane or gamma benzene hexachloride and malathion. All these agents are expensive and repeated treatment is required which makes it even more expensive.

For centuries the neem tree has been known as a **wonder tree in India.** Traditionally used in Ayurvedic remedies as an antiseptic to fight viruses and bacteria.

Neem leaf comes from the famous Neem Tree of the Indian subcontinent. The benefits of the Neem leaf are almost too numerous to mention. The leaf has been used in Ayurvedic medicine since the dawn of written language in India. One of the primary uses of Neem leaf over the years is in skin care. Neem is highly effective in treating gastritis, indigestion and heartburn. Blood disorders such as blood poisoning, kidney problems and poor circulation have been benefited by the use of neem.The neem leaf is also used topically against insect bites by removing the toxins from wasp and ant stings. Neem leaf is

also thought to be good for the eyes and nourishing to the hair and treating head lice. Recently, Neem leaf has been the focus of much research and has shown much promise in the area of treatment for malignant disease, especially when combined with Garlic. **(R.Sudha 2005)**

The Vedas called neem '**Sarva roga nivarani'** which means one that cures all ailments. The importance of neem tree has been recognized by Natural Research Council which published a report in (1992) entitled **'Neem'-a tree for solving global problems**. The US Academy of sciences currently attaches very high importance to the neem tree. The United Nations declared neem as the 'Tree of the 21st century. Because of its wider variety of application it is commonly called the **friend and protector of the Indian village.**

Today modern research has verified the remarkable attributes of this tree. Neem is increasingly a key ingredient in modern cosmetics and pharmaceuticals. The global scenario is now changing towards the use of non toxic plant products having traditional medicinal use. For the last few years there has been an increasing trend and awareness in neem research (**MS.Sudha 2009).**

Neem is primarily indigenous to India and it grows rapidly in any soil condition. Neem is a naturally, easily and cheaply available plant. It is available everywhere and it is found to be very safe to use without any side effects. Azadirachtin, is the most important active ingredient of neem and it has medicinal properties that will treat the problem.

Due to the limonoids, azadirachtin, mellantriol, and salanin property of neem leaves it interferes with the life cycle of lice, inhibits their ability to feed and prevents the egg from hatching. Clinical studies also have revealed that neem extract is effective against pediculosis capitis.

NEED FOR THE STUDY

In India head lice is a serious problem in both urban and rural areas. It is an important public health problem. Head lice is one of the common problems among school children, because of their tendency to be in close contact with other children especially at schools, day cares, buses, camps and play grounds-(**Ko&Elston 2004).** The condition is

more common in girls (**AAP2003**).Girls are 2-4 times more frequently infested than boys, because of close physical contact, sharing of hats, combs and hair ties **(Hoot man 2002).** In a survey of school children between the ages of 5 and 12 years in Kerala, the prevalence of head lice was 74.1% in boys and 96.6%in girls **(Idavl 2001).**

Infestation by head lice is most apparent at the beginning of each school year (**Burkhart 2003).** Based on an eleven year study of the Israel Defense Force, the head lice infestation rate is highest during the warmer and summer months-(**Lyn Guenther MD FRCP[C] 2009)** With our children missing an average of four to five school days due to chronic infestation of head lice it has become one of the leading causes of school absenteeism-(**Marseille2000**). On the other hand substantial proportions of children with head lice had not been identified by their parents and contribute to ongoing transmission with in schools-(**Megan.l 2005).**

Head lice infestation which causes problems, like itchy scalp, visible lice, head sores, swollen lymph nodes, and sensation of movement in hair, scalp redness, red bumps, black dandruff, and irritability. Head lice infestation can be uncomfortable and chronic head lice can lead to skin discomfort and scalp sores from constant irritation of lice. Individuals with sharper sensitivity to lice may experience more painful symptoms and irritation, and having lice can lead to embarrassment and social anxiety and psychological frustration for parents and children. Scratching can lead to skin sores and skin infections-(**Petrelli.G 2000).**

Preventive and therapeutic practices such as head shaving and the No-Nit policy of excluding infected children from school, can also induce social stress-(**Matthaaiou.D 2001).** Prevention of head lice by means of lice combing device, mechanical removal, using home remedies, and applying pediculocide and health education given by the public health nurse in the schools, camps, exhibitions and environmental modification are measures taken in order to deal with head lice. But the problem of head lice still persists.

Students who are day scholars receive attention from their parents with regard to care of their hair periodically. Children who stay in the hostel are hostlers and they are not able to take care of their hair hygiene by themselves. They usually use shampoo for washing the hair. The shampoo which is available from the shop for lice treatment is very

expensive and it needs to be applied over a period of time which makes it even more expensive.

Neem leaves are easily available and can be used by the students to perform their hair wash by themselves. It was observed during school health checkup that many school children were having complaints of head lice. School nurses often are the first healthcare professionals to diagnose lice infestation in children. The primary goal of the School nurse in controlling lice infestations is to identify children with head lice by doing a thorough screening of the child. Once the child is identified as having lice, the school nurse can play a key role in working with the child's family to eradicate the infestation. Education about treatment options and environmental cleaning are topics the nurse can address with the family. The School nurse also can function as a case manager who coordinates various aspects of treatment for an affected child. Because infestations can be very upsetting to students and to their families, the nurse can provide support and reassurance to the family as the child is treated. Participation of school nurses in developing appropriate and consistent policies and procedures within the school district is vital to the overall management of lice infestation. Their efforts to control and reduce infestations are necessary for the over all health of the school population.

However with in the last few years, resistance to commercial pediculocides has been reported and this is making head louse treatment more problematic and results in the use of unproven and often unsafe home remedies-(**Pray 2003**). While infestation with human head louse occurs worldwide existing treatment options are limited and reports on resistance to commonly used pediculosides have been increasing-(**Daniel Pilyer 2008).**

There are a lot of products available today for treating head lice, a good number of them rely on chemicals. These synthetic chemicals are poisons designed to kill the head lice. However, the poisons can also be an irritant to the human body. In some cases the chemicals which are used in head lice treatments can trigger allergic reactions which can be even worse than the original problem with the head lice, and if there has been any opening on the scalp as a result of bites or scratches the poisons can get into the blood of the person suffering from lice, causing even further problems. (**Frydenberg & Starr, 2003; Roberts, 2002).**

Apart from the chemical method new methods are still being introduced in order to deal with the problem in an economical way. Natural products using materials which are found in nature make it possible to remove head lice without causing any kind of undue irritation or posing a health risk in any way to users-(**Kurots.G 2006).**

Natural products have been used in traditional medicine for thousands of years and recently have been of increasing interest, since the costs are usually lower and they are considered less toxic by the public-(**Jiry Beukellbach -2007).**

The nit will hatch after seven days. So the product used for treating head lice has to be used continuously. Due to the influence of advertisement children prefer to apply shampoo which is not very effective for treating head lice.

As the literature says neem is effective in treating head lice and is also available easily. The investigator was motivated to try out neem paste application and to see its effect in children with pediculosis. Neem leaves are available locally, is of low cost and effective for treating head lice.

PROBLEM STATEMENT

A study to assess the Effectiveness of Neem Paste Application on Head Lice Infestation among Residential Students in two Selected Hostels at Coimbatore.

AIM OF THE STUDY

The aim of the study was to examine the efficacy of neem paste application against the regular shampoo application in controlling head lice infestation.

SPECIFIC OBJECTIVES

1. To assess and compare the degree of pediculosis infestation in the experimental group with neem paste application and in the control group with regular shampoo application before and after intervention.

2. To assess and compare the level of discomfort in the experimental and control group before and after intervention.

3. To associate the degree of head lice infestation with selected demographic variables (age, duration of stay, staying in room, type of hair, length of hair, duration of hair wash)

HYPOTHESIS

H1- There will be significant difference in the degree of head lice infestation in the experimental group before and after intervention.

H2- There will be significant difference in the degree of head lice infestation between the experimental and control group after intervention and no difference between the two groups before intervention.

H3- There will be significant difference in the level of discomfort between the experimental and control group after intervention and no difference between the two groups before intervention.

Ho- There is no significant correlation between degree of head lice infestation and level of discomfort.

OPERATIONAL DEFINITION

Effectiveness

In this study effectiveness is the result or outcome, which is reduction of signs and symptoms of head lice due to application of neem paste.

Neem paste

Neem leaves are dried, powdered, mixed with water and made to in a thick paste for application on the hair.

Head lice infestation

The presence of nits, nymphs and lice in the hair identified by signs and symptoms, Signs- which are observable by another person and Symptoms-which are reported by the individual as a result of pediculosis infestation.

ASSUMPTION

1. Head lice infestation is prevalent among school children in urban and rural areas of the community.

2. Head lice infestation can be prevented and treated.

3. All students will have varying degree of head lice infestation.

DELIMITATION

This study is delimited to female children between 10-15 years of age residing in two selected hostels.

LIMITATION

The symptoms reported by the individual may or may not be accurate.

SCOPE OF THE STUDY

This study will show the effect of application of neem paste on the head lice among school children residing in the hostel.

The reduction in degree of head lice infestation and discomfort after intervention with neem paste application will be an indication of the effectiveness of neem paste on head lice infested children A reduction in degree of head lice infestation and discomfort may provide motivation to the parents to introduce new natural, cheaply available product for the hair hygiene of their children. This finding will also give awareness to the children regarding the alternative method that could be adopted instead of using shampoo to get rid of head lice infestation.

CONCEPTUAL FRAMEWORK

Conceptual framework refers to interrelated concepts that are assembled together in rational scheme by virtue of their relevance to a common theme **(Polit Hungler-1999).**

Conceptual frame work for this study was a nursing process model based on **Dorothy.E.Johnson's Behavioral System theory (1980).**

According to Johnson, nursing views the individual as a set of interconnected or interdependent parts functioning as an integrated whole. Johnson identified seven subsystems. The subsystems are affiliative, aggressive, dependency, eliminative, ingestive, restorative, and sexual. These subsystems carry out special function for the system as a whole. Disturbance in any of the subsystem usually affects the other. The steps of the nursing process is incorporated with the Dorothy Johnson's Behavioral System model. Nursing process is a deliberate activity where the practice of nursing is performed in a systematic order. Dorothy Johnson, presents a three step nursing process, the steps are entitled nursing diagnosis which parallel the assessment and diagnosis phase, the second step nursing goal equals to the implementation and third step is evaluation. This study focused on children and the dependency system which is one among the subsystems which result in approval, attention, recognition, and physical assistance.

Assessment

Assessment is the process of collecting data regarding each subsystem. In this study the assessment was done in the dependency subsystem. Data on demographic profile (age, family income, education of the mother, type of hair, length of hair, duration of stay in hostel, sharing the bed, duration of hair wash, and use of fine tooth combing) was collected. The children's head was examined for signs and symptoms of head lice infestation and the physical and psychological discomfort experienced by the children was collected by interviewing the children.

Diagnosis

Through assessment from the subsystem problems are identified and diagnosis is made and it provides basis for nursing intervention. In this study the data collected through observation and interview using interview schedule and observational check list was analyzed and the diagnosis is made on head lice infestation and categorized into mild, moderate and severe infestation.

Nursing goals (Planning)

After diagnosis is made the goal is to maintain or restore the person's behavioral system balance, and stability through planning interventions. In this study the goal was to reduce or eliminate the head lice infestation and to restore the comfort. In this study planning occurs when the children and a nurse identify activities and bring about dependency system equilibrium.

Intervention

Nursing activity as an external regulatory force assists the person to regain equilibrium. Based on the diagnosis, nursing actions and intervention can be planned in terms of teaching, external control or providing resources needed by the client. In this study the nursing activity was the neem paste prepared and applied to the school children in the experimental group for a period of time to bring about change in the degree of pediculosis infestation.

Evaluation

Evaluation refers to checking the subsystem identified as problematic for balance and overall system stability. In this study the investigator compared the pediculosis infestation of the experiment group children with the control group by using criteria and evaluated the effectiveness of the intervention by observing the signs of head lice infestation and the self report given by the children.

Figure -1 High lights the conceptual framework on modified nursing process based on Dorothy Johnson's Behavioural System model

Assessment	Diagnosis	Goal	Implementation	Evaluation

A. Demographic variables

- age
- family income
- education of the mother
- type of hair
- duration of stay in hostel
- sharing the bed
- frequency of hair wash
- using fine tooth combing

B. Signs and symptoms

of head lice infestation due to head lice

Degree of head lice infestation & level of discomfort

- Mild
- Moderate
- Severe

To reduce level of discomfort and degree of head lice infestation

EXPERIMENTAL GROUP

Preparation and application of neem paste on every 7th day over a period of 30 days

CONTROL GROUP

Use of only shampoo as practiced on regular basis.

Reduction in the level of discomfort and degree of head lice infestation

Or

No changes in the level of discomfort and degree of head lice infestation

REVIEW OF LITERATURE

CHAPTER 11

REVIEW OF LITERATURE

James .L. (2004) stated that literature review provides the researcher with information concerning what has been done and what needs to be done. This chapter deals with the information collected in relation to the present study through published materials which provided the foundation to carry out this study.

The literature that was found relevant and useful for this study is organized and presented under the following headings.

1. Literature related to prevalence of head lice
2. Literature related to effectiveness of chemical and nonchemical product for head lice.

1. Literature related to prevalence of head lice.

Patrick Boyle in (2001) conducted a pilot study on prevalence of head lice infestation in a population of Saudi Arabian children over a period of 2 months. Three hundred consecutive children attending the general practioner for any reason were examined. In that 37 cases of active infestation were found, which was an overall prevalence of 12%.The infestation of 30% was in the age group of 6-8years and 16% in the age group of 10 years. These results shows a high head lice infestation, particularly in the early school years.

A survey conducted by **WHO (2000)** shows the prevalence of head lice in the following states.

India : A survey of 936 persons in 166 families was conducted in a semi urban community of Goa.Among them 56.6% had a member infested with head lice, 17.3% of all 936 persons were infested, but 55% of children were between the age group of 5-14years and 34.4% of the females were infested. Only 21% of males were infested with head lice. The infestation rates were highest among farming families and lowest among those in higher income families and rapid inspection of children in most villages in India and city schools showed that a head louse was very common.

Malaysia: A large survey was conducted in peninsular Malaysia with 308,101 children. Among them 10.7% of the children were infested, of which 34% were economically poor children the highest rate of infestation was among the Indian

ethnic group and the lowest was among the Chinese. The rate of infestation was higher for children with long hair and girls had higher rates than boys.

Kualalumpur: A survey conducted in the capital city covering 4,112 primary school children, revealed an overall prevalence rate of head lice as 12.9%. There were substantial differences in the rates of infestation. 28.3% of the Indians and 18.9% of the Malays, but only 4.6% of the Chinese being infested. The correlation between rates of infestation and socio economic status, length of hair, family size and age was close.

Selangur: A survey in the Kelang showed 41.5% of 1,243 children were infested with head lice of which 51.8% among Indians, 42% in Malays and 27.3% in Chinese. These rates were much higher than the 10.7%, national average rate of infestation in urban children. More girls were infested than boys.

Tanzania: In a study of the frequency of skin disease in Tanzania 5.34% of persons examined had head lice infestation. The average age of infested individuals was 12.5years and infestation was more common among girls.

Seychelles: A survey in Seychelles islands with several different racial groupings showed much higher rate of infestation, ranging between 27.5% to 28.7% in schools.

Ethiopia: In a survey conducted of 1482 elementary school children in North Ethiopia for skin disease 66.5% of them had head lice.

William R,Mackenzie (2000) conducted a prospective cohort study on 'lice, nits and school policy in two metropolitan Atlanta elementary schools by non random sampling. A total of 1729 children were screened for head lice. Twenty eight children (1.6%) had lice, where as 63 children (3.6%) had nits without lice. Fifty of the 63 children (97%) with nits alone completed follow up. The results were nine of 50 children (18.0%) followed for nits alone converted (That is becoming infested with head lice). Although children who converted did not have significantly more nits than those who were not converters, having nits near the scalp was a risk factor for conversion.

The result showed seven of 22 children (31.8%) with >5 nits with in one fourth inch of the scalp was converted, compared to two of 22 children (7%) with fewer nits. Although having >5 nits with one fourth inch of the scalp was a risk factor for conversion most children with nits alone did not become infested.

Essam.Eldin (2006) conducted an observational descriptive study in Sohay regarding incidence and the epidemiological factors related to pediculosis capitis infestation amongst the selected population by convenient sampling. Pupils of three primary schools were examined for head lice and associated infections during the educational year 2003-2004. One school as in were in rural area and two schools were in urban areas. For each pupil a questionnaire was filled, containing data about his/her name, age, gender, family size, co-sleeping, frequency of hair washing, and socio economic status. All pupils were examined, generally and locally for head lice or nits according to the standards method of examination Morsy et al (1991). Hair length and color was also recorded. The results were tabulated and statistically analysed. The whole number of the examined pupils in the selected schools totaled, 1402 pupils distributed between the three schools 224 pupils proved to be infested with pediculosis humanus capitis, a rate of 15.98% distributed between the three schools.

Ebomoy EN (1998) A survey conducted of 6882 primary school children living in Nigeria revealed that 3.7% of the children were infested with pediculosis humanus capitis. Infestation was determined by inspection of each child head with the aid of magnifying hand lens. After the inspection the children were interviewed using interview schedule form which contains a questions pertaining to age, sex, family size, overcrowding, length of hair, duration of hair wash. The result showed the infestation rate was 3% girls and only (2.1%) among boys of low socio economic status. Factors associated with the onset of pediculosis included overcrowding, long hair, family size, age, living in a sordid environment and personal hygiene.

2. Literature related to effectiveness of chemical and non chemical products on head lice;

Bradgoates.M, Joseph.S (2006) conducted an experimental study on an effective non chemical treatment for head lice in Salt Lake City. Totally 169 infested individuals were selected by random sampling for 6 different treatment methods. Each method delivered hot air in to the scalp in a different way and performed follow up

The result showed all 6 methods resulted in high egg mortality (>85%) and showed more variable success in killing hatched lice. The most successful method,

which used a custom –built machine called the louse buster, resulted in nearly 100% mortality of eggs and 80% mortality of hatched lice .The louse buster was effective in killing lice and their nits when operated at a comfortable temperature, slightly cooler than a standard blow dryer and one of 30 minutes application of hot air had the potential to eradicate head lice infestation and hot air was an effective, safe treatment and one to which lice were unlikely to evolve resistance.

Hipolito RB,Mallorca FG (2000) conducted a study in America regarding single versus combination therapy, with one percent Permethrin and Trimethprim/ Sulfamethoxazole and to compare the efficacy of 3 different treatment for head lice infestation and determine whether combination therapy reduced treatment failures. A randomized, clinical trial was performed in 3 private practices and the population was children ranging in age from 2 to13 years. Head lice infestation was diagnosed by direct inspection of the hair and scalp and 30 children were assigned to 1% Permethrin cream rinse, 30 children were assigned to oral administration of Trimethprim/ Sulfamethoxazole and 30 children were assigned to a combination of 1% Permethrin cream and Trimethprim/ Sulfamethoxazole. Follow up visits were done 2 and 4 weeks later and parents or care givers of those who did not return were interviewed by telephone. The results at the 2 week follow up showed that successful treatment for groups 1, 2, 3 was 79.5%, 83% and 95% respectively. The absolute risk reduction for recurrence comparing group 1 versus group 2 was 6%, group 2 versus group 3 was 14% and group 1 versus group 3 was 20%. No major adverse complication were seen in any treatment group and the findings indicated that a combination of 1% Permethrin and oral Trimethprim/Sulfamethoxazole be used and reserved in cases of multiple treatment failures or suspected cases of lice related resistance therapy.

Patridge S K, Korman AK (2000) conducted a study on efficacy of 1% permethrin for the treatment of head louse infestation among Kosovar refugees. A total of 1051 refugees were selected by systematic random sampling and screened for head lice infestation. In that 107(10%) were infested. Crawling lice were observed on 62 (6%) of the individuals examined. Refugees with crawling lice were treated with a pediculocide containing 1% Permethrin. Of these 57 were examined 7 days after treatment. No crawling lice were found on any of the refugees examined after

treatment and they concluded that 1% permethrin treatment was effective in lice control.

An open clinical trial study was conducted by **Dole Lawrence Pearlman in (2004)** regarding a simple treatment for head lice-Dry on suffocation based pediculoscide in Brazil. In that they assessed the efficacy of dimeticone based pediculocide lotion, as compared to a 1% permethrin lotion. One hundered and thirty three subjects participated in 2 open clinical trials. In the first trial 93 subjects completed treatment using dimeticone based pediculocide lotion. In the second trial, 40 subjects completed treatment using a 1% permethrin lotion. Subjects were contacted after 6 months for assessment of head lice infestation, and the result showed that cure was achieved for 97% patients in the first trial and 95% in the second trial. Here head lice infestation was defined as a wet combing test showing lice. Cure was defined as a wet combing test showing no lice, with an absence of symptoms. There were no side effect and concluded as, dimeticone based pediculocide lotion effectively treats head lice without neurotoxins.

Abdel-Ghaffar,.Fathy (2007)conducted an experimental study on efficacy of neem seed extract shampoo on head lice of naturally infected humans in Egypt In that 60 heavily lice infested male and female children (4-15yrs) were selected by purposive sampling and subjected to the treatment with a neem seed extract shampoo. Twenty to thirty millimeter ofthe shampoo were thoroughly mixed with completely wet hair and rubbed in to reach the skin of the scalp. After 10, 15 and 30 minutes, the shampoo was washed out and the hair basically combed. Head lice were collected and examined .The neemseed extract shampoo proved to be highly effective against all stages of head lice. No differences were observed between an exposure time of 10, 15 or 30 minute. No side effect, such as skin irritation, burning sensation, or red spots was seen on the scalp.

Archer .P (2005) conducted a randomized trial double blind study in Queensland on comparing a product containing Melaleuca oil (herbal product) with a 1% Malathion foam. The subjects were primary school children with head lice 74 in herbal group and 70 in Malathion group. Both products were applied for 20 minutes, the herbal product to dry hair or hair combed free of conditioner and Malathion

product to wet hair and treatment was repeated after 7days in both groups. Post treatment efficacy was observed 20 minutes, 7days, and 14 days by means of combing the hair and wiping the combings to the white paper to examine if any lice or eggs were present. In this study, presence of live lice at 20 minutes or 7days post study was regarded as evidence of résistance to treatment. Treatment success was assessed at 14 days on the absence of live lice. No active lice were found on 20 minutes and 7 days after treatment with herbal product Active lice were found on five subjects in the Malathion group at 20 minutes and 7 days .At 14days 71% of patients were rated as cured in the herbal product group, and 47% in the Malathion group. So this study suggests that the low success rate with 1% Malathion foam may not be effective on head lice due to resistance to head lice.

Kayali M, Briggs.D (2003) conducted an experimental study in Queensland on cream containing 20% extract of custard apple(Annona squamusa seed) compared with 25% Benzyl Benzoate emulsion. Primary school children were selected randomly, 11 students for each group with at least 3 live lice and eggs. One of the two treatments was applied to the head of the school girls (n=11per treatment group). After 3 hours hair was washed, lice were combed from the head immediately after treatment, and the proportion of live and dead lice were calculated. In the group treated with custard apple cream 89%-99% of the lice were dead, while only 47%-60% were dead in Benzyl Benzoate group. No adverse events were detected in custard apple cream group, although skin irritation was reported in the Benzyl Benzoate group. So it was concluded that cream containing custard apple extract is effective in treating the head lice without side effects.

The literature highlights the presence of head lice as a problem all over the world. Several intervention studies have been conducted with several products to ensure their effectiveness to tackle the problem of head lice. However the studies on natural productarelimited. The studies cited in this chapter have been found very useful in designing the present study.

METHODOLOGY

CHAPTER III

METHODOLOGY

This chapter provides a brief description of the method adopted for the study. Methodology of research indicates the general pattern of organizing the procedure, of gathering valid and reliable data for the problem under investigation (Kothari 1996). The methodology of study includes the research approach, research design, and settings of the study, population, sampling technique and criteria for samples, development of tool, pilot study and data collection procedure.

RESEARCH APPROACH

In view of the nature of the problem and to accomplish the objectives of the study an evaluative approach was considered to be most appropriate.

RESEARCH DESIGN

The research design selected for this study was quasi experimental multiple treatment time series with control group.

Days   - D_1 D_8 D_{15} D_{22} D_{29} D_{30}

Group 1 - $O_1 X_1$ ___ $O_2 X_2$ ___ $O_3 X_3$ ___ $O_4 X_4$ ___ $O_5 X_5$ ____ O_6

Group 2 - O_1 —— O_2 —— O_3 —— O_4 —— O_5 —— O_6

O_1- Observation of signs and symptoms of head lice infestation for experimental and control group

O_2- O_5- Observation of signs of head lice infestation for experimental and control group before intervention.

O_6- Observation of signs of head lice infestation for experimental and control group after the last application.

Level of discomfort was done only on self reported 3 times O_1, O_3, and O5.

For the experimental group neem paste was applied once on every 7th day for a period of 30 days and total of 5 applications. For the control group no neem paste

was applied. They were allowed to continue to use regular shampoo. For experimental group and control group observation was done before every intervention and one day after last application. During the observation degree of head lice infestation and symptoms were observed and self report obtained from the children. Total days of study were 30 days. Observation was done 6 times

X_1 X_5- Treatment

D_1 D_{30}- Total duration of The study

D_1 D_8- D_{15} D_{22}- D_{29}- Are the days during which observation was done and treatment was applied to experimental group and control group with out neem paste application and only observation for both the group after last day of application.

VARIABLES IN THE STUDY

In this study neem paste was the independent variable. Dependant variables were signs of head lice infestation and self reported discomforts.

SETTINGS OF THE STUDY

A setting of the study refers to the, area where the study is conducted. The study was conducted in two selected hostels in Coimbatore (hostel A, hostel B). Hostel A is situated in Sulur and hostel B is situated 6 km away from Sulur. In both the hostels there are double rooms and common rooms. In a double room minimum of 3 students and maximum of 4 students were accommodated, and in a common room minimum of 5 and maximum of 8 students are accommodated. Some times only one student occupies a double room. These rooms are moderate in size. Individual cot is provided for each student. But students have the habit of sharing beds. All facilities provided in both hostels are adequate to meet the basic needs of the students. The students from both these hostels studied in Matriculation school which is situated near to their hostel. The total number of students in hostel A was 34 and total number of students in hostel B was 84.

POPULATION

Out of a total of 118 students residing in the two hostels only 30 students were eligible to be in the population of the study as the others did not meet the criteria set by the researcher

SAMPLE SIZE

The sample consisted of 30 students from the two hostels (hostel A and hostel B) who fulfilled the criteria for sample selection.

SAMPLING TECHNIQUE

Purposive sampling technique was adopted for the selection of the sample. From hostel A all the students were assigned to the experimental group and all students from hostel B to control group.

SAMPLING CRITERIA

The following were the criteria for the selection of the sample.

INCLUSION CRITERIA

➢ Students between the age of 10-17 years
➢ Students who were infested with head lice.
➢ Students who were using only shampoo once a week.

EXCLUSION CRITERIA

➢ Students who were using any pediculocide product against head lice.
➢ Student with skin disease
➢ Student taking treatment for any skin disease
➢ Students who were using shampoo more than once in a week

DESCRIPTION OF THE TOOL

The tools used for the collection of the data were a structured interview schedule with two parts, and an observational checklist.

I. Structured interview schedule

Part I-Demographic profile

This part was to seek information such as age, family income, education of the mother, and type of hair, duration of stay in hostel, sharing the bed and personal things, frequency of hair wash, and using fine tooth comb.

Part II-Questionnaire on discomforts.

This part consisted of 10 items which reflected physical and psychological discomforts due to presence of head lice infestation. Three columns were provided to collect the data on discomfort for three times (on 1st, 15th, 29th day). (Refer appendix Page. No 81)

II. Observational check list

This checklist consisted of 10 signs of head lice infestation. Columns were provided to record the presence of signs for five times (on 1st .7th, 14th, 22nd, 29th day). (Refer appendix Page. No 81)

SCORING AND SCORING INTERPRETATION

1. Questionnaire on level of discomfort due to head lice Infestation

For the presence of discomfort a score of 1 was given and for absence of discomfort a zero score was given. Total obtained score was maximum 10 and minimum was 0.

SCORE	CATEGORY
1 to 3	Mild level of discomfort
4 to 6	Moderate level of discomfort
7 to10	Severe level of discomfort

2. Observational check list on signs of head lice infestation

A score of 1 was assigned for the presence of a sign and zero score was assigned for absence of a sign. Total obtained score was maximum 10 and minimum was 0.

SCORE	CATEGORY
1 to 3	Mild degree of head lice infestation
4 to 6	Moderate degree of head lice infestation
7 to 10	Severe degree of head lice infestation

DEVELOPMENT OF THE TOOL

The tool was developed using information obtained from literature review, books and researcher's own experience with the head lice infestation. Simplicity of language, organization and clarity of statement were the few factors kept in mind while preparing the tool. The tool was revised several times by consultation with experts and colleagues until it reached the final stage. Then the tool was drafted in English and Tamil.

NEEM PASTE PREPARATION

Once neem leaves were collected from neem tree it was dried in sunlight for a period of one week. After drying, the dry leaves were ground in a mixy and the powder was stored in an airtight bottle. Before application the powder was made in to a thick paste using water. For one application 20 gram of powder was added with 30 ml of water to make it in to a paste.

NEEM PASTE APPLICATION- STEPS

1. Comb and detangle the hair
2. Wet the hair with plain water.
3. Divide the hair into parts
4. Apply the neem paste starting from right side of ear upward to center and down to the left ear and above the nape of neck and back of the head with the gloved hand.
5. Cover the head with disposable cap and wait for 30 minutes.
6. Wash the hair with plain water.

VALIDITY OF THE TOOL

Validity refers to the degree to which an instrument measures what it is intended to measure (Polit and Hungler 1999)

The validity of the tool was obtained from five experts. Three nursing experts, one medical expert, and one Ayurveda expert. All the three nursing experts had Masters qualification in Nursing with Community Health Nursing specialization. One nursing expert was a Principal in a private School of Nursing, with 8 years of Experience and the two Nursing experts were Readers in private college of nursing with 9 years of experience. The medical expert was a Professor and consultant Dermatologist and HOD of Dermatology department in a private hospital. Ayurveda expert had a MD degree in Ayurveda, and working as a lecturer in the department of Ayurveda with 5 years of experience.

Based on the suggestions of these experts the questions in the questionnaire for discomfort was rearranged to bring all the physical discomforts together and all psychological discomfort together.

RELIABILITY

The reliability of the tool was established as follows

The reliability of the interview schedule was established by the Split half method. Corelation co-efficient was calculated by Gutt man split half coefficient. The value obtained was r=0.762 which showed a highly positive correlation

In order to test the reliability of observational checklist interrater method was used. It was done by using observational checklist where the sign of head lice infestation was assessed by two person at the same time and marking independently on the checklist. 3 students were observed. Correlation coefficient was calculated by Karl Pearson correlation method. The value obtained was r=1 which showed a highly positive correlation.

PILOT STUDY

In order to test the practicability and feasibility of the tool a pilot study was conducted on 6 students selected from one hostel other than the hostel were the main

study was planned to be conducted. By convenient sampling among 6 students 3 were assigned to experimental group and 3 were assigned to control group. The students were explained about the nature and purpose of the study and after obtaining their willingness demographic data was collected by interviewing the student individually. The sign of pediculosis infestation was observed and recorded on the observational check list. The sign of discomfort was self reported.

On 7th day and again on 14th day application of neem paste was done and signs of pediculosis infestation and discomfort due to pediculosis were assessed on the 7th and 14th day

For the experimental group neem paste was prepared and applied as per the steps planned for neem paste application. After finishing the application the head was covered with disposable cap and the hair was washed after 30 minutes using plain water. Instruction was given not to use shampoo and any product for a period of 14 days

Likewise in the control group the data were collected from the students on sign of head lice infestation and discomforts and they were asked to continue the use of regular shampoo as they practiced once a week for 14 days. The total period of data collection was 14 days. On the 7th day and 14th day the students were assessed for sign of head lice infestation and discomfort.

DATA COLLECTION PROCEDURE

Before the commencement of the study permission was obtained from the secretary of the institution I which the school is attached and schools and warden of the two selected hostels (A, B). The investigator collected a list of student as maintained by the warden and a separate room was obtained to carry out this treatment.

First the investigator developed rapport with the students explained about the purpose of the study, duration, type of intervention, and obtained their willingness. Initially the demographic data and information on discomfort due to head lice infestation were collected by interview method and recorded and sign of the head lice infestation were observed with the check list and recorded.

15 students from each of the two hostels were selected according to the sampling criteria. Students from hostel A were the experimental group and students from hostel B were the control group.

For the experimental group the neem paste was prepared and applied according to the steps planned for neem paste application. On the day of application of the paste the comfort and privacy were maintained. Following the application the head was covered by cap for 30 minutes followed by hair wash with plain water. The students were instructed not to use shampoo or any other product on the head for the next 30 days and were instructed about the next intervention. During this period neem paste application was repeated on every 7th day. Before each application and one day after last application data on sig of head lice infestation was collected by observation and recorded on the check list. This a total of 5 application total of 5 application and 6 observation of the sign of pediculosis infestation was done.. data on discomfort was gathered 3 times during this one month period (D1,D2,D3) The treatment was done on Sundays from May to and to June month. Every Sunday students were given the treatment. Time taken for one student was 5-10 minutes for application and for observation 5 minutes

In the control group after collecting the base line data on sign of pediculosis infestation and discomfort the students were individually instructed to continue the use of regular shampoo once a week for the period of one month. The investigator met the sample on every 7th day and collected data on lice infestation and discomfort. A total of 6 observation. Total duration of data collection was 1 month.

DATA ANALYSIS

It was planned to analyze the data using descriptive and inferential statistics.

Descriptive statistics

The frequency and percentage were used to analyze the demographic data and degree of head lice infestation of the samples.

Mean and standard deviation were used to assess the effectiveness of neem paste.

Inferential statistics

Paired 't' test, was used to test the hypothesis and compare the results.

X^2 test was used to see the association between demographic variables and study variables

ETHICAL CONSIDERATION

Nature, purpose and type of study and intervention was explained and obtained the verbal consent of the student. Privacy, comfort of the samples was maintained through out the study. Adequate explanation was given when ever they asked question. Records are maintained for each student confidentially. Permission was obtained from higher authorities of the schools and the hostels where the student are staying.

ANALYSIS AND INTERPRETATION

CHAPTER – IV

DATA ANALYSIS

This chapter deals with the analysis and interpretation of data collected from 30 students infested with head lice and living in two hostels. The data have been analyzed and presented under the following headings.

1. Demographic characteristics of the sample

Demographic characteristics of experimental and control group have been presented in relation to personal information and hygiene of hair in frequency and percentage

2. Assessment of head lice Infestation

Physical signs of head lice infestation has been analyzed in three degrees (mild, moderate, severe) comparatively for both the groups before and after intervention in frequency and percentage, in mean score and significance difference between the groups by statistical test. The analysis has also been done separately for the control and experimental group before intervention and after intervention on 15th day and 30th day and degree of infestation is analyzed in frequency and percentage.

3. Assessment of discomfort due to head lice Infestation

Discomfort due to head lice Infestation has been analyzed in three levels (mild, moderate, severe) separately for the experimental and control group before intervention and after intervention 15th and 30th day in frequency and percentage. Also comparatively for the experimental and control group before intervention and after intervention on 15th day and 30th day. Analysis has also been done in mean score and significant difference in discomfort between the two groups by statistical test.

4. Association of variables

Associations between the degree of head lice infestation and demographic variables have been explored. Also the association between degree of head lice infestation and level of discomfort have been examined.

1. Demographic characteristics of the sample

TABLE – I

FREQUENCY AND PERCENTAGE OF EXPERIMENTAL AND CONTROL GROUP ACCORDING TO DEMOGRAPHIC VARIABLES ON PERSONAL INFORMATION

N=30

S.No	Demographic variables	Experimental Group N=15		Control Group N=15	
		Freq	%	Freq	%
1.	Age in year a. 10-11 b. 12-13 c. 14-15 d. 16-17	2 3 6 4	13.33 20.00 40.00 26.66	- 14 1 -	- 93.30 06.66 -
2.	Family income / month a. Below Rs.5000 b.Rs. 5001- Rs.10,000 c. Rs.10001 &above	1 9 5	06.66 60.00 33.33	- 14 1	- 93.33 06.66
3.	Education of mother a. Primary Education b.Higher Secondary Education c.Graduate	- 9 6	- 60.00 40.00	3 8 4	20.00 53.33 26.66
4.	Duration of stay in hostel a.1 year b.2 year C.Above 2 years.	13 2 -	86.66 13.33 -	6 8 1	40.00 53.33 06.66
5.	Stay in a. Double room alone b. Double room(more than two) c.Common room(more than two)	4 11 -	26.66 73.33 -	- 1 14	- 06.66 73.33
6.	Sharing bed with a. One person b.Two person c.Three and more d.None	5 - 2 8	33.33 - 13.33 53.33	11 1 - 3	73.33 06.66 - 20.00
7.	Sharing personal things a. Comb, clothing, bed sheets, towels.	15	100.0	15	100.0

Table – 1 presents the demographic characteristics of the sample related to personal information

Age: In experimental group samples belonged to 10 – 17 years of age. In that 6 (40%) samples were 14-15 years of age, 4 (6.66%) of the samples were 16-17 years of age and only2 (13.33%) samples were in the age group of 10-11 years. In the control group majority of the samples (14) (93.30) were in the age group of 12-13 years.

Family income: In experimental group the family income was Rs.5001-10,000 for 9 (60%) samples and above Rs.10,000 for 5 samples (33.33%) In the control group majority of the sample 14(93%) were in the income category of Rs.5001-Rs.10,000 per month.

Education of the mother: In experimental group 9 (60%) mothers had higher secondary education and 6(40%) were graduation. In the control group the majority of mothers had higher secondary education. 4 mother (26%) and 3 mother (20%) had graduation and primary education respectively.

Duration of stay in hostel: Majority of the samples in the experimental group (86.66%) had stayed in hostel for one year and 2 samples (13%) for two years. In control group half of the sample 8(53%) had stayed for a period of two years. 6 (40%) had stayed for one year and only one sample had stayed for more than two years.

Stay: In the experimental group 4 samples (26.66%) stayed in double room and majority (73.33%) was in double room with more than two children. In control group14 samples (73.33%) stayed in a common room with more than 3 students and 1 sample in double room with more than two children.

Sharing the bed: Majority of samples in the control group (73.33%) shared bed with one person. Half of the experimental group did not share bed with other children. How ever 5 samples (33.33%) shared bed with one person in the experimental group also.

Sharing personal things: All students 100% in the experimental group and control group shared the combs, clothing, bed sheets and towel.

TABLE – II

FREQUENCY AND PERCENTAGE OF EXPERIMENTAL AND CONTROL GROUP ACCORDING TO DEMOGRAPHIC VARIABLES ON HYGIENE OF HAIR

N=30

S.No	Demographic variables	Experimental Group N=15		Control Group N=15	
		Freq	**%**	**Freq**	**%**
1.	Type of hair a. Thick b.Thin	1 14	06.66 93.33	10 5	66.66 33.33
2.	Length of hair a. Shoulder length hair b.Below shoulder length hair	14 1	93.33 06.66	5 10	33.33 66.66
3.	Frequency of hair wash a. once b. twice	7 8	46.66 53.33	13 2	86.66 13.33
4.	Product used for hair wash a. shampoo	15	100.0	15	100.0
5.	Using fine tooth comb a. Yes b. No	13 2	86.66 13.33	15 -	100.0 -

Table – II Presents the demographic characteristics of the sample related to hygiene of hair.

Type of hair: Majority of the students 14(93.33%) in the experimental group had thin hair and in the control group 10(66.66%) students had thick hair and remaining 5 students (33.33%) had thin hair.

Length of hair: In the experimental group majority of the students were having hair length below shoulder level and only one student had long hair. In control group 10 students (66.66%) had hair below shoulder level.

Frequency of hair wash; Half of the samples in experimental group 8 (53.33%) washed hair twice in a week and remaining samples took hair wash once a week. In control group majority 13 (86.66%) of samples washed hair once a week and only two students 2 (13.33%) washed hair twice a week.

Product used to wash hair: All the samples 100% in the experimental and control group were using shampoo for hair wash.

Using fine tooth comb: In the experimental group majority of the students 13 (86.66%) were using fine tooth comb and remaining 2 students (13.33%) did not use fine tooth comb where as in the control group all students 100% were using fine tooth comb.

2. Assessment of degree of head lice infestation

TABLE – III

FREQUENCY AND PERCENTAGE DISTRIBUTION OF EXPERIMENTAL GROUP IN THREE DEGREE OF HEAD LICE INFESTATION BEFORE AND AFTER INTERVENTION

N=15

S.NO	Degree of head lice infestation	Before intervention		After intervention			
				On 15th day		On 30th day	
		Freq	%	Freq	%	Freq	%
1.	Mild (1-3)	-	-	2	13.33	15	100
2.	Moderate (4-6)	7	46.66	11	73.33	-	-
3.	Severe (7-10)	8	53.33	2	13.33	-	-

TABLE-III presents the distribution of experimental group in three degree of head lice infestation before and after intervention.

Before intervention in the experimental group (46.66%) of samples had moderate degree of head lice infestation. The rest of the sample (53.33%) had severe degree of head lice infestation.

On 15th day after intervention 2(13.33%) had mild degree of head lice infestation. Majority 11(73.33%) of samples had moderate degree of head lice infestation and (13.33%) had severe degree of head lice infestation. On 30th day all (100%) had only mild degree of head lice infestation.

This table concludes that degree of head lice infestation changes as a result of the intervention (neem paste application).Students experience lesser degree of head lice infestation after intervention from severe to moderate and moderate to mild degree of head lice infestation.

Figure 2- Highlights degree of head lice infestation in experimental group before and after intervention

Figure-2 Degree of head lice infestation in experimental group before and after intervention on 15th and 30th day in percentage

TABLE –IV

FREQUENCY AND PERCENTAGE DISTRIBUTION OF CONTROL GROUP IN THREE DEGREE OF HEAD LICE INFESTATION BASED ON BASELINE OBSERVATION ON 15th & 30th DAY

N=15

S.No	Degree of head lice infestation	Base line observation		On 15th day		On 30th day	
		Freq	%	Freq	%	Freq	%
1.	Mild (1-3)	-	-	-	-	-	-
2.	Moderate (4-6)	8	53.33	8	53.33	8	53.33
3.	Severe (7-10)	7	46.66	7	46.66	7	46.66

TABLE- IV presents the distribution of control group in three degrees of head lice infestation on baseline observation on 15th and 30th day.

In the control group the first observation before intervention shows that 53.33% of the students had moderate degree of head lice infestation and remaining 46.66% had severe degree of head lice infestation. The 2nd and 3rd observation on 15th and 30th day showed the same degree of head lice infestation.

Figure 3- Highlights degree of head lice infestation of control group on baseline observation and on 15th, 30th day of observation
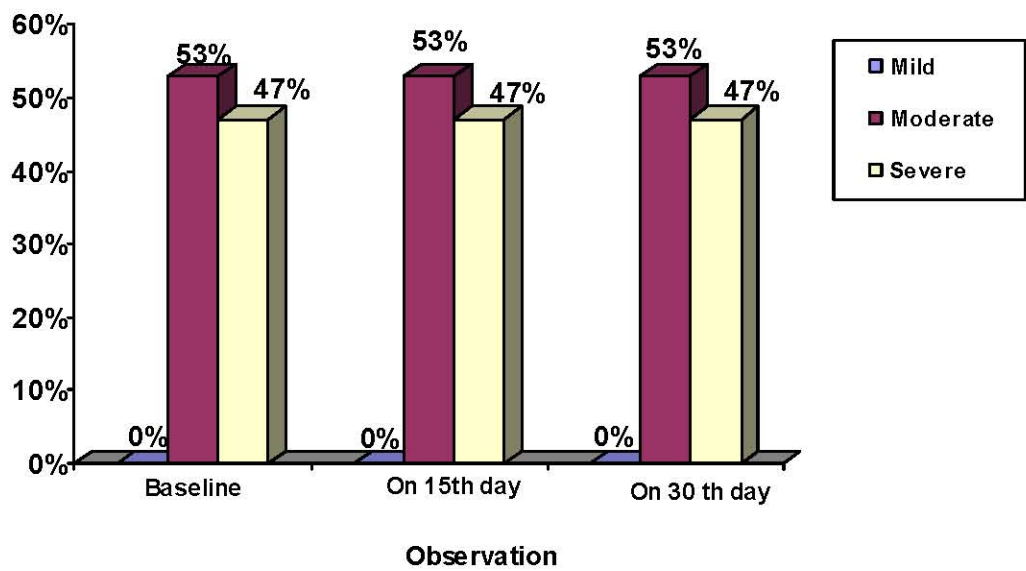
Figure 3- Degree of head lice infestation in control group on baseline and 15th, 30th day of observation in percentage

TABLE – V

COMPARISON OF EXPERIMENTAL AND CONTROL GROUPS IN THREE DEGREE OF HEAD LICE INFESTATION BEFORE INTERVENTION.

N=30

S. No	Degree of head lice Infestation	Experimental group N=15		Control group N=15	
		Freq	**%**	**Freq**	**%**
1	Mild (1-3)	-	-	-	-
2	Moderate (4-6)	7	46.66	8	53.33
3	Severe (7-10)	8	53.33	7	46.66

Table –V shows the frequency and percentage distribution of experimental and control group in 3 degrees of head lice infestation.

In the experimental group 7(46.66%) samples and in control group 8(53.33%) had moderate degree of head lice infestation. The remaining 8 students in the experimental group (53.33%) samples and 7 (46.66%) in the control group had severe degree of head lice infestation. This table shows that before the intervention the presence of head lice infestation was equally distributed in the two groups.

Figure 4-Highlights degree of head lice infestation in experimental and control group
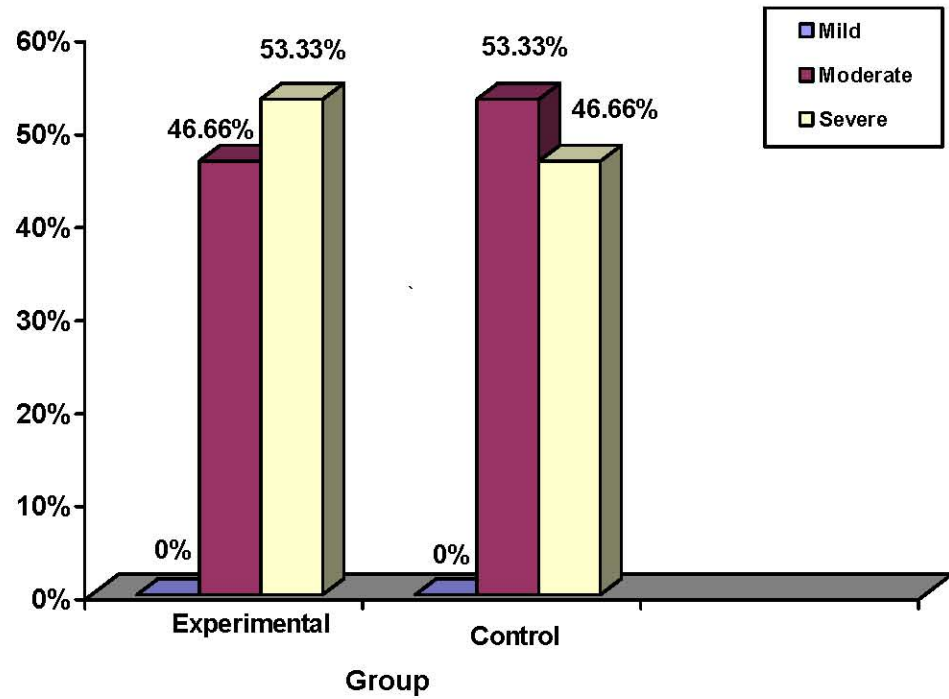
Figure 4 Degree of head lice infestation in experimental and control group before intervention in percentage

TABLE – VI

COMPARISION OF EXPERIMENTAL AND CONTROL GROUP IN THREE DEGREE OF HEAD LICE INFESTATION AFTER INTERVENTION ON 15th AND 30TH DAY

N=30

S.no	Degree of head lice Infestation	Experimental group after intervention N=15				Control group With out intervention N=15			
		On 15th day		On 30th day		On 15th day		On 30th day	
		Freq	%	Freq	%	Freq	%	Freq	%
1	Mild (1-3)	2	13.33	15	100	-	-	-	-
2	Moderate (4-6)	11	73.33	-	-	8	53.33	8	53.33
3	Severe (7-10)	2	13.33	-	-	7	46.66	7	46.66

Table-VI presents the distribution of experimental and control group in 3 degree of

head lice infestation after intervention.

In the experimental group, on 15th day after intervention 2 of the students (13.333%) had mild and 11 (73.33) had moderate and 2 (13.33%) had severe degree of head lice infestation. On 30th day after intervention all the students (100%) had mild degree of head lice infestation.

Unlike the experimental group, in control group on 15th day and 30th day observation 8 student (53.33) had moderate and 7 (46.66%) had severe degree of head lice infestation.

This table clearly shows the marked reduction in the pediculosis infestation of the experimental group as a result of neem paste application, where as in the control group which used shampoo did not show any decrease in lice infestation

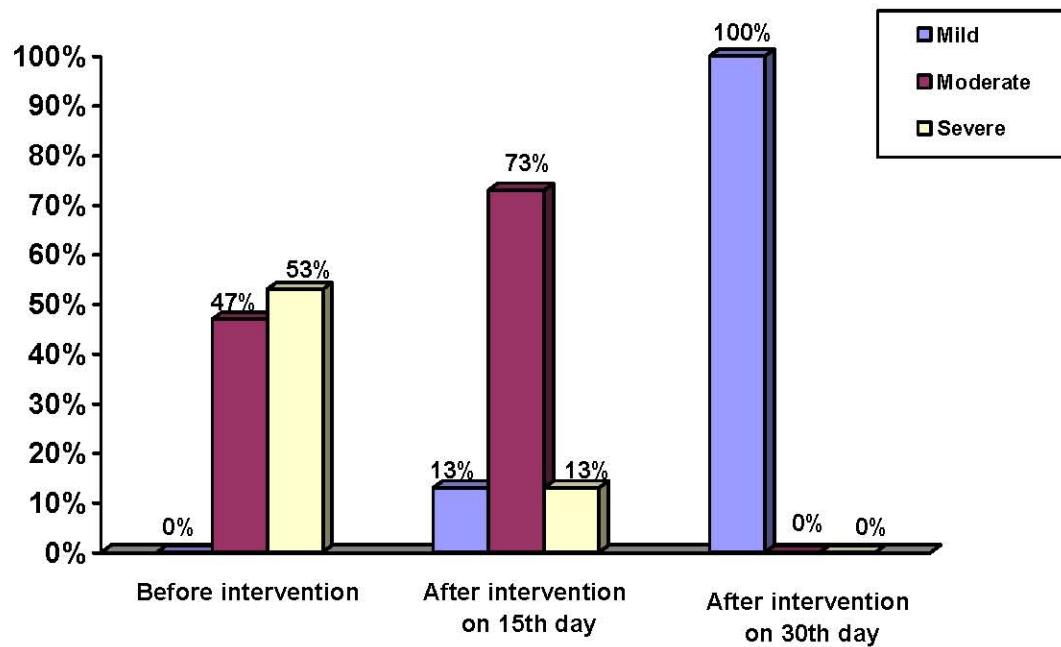**Figure 5-** Highlights the degree of head lice infestation in both groups after intervention
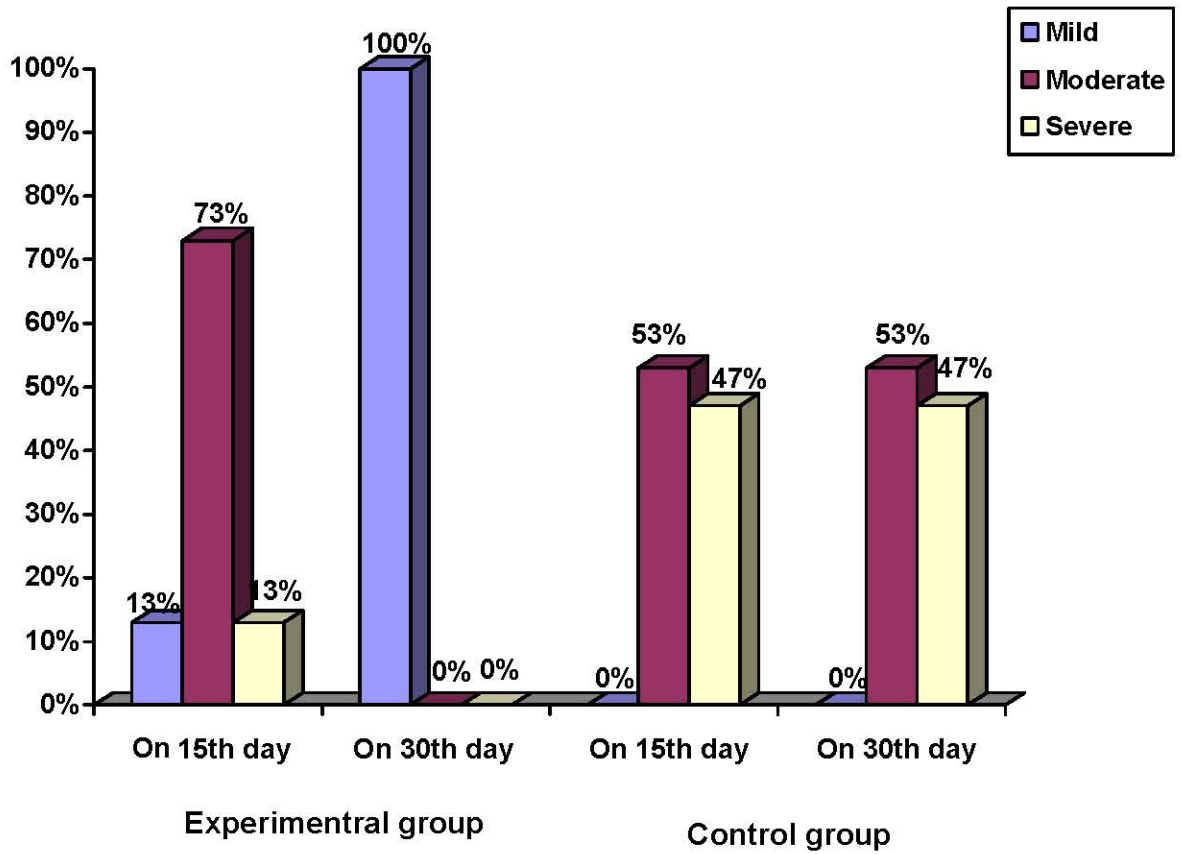
Figure-5 Degree of head lice infestation in experimental and control group after Intervention on 15th and 30th day in percentage

TABLE – VII

MEAN SCORE OF DEGREE OF HEAD LICE INFESTATION IN EXPERIMENTAL GROUP BEFORE AND AFTER INTERVENTION ON 15TH AND 30TH DAY AND LEVEL OF SIGNIFICANCE.

N=15

S.NO	DAYS OF INTERVENTION	MEAN	MEAN %	SD	MD	Paired t test P=<0.05 df=14
1	Before	6.13	61.30	1.25		
2	After 15th day	5	50.00	1.51	1.13	3.52 NS
3	Before	6.13	61.30	1.25		
4	After 30th day	1	10.00	0	5.13	15.96*

* Significant   NS – Not significant   df – degree of freedom.   Table value=3.84

Table – VII presents the mean score of degree of head lice infestation in experimental group before and after intervention.

In the experimental group the mean score before intervention was 6.13. On 15th day after intervention the mean score was 5 and 30th day after intervention the mean score was 1. In the experimental group the high mean score observed before intervention. On 15th day the mean score reduced from 6.13 to 5 and on 30th day it was again reduced to 1.

The statistical test shows no significant difference between before intervention and on 15th day after intervention. There is a significant difference before intervention and on 30th day after intervention. (t= 15.96 at df-14, p<0.05).So the hypothesis on page. no 9 H1-'There will be significant difference in the degree of head lice infestation in the experimental group before and after intervention' is accepted.

TABLE – VIII

COMPARISION OF MEANSCORE OF DEGREE OF HEADLICE INFESTATION IN EXPERIMENTAL AND CONTROL GROUP AFTER INTERVENTION AND LEVELOF SIGNIFICANCE

N=30

Degree of head lice infestation	EXPERIMENTAL GROUP N=15			CONTROL GROUP N=15			Unpaired 't'test t=0.01 df-28
	M	SD	MD	M	SD	MD	
Before	6.13	1.25	-	6.2	1.08	5.13	0.18 NS
After	1	0	-	6.2	1.08	0	14.44 *

* Significant   NS – Not significant   df – degree of freedom. Table value =2.76

Table – VIII   presents the mean score of degree of head lice infestation in experimental   group before and after intervention.

The mean score of experimental group before intervention was 6.13 and in control group 6.2. The mean score reduced to 1 in experimental group after intervention on 30th day. But in control group it remained at the same level of mean score 6.2.

The statistical test shows there was no significance difference between experimental and control group before intervention and there was significance difference between experimental and control group after intervention (t=14.44 df-28 p<0.01). So the hypothesis on page no 9 **H2**- "There will be significant difference in the degree of head lice infestation between the experimental and control group after intervention and no difference between the two groups before intervention " is accepted.

TABLE – IX

MEAN SCORE OF SIGNS OF HEAD LICE INFESTATION IN EXPERIMENTAL GROUP BEFORE AND AFTER INTERVENTION ON 15TH DAY AND LEVEL OF SIGNIFICANCE.

N=15

S. No	Signs of head lice infestation	Before intervention		After intervention on 15th day		MD	SD	Paired t" value P<0.01 df-14
1	Lice in the hair	0.93	93	0.8	80	0.13	0.09	6.5 *
2	Red bump in the scalp	0.93	93	0.6	60	0.33	0.22	6.6 *
3	Excoriation of scalp	0.87	87	0.73	73	0.14	0.22	6.5*
4	Scalp redness	0.33	33	0.0.06	6	0.27	0.11	13*
5	Presence of lice/nits behind the ear or back of the neck	0.53	53	0.06	6	0.47	0.50	3.83*
6	Nymphs in the hair	1	100	0.93	93	0.07	0.64	0.37NS
7	Nits in the hair	1	100	0.93	93	0.07	0	0.37NS
8	Head sore	0.8	80	0.8	80	0	0	NS

* - Significant.   NS – Not significant. df – Degrees of freedom.   Table value = 2.98

Table – IX presents the mean score of sign of head lice infestation in experimental group before and after intervention on 15th day.

The highest mean score of 100% was seen with regards to nymphs and nits in the hair. The 4 signs of lice in the hair, red bump in the scalp, excoriation of scalp and head sore obtained a mean score of (80-93%).comparatively scalp redness, presence of lice/nits behind the ear and back of the neck received a mean score of 33 and 53 respectively.

On 15th day after intervention 7 items the mean score of 7 sign reduced except head sore which remained at same level (mean score 80%. A marked reduction of 33-47% was seen with regard to red bump in the scalp and presence of lice/nits behind the ear and back of the neck Statistically there was significant difference between before intervention and on 15th day in the first five signs on the table (No.1, 2, 3, 4, 5) and there was no significant difference in the signs (No.6, 7and 8).

TABLE-X

MEAN SCORE OF SIGNS OF HEAD LICE INFESTATION IN EXPERIMENTAL GROUP BEFORE AND AFTER INTERVENTION ON 30TH DAY AND LEVEL OF SIGNIFICANCE.

N=30

S. No	Signs of head lice infestation	Before intervention		After intervention on 30th day		MD	SD	Paired 't' value P<0.05, df-14
		Mean	Mean %	Mean	Mean%			
1	Lice in the hair	0.93	93	0	0	0.93	0.26	14*
2	Red bump in the scalp	0.93	93	0.20	20	0.73	0.48	6.62*
3	Excoriation of scalp	0.87	87	0	0	0.87	0.35	9.54*
4	Scalp redness	0.33	33	0	0	0.33	0.49	2.65*
5	Presence of lice/nits behind of the ear or back of the neck	0.53	53	0	0	0.53	0.52	4*
6	Nymphs in the hair	1	100	0	0	1	-	NS
7	Nits in the hair	1	100	0.8	80	0.20	0.41	1.87NS
8	Head sore	0.8	80	0	0	0.80	0.41	7.48*

*- Significant.   NS – Not significant   df – degree of freedom.   Table value = 2.15

Table -X presents the mean score of signs of head lice infestation in experimental group before and after intervention on 30th day.

The 6 signs (No1, 2, 3, 6, 7, 8) received a high mean score of 80-93% and only two signs received a mean score of 33%,53%(No 4, 5) in before intervention.

On 30th day after intervention red bump on scalp and nits in the hair showed a mean score of 20% and 80% and all other signs received a mean score of 0. Statistically there is significant difference was seen in the sign (No 1, 2, 3, 4, 5 and 8) before and after intervention on 30th day

TABLE – XI

MEAN SCORE OF SIGNS OF HEAD LICE INFESTATION IN CONTROL GROUP ON BASELINE, 30$^{\text{TH}}$ DAY AND LEVEL OF SIGNIFICANCE.

N=**15**

S. No	Signs of head lice infestation	Base line observation		On 30$^{\text{th}}$ day		MD	Paired 't'value P<0.01 df-14
		Mean	Mean %	Mean	Mean %		
1	Lice in the hair	1	100	1	100	0	NS
2	Red bump in the scalp	0.87	87	0.87	87	0	NS
3	Excoriation of scalp	0.27	27	0.27	27	0	NS
4	Scalp redness	0.87	87	0.87	87	0	NS
5	Presence of lice/nits behind of the ear or back of the neck	0.6	60	0.6	60	0	NS
6	Nymphs in the hair	1	100	1	100	0	NS
7	Nits in the hair	1	100	1	100	0	NS
8	Head sore	0.6	60	0.6	60	0	NS

* Significant   NS – Not significant   df – degree of freedom Table value = 3.84

Table – XI presents the mean score of signs of head lice infestation in control group before and after intervention.

In control group lice in the hair and nits in the hair received the highest mean score of 100%. Red bump in the scalp, scalp redness also received a high score of

87%. Presence of lice/nits behind the ear and back of the neck, head sore received a mean score of 60% and only excoriation of scalp received a mean score of 27%.

On 30th day the mean score of all the 8 signs in control group continued to remain the same. Regular shampoo has no effect on reducing pediculosis infestation.

TABLE – XII

COMPARISION OF MEAN SCORE OF SIGN OF HEAD LICE INFESTATION IN EXPERIMENTAL AND CONTROL GROUP BEFORE INTERVENTION AND LEVEL OF SIGNIFICANCE.

N=30

S. No	Signs of head lice infestation	Experimental group N=15			Control group N= 15			unpaired" t"value p=0.01 df-28
		Mean	Mean %	SD	Mean	Mean %	SD	
1	Lice in the hair	0.93	93	0.26	1	100	0	0.28 Ns
2	Red bump in the scalp	0.93	93	0.26	0.87	87	0.35	0.6 NS
3	Excoriation of scalp	0.87	87	0.35	0.27	27	0.46	12*
4	Scalp redness	0.33	33	0.49	0.87	87	0.35	9.83*
5	Presence of lice/nits behind of the ear or back of the neck	0.53	53	0.52	0.6	60	0.51	0.38 NS
6	Nymphs in the hair	1	100	0	1	100	0	NS
7	Nits in the hair	1	100	0	1	100	0	NS
8	Head sore	0.8	80	0.41	0.6	60	0.51	1.42 NS

* - Significant   NS- Not significant df – degrees of freedom   Table value =   2.76

Table XII-presents the mean score of signs of head lice infestation in experimental and control group on base line observation.

In the experimental group all the signs of head lice infestation (No.1, 2, 3, 6, 7) showed a high mean score of 80-100%. Comparatively for scalp redness, Presence of lice/nits behind the ear and back of the neck, (No.4, 5) the mean score was 33%, 53%.respectively.

In the control group (No. 1, 2, 4, 6,7) had high mean score of 87-100.Comparatively (No. 3,5,8) shows a mean score of 27-60% .The mean score of excoriation of scalp was 87% in experimental group and 27% in the control group.

The statistical test shows there is no significant difference between the mean sign score of experimental group and control group for all the signs except for excoriation of scalp and scalp redness(t= 9.83, 12, p<0.01 at 28 df)

TABLE – XIII

COMPARISION OF MEAN SCORE OF SIGNS OF HEAD LICE INFESTATION IN EXPERIMENTAL AND CONTROL GROUP AFTER INTERVENTION ON 30TH DAY AND LEVEL OF SIGNIFICANCE.

N=30

S. No	Signs of head lice infestation	Experimental group N=15			Control group N= 15			Unpaired "t" value $p<0.01$ df-28
		Mean	Mean %	SD	Mean	Mean %	SD	
1	Lice in the hair	0	0	0	1	100	0	NS
2	Red bump in the scalp	0.20	20	0.4	0.87	87	0.35	7.4*
3	Excoriation of scalp	0	0	0	0.27	27	0.46	1.07NS
4	Scalp redness	0	0	0	0.87	87	0.35	3.34*
5	Presence of lice/nits behind of the ear or back of the neck	0	0	0	0.6	60	0.51	3*
6	Nymphs in the hair	0	0	0	1	100	0	NS
7	Nits in the hair	0.8	80	0.4	1	100	0	1NS
8	Head sore	0	0	0	0.6	60	0.52	3*

* - Significant   NS- Not significant df – degrees of freedom   Table value =   2.76

Table – XIII presents the mean score sign of head lice infestation in experimental and control group after intervention.

In the experimental group the mean percentage of red bump in the scalp, and nits in the hair was 20%, 80% after intervention where as in the control group the mean percentage of red bump in the scalp and nits in the hair was 87%, and100%.All other signs in experimental group receiving a mean percentage of 0.In the control group the mean percentage of remaining signs received a mean score of 27-100%.It shows that the mean percentage of control group was higher than experimental group.

The statistical test shows a significant difference between the signs of head lice infestation of experimental and control group after intervention for the 4 signs (No.2,4,3,8) (t=3-7.4 at df-28,p<0.05) and for other signs there was no significant difference.

TABLE XIV

FREQUENCY AND PERCENTAGE DISTRIBUTION OF EXPERIMENTAL GROUP ACCORDING TO DEGREE OF HEADLICE INFESTATION AFTER INTRERVENTION IN DAY WISE

N=15

Days of observation		D1		D8		D15		D22		D29		D30
Degree of head lice infestation	F	%	F	%	F	%	F	%	F	%	F	%
Mild (1-3)	-	-	-	-	2	13.33	11	73.33	15	100	15	100
Moderate (4-6)	7	46.66	11	73.33	11	73.33	3	20.00	-	-	-	-
Severe (7-10)	8	53.33	4	26.66	2	13.33	1	06.66	-	-	-	-
Mean score	6.4		5.6		5		3.06		1.53		1	

Table XIV presents the day wise mean sign score of experimental group after intervention. The first observation on day one the mean sign score is 6.4 and there is a gradual reduction of mean score in subsequent observation. This shows there is reduction of signs on each observation. A marked reduction in the sign is seen after two neem paste application.

Figure 6 Highlights the day wise mean score of experimental group
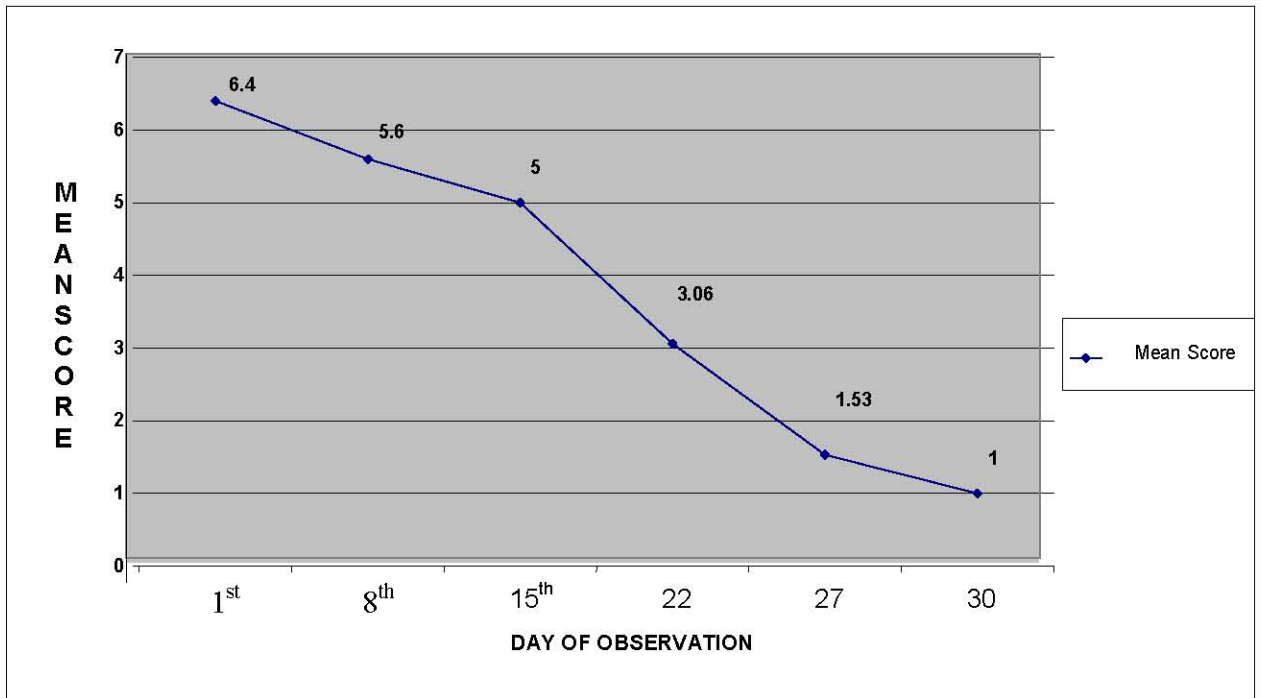
MEAN SCORE OF EXPERIMENTAL GROUP

Figure 6-Mean sign score of experimental group in day wise

3. Assessment of discomfort due to head lice infestation

TABLE XV

FREQUENCY AND PERCENTAGE DISTRIBUTION OF EXPERIMENTAL GROUP IN THREE LEVELS OF DISCOMFORT BEFORE AND AFTER INTERVENTION ON 15th AND 30th DAY.

N=15

S. No	Degree of Discomfort	Before intervention		After intervention			
				On 15th day		On 30th day	
		Freq	%	Freq	%	Freq	%
1	Mild (1-3)	-	-	5	33.33	15	100.00
2	Moderate (4-6)	12	80.00	10	66.66	-	-
3	Severe (7-10)	3	20.00	-	-	-	-

Table -XV presents the distribution of experimental group in three level of discomfort before and after intervention**.**

Before the intervention in the experimental group majority (80%) had moderate discomfort. The rest (20%) had severe discomfort

On 15th day after the intervention 10 samples 66.66% had moderate discomfort and 5 samples (33.33%) had mild discomfort. On 30th day all (100%) had mild discomfort.

This table concludes that discomfort due to head lice infestation changes as a result of neem paste application. Students experience lesser degree of discomfort after intervention from severe to moderate and moderate to mild discomfort.

Figure-7 Highlights the levels of discomfort in the experimental group before and after intervention.
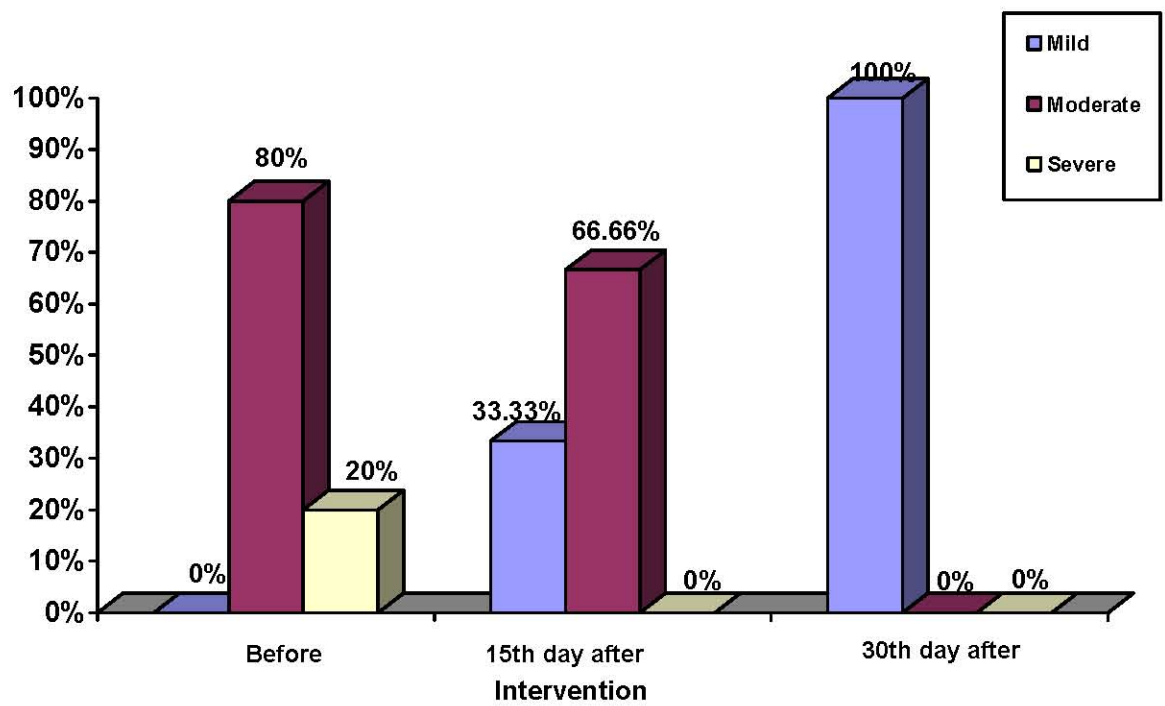
Figure -7 Level of discomfort before and after intervention in the experimental group in percentage

TABLE – XVI

FREQUENCY AND PERCENTAGE DISTRIBUTION OF CONTROL GROUP IN THREE LEVELS OF DISCOMFORT ON BASE LINE OBSERVATION AND ON 30TH DAY

N=15

S. No	Degree of discomfort	Base line observation		On 30th day	
		Frequency	Percentage	frequency	Percentage
1	Mild (1-3)	-	-	-	-
2	Moderate (4-6)	12	80.00	12	80.00
3	Severe (7-10)	3	20.00	3	20.00

Table XVI-presents the distribution of control group and three levels of discomfort.

In the control group the base line observation shows that most of the students (80%) had moderate discomfort and 20% had severe discomfort.

On 30th day the control group showed the same number of students with the same level of discomfort.

The regular use of shampoo does not seem to be the right choice for head lice infestation. The number of students with moderate and severe discomfort remains the same even after the regular use of shampoo for 30 days.

Figure-8 Highlights the levels of discomfort in control group.
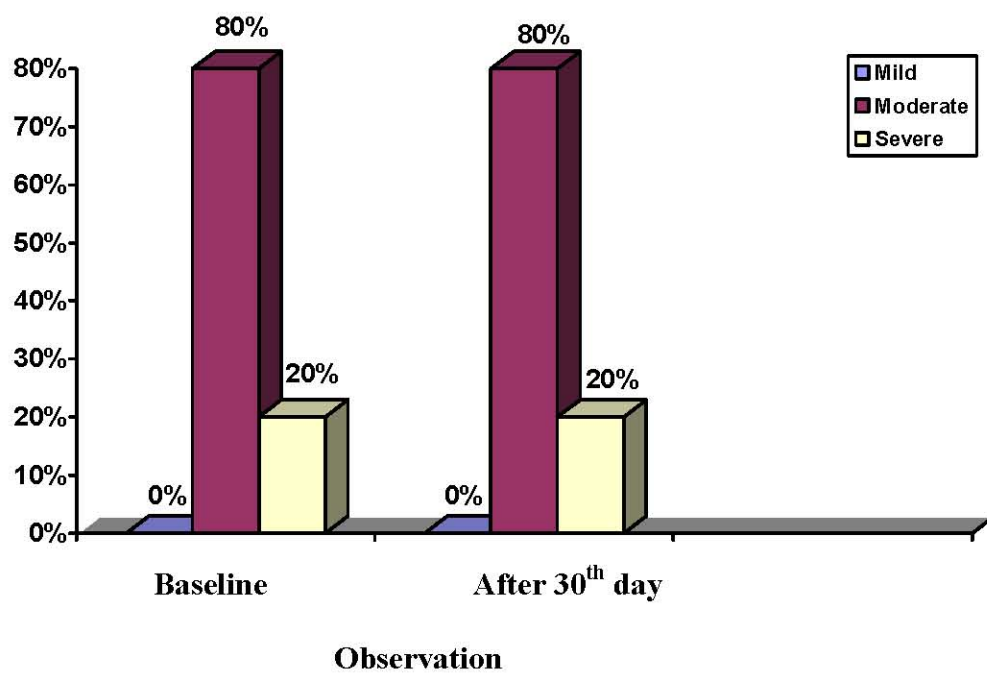
Figure -8 Levels of discomfort on baseline and on 30th day in the control group in percentage.

TABLE XVII

MEAN DISCOMFORT SCORE OF EXPERIMENTAL AND CONTROL GROUP BEFORE AND AFTER INTERVENTION ON 30TH AND THE LEVEL OF SIGNIFICANCE

N=30

Groups	Experimental Group N=15			Control group N=15			Paired 't' test P<0.01 Df-28
	M	SD	MD	M	SD	MD	
Before Intervention	5.73	1.01	-	6	0	-	0.75NS
After Intervention	1.46	0.35	4.27	6	0	0	13.35*

*Significant   df = Degrees of freedom.   Table value=2.98

Table XVII-presents the mean discomfort score of experimental and control group after intervention

The mean discomfort score before intervention was 5.73 in experimental group where as it was 6 in control group.

After intervention the mean discomfort score of experimental group reduced to 1.46 where as in control group it remained the same.

The statistical test shows there is significant difference in level of discomfort between experimental and control group after intervention (t= 13.35 p<0.01, df-28) and no difference between experimental and control group before intervention.

So the hypothesis page no 9 **H3-"**There will be significant difference in the level of discomfort between the experimental and control group after intervention and no difference between the two groups before intervention" is accepted.

TABLE –XVIII

MEAN DISCOMFORT OF EXPERIMENTAL GROUP BEFORE AND AFTER INTERVENTION ON 15th AND 30th DAY AND ITS STATISTICAL SIGNIFICANCE

N=15

S. No	Intervention	Mean	MD	SD	Paired 't'value P<0.05 df=14
1	Before	5.73	1.93	0.28	27.57*
2	After 15th day	3.8			
3	Before	5.73	4.27	0.35	46.66*
4	After 30th day	1.46			

*Significant df = Degrees of freedom.   TV = 3.84

Table XVIII-presents the mean discomfort of experimental group and control group.

The mean discomfort score before intervention 5.73 is higher than the mean discomfort score of 3.8, on 15 days after intervention and 1.46 on 30 days after intervention. The difference observed in the mean discomfort score of before and after intervention on 15th day is statistically significant (t=27.57, df-14, P=0.01). The mean difference observed in the mean discomfort score before and after intervention 30th day also statistically significant (t=46.66, df-14, p=0.01).

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4. Association of study variables and demographic variables.

TABLE – XIX

ASSOCIATION OF DEMOGRAPHIC VARIABLES WITH DEGREE OF HEAD LICE   INFESTATION BEFORE INTERVENTION.

N=30

S. No	Demographic variables	Degree of head lice infestation				X^2 at 1 df p <0.05
		Moderate		Severe		
		Frequency	Percentage	Frequency	Percentage	
1.	Age in years					
	a)<14	12	40	5	16.67	0.14NS
	b)14 and above	11	33.33	3	10	-
2.	Duration of stay					
	a)<2 years	17	56.67	7	23.33	0.01NS
	b)2 years and more	5	16.67	1	03.33	-
3.	Stay in					
	a)single room	3	10	1	03.33	-
	b)double room	10	33.33	3	10	7.69*
	c)common room	10	33.33	3	10	**Tv=5.99**
4.	Sharing the bed with					
	a)one person	12	40	5	16.67	0.17NS
	b)>1 person	10	33.33	3	10.00	-
5.	Type of hair					
	a)thick hair	8	26.67	2	6.67	0.16NS
	b)thin hair	13	43.33	7	23.33	-
6.	Length of hair					
	a)long hair	10	33.33	6	20	0.9NS
	b)shoulder length hair	11	36.67	3	10	-
7.	Duration of hair wash					
	a)once	13	43.33	5	16.67	0.54 NS
	b)twice	10	33.33	2	6.67	-

Table XIX -presents association of demographic variables with degree of head lice infestation before intervention.

This table shows that there is no association between the age, duration of stay, sharing the bed, type of hair, length of hair, duration of hair wash. However there is association between the stay in room and degree of head lice infestation. (X_2 = 7.69 df-1 p<0.05). This suggest the students who stay alone in a double room have lesser degree of head lice infestation than the students who stay in double room with more than two students and common room.

TABLE – XX

ASSOCIATION BETWEEN DEGREE OF HEAD LICE INFESTATION AND LEVEL OF DISCOMFORT

N=30

		Level of discomfort		X_2 P<0.05 df-1
		Moderate	Severe	
Degree of head lice infestation	Moderate	14	10	1 NS
	Severe	0	6	

*-significant NS- not significant   Table value=3.84

Table – XXI-presents the association between the degree of head lice infestation and level of discomfort.

The association was done only between the severity in degree of head lice infestation and severity in level of discomfort. Because there was no data in moderate level of discomfort.

When statistically computed there was no significant correlation between degree of head lice infestation and level of discomfort. The obtained x^2 value 1 is less than the table value. So the hypothesis page no 9 Ho 'There is no significant correlation between degree of head lice infestation and level of discomfort' is accepted

DISCUSSION

CHAPTER –V

DISCUSSION

The discussion brings the research to closure section 'makes sense' of research results. This is the most important section of any research report. The discussion section may be presented in precise and concise language avoiding research jargons. (Hays 1992, Klison 1985).

The study focused on assessing the effectiveness of neem paste application on degree of head lice infestation and the level of discomfort due to head lice infestation experienced by school students residing in two hostels. This chapter presents the main findings and its discussion

1. **Assessment of degree of head lice infestation in experimental and control group**.

Table III, Table IV, Table V, Table VI, Table VII, Table VIII- These 6 tables present the degree of head lice infestation in experimental and control group.

Table III, IV shows 53.33% of children in experimental group had severe degree of head lice infestation and 46.66% of children had moderate degree of head lice infestation before intervention and in control group 53.33% of children had moderate degree and 46.66% of children had severe degree of head lice infestation. In the experimental group after 15th day the number increased in mild degree of head lice infestation, but in the control group the degree of infestation remained in the same level.

Table VI presents the comparison of degree of head lice infestation of experimental and control group after intervention on 15th and 30th day.

In experimental group after intervention on 15th day majority 73.33% of samples had moderate degree and only 13.33% of the samples had mild and moderate degree of head lice infestation. On 30th day all 100% of the samples had mild degree of head lice infestation. But in the control group the degree of head lice

infestation remained at the same level. This shows the effect of neem paste application for head lice infestation.

In table VII the means score of degree of head lice infestation of experimental group before intervention was 6.13 and on 15th day the mean score reduced to 5 and a further reduction to 1 on 30th day. Statistically there was no significant difference between before intervention and on 15[th]day after intervention and there was a significant difference before intervention and on 30th day (t=15.96 at df -14, p< 0.05. This result supported the hypothesis.**H1**-There will be significant difference in the degree of head lice infestation in the experimental group before and after intervention.

Table VIII presents the comparison of degree of head lice infestation in experimental and control group after intervention.

The mean score of experimental and control group before intervention was 6.13, 6.2 respectively. In experimental group after intervention on 30th day the mean score reduced to 1 and in control group it remained at the same level. Statically there was significant difference between difference experimental and control group after intervention. (t= 14.44 df-28 p<0.01). This supported the hypothesis **H2**- There will be significant difference in the degree of head lice infestation between the experimental and control group after intervention and no difference between the two groups before intervention.

The findings of the present study is supported by the findings of the study by Abdel Ghaffer, Fathy (2007) on efficacy of neem seed extract shampoo on head lice of naturally infected human. After the intervention it was showed that neem seed extract was effective on killing the lice in all stages, and there was no side effect like skin irritation and burning sensation.

Table IX, Table X, Table XI, Table XII, Table XIII- These tables explain the mean score of signs of head lice infestation in experimental and control group.

Table IX, X presents the mean score of signs of head lice infestation in experimental group before and after intervention on 15th and 30th day.

Before intervention the signs of nymphs and nits in the hair obtained a high

mean score of 100%. The four signs of lice in the hair, red pump in the scalp and head sore obtained a mean score of 80%-90% and two signs of scalp redness, presence of lice/nits behind the hair and back of the neck received a mean score of 33% and 53% respectively.

On 15th day after intervention the mean score of 7 signs reduced except head sore 80% which remained at the same level. A marked reduction of 33-47% was seen with regard to the signs of red bump in the scalp and presence of lice / nits behind the ear and back of the neck. There was significant difference between before intervention and on 15th day for signs of lice in the hair, red bump in the scalp, excoriation of scalp, scalp redness, presence of lice / nits behind the ear and back of the neck (t=3.83-13, df-14,p< 0.01) and there was no significant difference in the signs like nymphs, nits in the hair and head sore.

On 30th day after intervention red bump in the scalp and nits in the hair showed a mean score of 20% and 80% and remaining six signs showed a mean score of 0. When statistically computed significant difference was seen in all the sign (t= 2.65-14, df-14, p<0.01) except for the signs of nymphs, nits in the hair and head sore. This shows the effect of neem paste application for control of head lice.

The findings of the present study is supported by the findings of the study by **William .R, Mackenzie (2000)**. A cohort study on lice, nits and school policy showed that having more than 5 nits was a risk factor for conversion. Though the neem paste application has brought a reduction in all the sign, the presence of nits is an indication of the need for further application of neem paste.

Table XI -Presents the mean score sign of head lice infestation in control group on base line and 30th day of observation.

In control group a high mean score of 100% seen in the sign of lice and nits in the hair. A mean score of 87% was seen with regards to red bump in scalp, scalp redness and a mean score of 60% seen in lice/nits behind the ear and back of the neck, head sore and only a mean score of 27% seen in excoriation of scalp.

On 30th day the mean score for all the signs in control group continued to remain the same. Regular shampoo has no effect on reducing pediculosis infestation.

Table XII, shows the comparison of mean score of sign of head lice infestation in experimental and control group before and after intervention.

The mean percentage of six signs listed in table (No.1,2,5,6,7,8) was approximately same for both the groups (27%-100%), for the signs of excoriation of scalp and scalp redness the mean score percentage of experimental group was 87%, and 33% and in control group 27%, and 85% respectively. It suggest that both the group had same signs of head lice infestation except for 2 signs (t= 12, 9.83, df-28, p<0.01)

The mean score percentage of head lice infestation in table XIII on 30th day after intervention in the experimental group ranged from (0-80%), where as in control group it ranged from (27%-100%).There was a significant difference found between the mean score in sign of head lice infestation in the experimental and control group after intervention for most of the signs (t=3-7.4 df-28 p< 0.05) except for the sign of lice in the hair, excoriation of scalp, nymphs and nits in the hair.

According to this table the mean score of sign of head lice infestation of experimental group was lesser than the control group except red bump in the scalp and nits in the hair which remained the same for both the groups. Except for the sign of lice in the hair, excoriation of scalp, nymphs and nits in the hair the mean score of signs of head lice infestation was significant.

Table XIV presents the mean sign score of head lice infestation of experimental group after intervention in day wise order.

On the first observation the mean score of 6.4 was seen and there is a gradual reduction of mean score in subsequent observation. A marked reduction in the sign is seen after 2 neem paste application.

2. **Assessment of discomfort due to head lice infestation in experimental and control group**

Table XV, Table XVI, Table XVII, Table XVIII, Table XIX –These five tables presents the discomfort due to head lice infestation in experimental and control group.

In experimental and control group the 80% had moderate discomfort and 20% had severe discomfort before intervention.

On 15th day 66.66% of the samples had moderate discomfort, 33.33% had mild discomfort and no children with severe discomfort. On 30th day all the children had

mild discomfort (100%). In the control group the discomfort remained at the same level.

Table XVI shows mean score of 5.73 in experimental group and 6 in the control group was seen before intervention. After intervention the mean discomfort score of experimental group reduced to 1.46 and in the control group it remained the same.

There was significant difference in level of discomfort between experimental and control group (t=13.35 p<0.05, df-28) after intervention and no significant difference before intervention. This supported the hypothesis. H3- There will be significant difference in the level of discomfort between the experimental and control group after intervention and no difference between the two groups before intervention.

According to Table XVIII in the experimental group the mean discomfort score before intervention was 5.73, on 15th day after intervention was 3.8, and on 30th day after intervention was 1.46. This difference was statistically significant on 15th day after intervention. (t= 46.66, df-14, p<0.01) and on 30th day after intervention (t=46.66 df-14 p<0.01).

3. Association of variables.

Table XX presents the association of demographic variables with degree of head lice intervention.

There was a significant difference between the stay in room and degree of head lice infestation (X_2 =7.69 df-1 p<0.05). Students who stayed alone in a double room had lesser degree of head lice infestation than the students who stayed in double room with more than 2 students and common room with more than 2 to 3 students.

The finding is supported by the study done by Ebomoy.E (1998) A survey of pediculosis capitis among school children showed that over crowding was one of the factors associated with the onset of pediculosis.

SUMMARY, FINDINGS, CONCLUSION, IMPLICATION AND RECOMMENDATION

CHAPTER VI

SUMMARY, FINDINGS, CONCLUSION, IMPLICATION AND RECOMMENDATION

This chapter presents the summary of the study, summary of the findings, conclusion, implications and recommendation.

Summary of the study

The main aim of the study was to evaluate the effect of neem paste application on head lice infestation of school students in comparison with regular application of shampoo.

The conceptual framework of the study was a nursing process model based on the Dorothy Johnson's behavior system model. The design used in this study was quasi experimental time series with multiple treatments with two groups design. The independent variable of the study was neem paste application and the dependent variables were degree of head lice Infestation and level of discomfort.

The study was conducted in two selected hostels where school children were residing. A convenient sampling of 15 children with head lice infestation from one hostel was placed in experimental group and 15 children from another hostel in control group. Demographic data and data on degree of head lice infestation and discomfort were collected from both the groups using an observational checklist and structured interview schedule respectively prior to treatment.

For the experimental group neem paste was applied on the hair on every 7th day for 30 days- a total of 5 applications. Prior to each application and after the last application the degree of head lice infestation was assessed with naked eye using the check list- a total of 6 observations. Data on discomfort was assessed 3 times by self report during the period of 30 days.

The control group continued to use shampoo regularly once a week. Data on discomfort and head lice infestation was collected as for the experimental group. The data were analyzed using descriptive and inferential statistics.

SUMMARY OF FINDINGS

Demographic data

In both the groups majority of samples were in the age group of 14-15 years. Family income of both the groups was Rs.5001-10,000 per month for 60% of the samples. Most of the mothers in both the groups had higher secondary education. Majority of the samples in both the groups staying in a hostel for a period of two years. Most of the samples 73.33% in experimental group were staying in a double room and in control group most of the samples 93.33% were staying in a common room. Majority of the samples 80% in the control group and 46.66% of the sample in experimental group shared the bed with other children. In both the groups all 100% samples shared the personal things like combs, clothing, bed sheets and towels.

Majority of the samples 93.33% in the experimental group had thin hair and 53.33% of samples in the control group had thick hair. Majority of the samples (93.33%) in experimental group had hair length below shoulder level and in control group 66.66% of the samples had the below shoulder length hair. Majority of the samples 86.66% in control group and 46.66% of the sample in experimental group took hair wash once in a week. All the samples 100% in both the group were using only shampoo for washing the hair. In the experimental group majority 86.66% of the samples and in control group all 100% of the samples using fine tooth combing.

Signs of head lice infestation

The signs observed were lice in the hair, red bump in the scalp, excoriation of scalp, scalp redness, presence of lice/nits behind the ear or back of the neck, nymphs in the hair, nits in the hair and head sore.

The head lice infestation was assessed in three degrees - mild infestation, moderate infestation and severe infestation. Before intervention both the groups

46.66% of the samples had moderate and 53.33% of the samples had severe degree of infestation. In experimental group on 15th day after intervention 73.33% of samples had moderate degree of head lice infestation. On 30th day all 100% of the samples had only mild degree of infestation. In the control group the degree of infestation remained at moderate and severe both in the beginning and on 30th day.

The mean score of degree of infestation in experimental group showed a significant reduction after the application of neem paste on 15th day (6.13) and a further reduction on the 30th day (1).

Discomfort of experimental and control group
The discomfort due to head lice infestation was assessed in three levels (mild, moderate and severe). The discomforts assessed were, difficult to concentrate in the class, missing school due to discomfort , feeling of crawling sensation in hair, frequent scratch, sleep disturbance, hair loss, difficult to make friends, feeling embarrassed when others comment, feeling bad in the company of others, feeling left out by friends. Before intervention both the group 80% of the samples had moderate discomfort and 20% of the samples had severe discomfort.

In the experimental group on 15th day after intervention 66.66% of the samples had moderate level of discomfort. On 30th day all the samples 100% had only mild level of discomfort. In the experimental group mean discomfort score was 1.46 which was less compared to the control group (6). This shows the effect of neem paste on reducing level of discomfort due to head lice infestation among students.

SIGNIFICANT FINDINGS

There was significant difference in mean score of degree of head lice infestation of experimental group (t= 13.35, $p < 0.05\%$, df-14) compared to control group. Hence the research hypothesis H_1 was accepted at 0.05 level of significance..

There was significant difference in the mean discomfort score between the experimental and control group (t=13.35 df=28 $p < 0.01\%$,). Hence the research hypothesis H_3 was accepted at 0.01 level of significance.

There was a significant association between the stay in room and degree of head lice infestation. ($X^2 = 7.69$ df-1 $p< 0.05$).

CONCLUSION

The degree of head lice infestation and level of discomfort is same for both the groups before intervention. But after intervention there was significant reduction in experimental group for all signs of head lice infestation except for nits. and nymphs. where as in the control group it remained at the same level. There was a significant reduction in level of discomfort in experimental group after intervention and in control group it remained at the same level.

IMPLICATION

Nursing practice

Neem paste did have an effect on degree of head lice infestation and level of discomfort due to head lice infestation on infested students. Nurses as health professionals have the dual responsibility of being health care providers as well as health educators.

The findings of the study indicate that all the health team members especially the nurse who works in the community should be aware about the effectiveness of neem paste on head lice infestation and educate the people to use this low cost natural product. People belonging to all strata of society must be encouraged to use of neem paste by creating awareness about the availability, low cost, and efficiency of this natural product to decrease the degree of head lice infestation.

Nursing education

The findings of the study emphasize the effect of neem paste on reducing the degree of infestation and the level of discomfort due to head lice infestation on school students. This information can be included in the nursing curriculum in order to improve the practice for hair hygiene and prevent head lice infestation in the community.

School administration

The result showed use of shampoo does not decrease the head lice and teachers in the schools should create the awareness among the students regarding the effectiveness of neem paste preparation and application. It can also be added to their curriculum.

RECOMMENDATION FOR FURTHER RESEARCH

1. A similar study can be conducted on large samples

2. A similar study can be conducted among primary school and college student's who are staying in hostel.

3. A similar study can be conducted in community area.

4. A comparative study can be conducted between rural and urban settings.

5. A comparative study can be conducted between male and female school students.

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APPENDICES

APPENDIX - i

LETTER REQUESTING PERMISSION TO CONDUCT THE STUDY

To,

   The Secretary,

   RVS Educational Trust,

   Sulur.

Respected Sir / Madam,

  SUB: Letter requesting permission for conducting the study.

  Ms.P.Karpagam is a post graduate nursing student of our institution. She has selected the below mentioned topic for her research project to be submitted to Dr.MGR Medical University of health Sciences, as a partial fulfillment of Master of Science in Nursing Degree.

  "A Study to assess the Effectiveness of Neem Paste Application on Head Lice Infestation among Residential Students in two Selected Hostels at Coimbatore".

   Regarding this project, she is in need of your esteemed help and cooperation as she is interested in conducting a study of her project, in the school during the month June 2009. I request you to kindly permit her to conduct the proposed study and provide her the necessary facilities.

   The student will furnish details of the study, if required personally. Please do the needful and oblique.

<div align="center">Thanking you</div>

Date: Yours faithfully,

Place:

                                      PRINCIPAL

PERMISSION LETTER FOR CONTENT VALIDITY

From:

       P.Karpagam,

       M.sc (N) IInd Year student,

       R.V.S College of Nursing,

       R.V.S Education Trust,

       Sulur, Coimbatore.

To:

Through the Principal

Respected Madam / Sir,

   Sub: Letter requesting opinion and suggestion of experts for establishing content validity of the tool.

   I am a Master of Science in Nursing student of R.V.S College of Nursing in the specialty of Community Health Nursing. As per requirement for partial fulfillment of the Nursing Degree under the Tamilnadu Dr.M.G.R Medical University, I have selected the following topic for dissertation.

   "A Study to assess the Effectiveness of Neem Paste Application on Head Lice Infestation among Residential Students in two Selected Hostels at Coimbatore"

   I humbly request you to kindly validate the tool and give your valuable suggestion.

               Thanking You   Your sincerely,

                                         (P.Karpagam)

Enclosure

1. Structured interview schedule.
2. Observational checklist.
3. Criteria for validation

CERTIFICATE OF CONTENT VALIDITY

This is to certify that the tool developed by P.Karpagam, Msc II Year Student, RVS College of Nursing , RVS Educational Trust, Sulur, Coimbatore to collect data on the problem

"A Study to assess the Effectiveness of Neem Paste Application on Head Lice Infestation among Residential Students in two Selected Hostels at Coimbatore."

Is validated by the undersigned and she can proceed with this tool to conduct the main study.

Name & Address

Signature

Seal

Date

LIST OF EXPERTS

Medical Experts

1. **Dr.C.R.Srinivas, MBBS, MD**

   Professor of Head,

   Dermatology Department,

   P.S.G. Hospitals,

   Coimbatore.

2. **Dr.M.Krithiga, M.D (Ayurveda),**

   Lecturer,

   Ayurveda College,

   R.V.S.College Campus,

   Sulur, Coimbatore.

Nursing Experts

3. **Prof.Mrs.Sivagami MSc (Nursing),**

   Head of Department,

   KMCH College of Nursing,

   Coimbatore.

4. **Mrs.Jaeny Kemp, MSc (Nursing),**

   Principal,

   G.K.N.M School of Nursing,

   Coimbatore.

5. **Mrs. Christy Mekala, Msc (Nursing),**

   Professor

   PSG College of Nursing,

   Coimbatore.

6. **Mrs.Saramma Samuel, MSc (Nursing),**

   Vice Principal,

   R.V.S College of Nursing,

   Sulur, Coimbatore.

APPENDIX iv

CRITERIA FOR VALIDATION

Criteria scale for validating the interview schedule and observational check list on head lice infestation

Kindly go through this tool. Please give your views regarding clarity, relevancy, adequacy and remarks.

S.NO	Item	Clarity	Relevancy	Adequacy	Remarks
	PART – A Demographic data on personal information and hair hygiene				
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

	PART-B Discomfort due to head lice infestation				
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Q.No.	Item	Clarity	Relevancy	Adequacy	Remarks
	PART – C Observation check list on head lice infestation				
1.					
2.					
3.					
4.					
5.					
6.					
7					
8					
9					
10					

Signature of Valuator:

REQUISTION LETTER FOR CO-GUIDE

From:

 P.Karpagam,

  M.sc (N) IInd year student,

  RVS College of Nursing,

  Sulur,Ciombatore.

To:

 Dr.C.R.Srinivas, MBBS, MD

  Professor of Head,

  Dermatology Department,

  P.S.G. Hospitals,

  Coimbatore.

Through the Principal,

Respected Sir,

Sub: Request for Co-Guide

  I wish to state that I am P.Karpagam, Msc (N) 2nd year student of RVS College of Nursing. I have selected the below mentioned topic for dissertation as a partial fulfillment for the Master of Nursing Degree to the Tamilnadu Dr.MGR Medical University.

  "A study to assess the Effectiveness of Neem Paste Application on head Lice Infestation among Residential Students in two Selected Hostels at Coimbatore"

  Regarding this I am in need of your valuable help and   co-operation by providing service to be a Co-Guide for my study.

  I humbly request your highness to consider the same and do the needful.

      Thanking you,

           Yours sincerely,

           (P.KARPAGAM)

TOOLS USED

INTERVIEW SCHEDULE

INTRODUCTION

Head lice infestation is common among children. To get rid of head lice various methods such as applying medications, shampooing, fine tooth combing are practiced. Many new methods are still being introduced in order to deal with the problem in an economical way.

PURPOSE

The purpose of this interview is to find out from you the problem you face as a result of pediculosis infestation and how you take care of your hair.

INSTRUCTION

Kindly give your response to the questions asked. Please feel free to respond. Your answers will be kept confidential.

SAMPLE NO:

PART- A

DEMOGRAPHIC DATA- RELATED TO PERSONAL INFORMATION

1 .What is your age

    A. 10-11

    B. 12-13

    C. 14-15

2. What is your family income/ month

    A. Below 5000

    B .Rs.5000- Rs.10000

    C. Rs.10000 and above

3. What is the education of your mother

    A. Illiterate

    B .Primary school

    C .Higher secondary school

    D .Graduate

4. What is the duration of your stay in the hostel

    A. 1year

    B. 2year

    C. Above 2years

5. Do you stay in

    A. Double room alone

    B. Double room (more than two

    C.Common room (more than two)

6. Do you share the bed with

    A. One person

    B. Two person

    C. 3 and more

    D. None

7. Do you share personal things like

    A. Comb, clothing's, pillows, bed sheets, towels

    B. Books

    C. Plates

DEMOGRAPHIC DATA- RELATED TO HAIR HYGIENE

1. Type of hair [observe]

    A. Thick hair

    B. Thin hair

    C. Brittle hair

2. Length of hair [observe]

    A. Shoulder length hair

    B. Below shoulder length hair

3. How many times do you   take hair wash in a week?

    A. Once

    B. Twice

    C .Three and more

4. What   do you use to wash your hair?

    A. Soap

    B. Herbal products

    C. Shampoo

5. Do you use fine tooth combing

    .   A. Yes

    B. No

DISCOMFORT DUE TO HEAD LICE INFESTATION

When head lice is present it causes discomfort . Which of the following discomfort do you have due   to head lice.

S.NO	DISCOMFORT	DAY 1 Pre intervention [o1]		DAY 14 Intermediate Intervention [o2]		DAY28 Post intervention [o3]	
	DAYS OF OBSERVATION	Y	N	Y	N	Y	N
1	Do you find it difficult to concentrate in the class due to itching?						
2	Do you miss school due to discomfort caused as a result of head lice?						
3	Do you feel crawling sensation in your hair?						
4	Do you get frequent scratch?						
5	Do you have sleep disturbance?						
6	Do you have hair loss?						
7	Do you find it difficult to make friends?						
8.	Do you feel embaressed when others comment on you?						
9	Do you feel bad in the company of others						
10	Do you feel left alone						

PART-C

OBSERVATIONAL CHECK LIST

	Days of treatment	D_1		D_8		D_{15}		D_{22}		D_{29}			
	Days of observation	$D_1 O_1$		$D_8 O_2$		$D_{15} O_3$		$D_{22} O_4$		$D_{29} O_5$		$D_{30} O_6$	
S.NO	Criteria	P	A	P	A	P	A	P	A	P	A	P	A
1.	Red Bumps in the Scalp												
2.	Excoriation on the scalp												
3.	Scalp redness												
4.	Presence of Lice / nits behind the ear or back of the neck												
5.	Presence of Lice / nits in eye brows or eyelash												
6.	Lice in the hair												
7.	Nymphs in the hair												
8.	Nits in the hair and scalp												
9.	Head sore												
10	Lymph node enlargement in front or back of the neck												

O-observation D- day P- present A-absent

Observation will be done before every application and one day after last application.

5Application 6 Observation

Conclusion: Thank you for your kind co- operation.

ARTICLES FOR NEEM PASTE APPLICATION

ARTICLES

Chair

Combs

Cotton ball

Towels

Gloves

Neem paste

Plastic cover

Paper bag

Kidney tray with savlon solution

Bucket with water

NEEM PASTE PREPRATION

Dry the neem leaves under shade place for one week. After that grind the dry leaves and make it powder and preserve in a bottle. while using the powder make in to paste.3teaspoon neem powder added in a 10ml of water and make it in to paste.

NEEM PASTE APPLICATION

After combing the hair, divide the hair in to section and apply neem paste starting from one end, from the hair line to the whole head with the gloved hand. After applying cover the head with plastic cover and wait for 30 minutes. After that wash the hair with water.

STEP-1 PARTING THE HAIR AND APPLYING NEEM PASTE

STEP-2 APPLYING NEEM PASTE ALL OVER THE HEAD

STEP-3 TYING THE HAIR

STEP-4 COVERING THE HEAD WITH CAP