DOI Number: 10.37506/v14/i1/2020/ijfmt/192948

Study of the Effectiveness of Some Raw Plants and Materials in the Treatment of Pediculosis in Najaf province Iraq

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Abstract

Head lice are a public health problem and resistance to over-the-counter medications is a source of concern for many. The current study was conducted to evaluate the activity of three plants as a natural alternative to medical pesticides to treat pediculosis in Najaf province ,Iraq. It was noted that the *Lawsonia Inermis* plant (Henna paste) mixed with mercury has scored the highest effectiveness for killing lice in two hours from the first use by 100% followed by the *Allium cepa* juice mixed with *Curcuma longa* plant, where the rate of killing 80% of the second use and finally vinegar mixed with sodium chloride (food salt) by 46.66%. our suggestion that these blended Materials give better results than if they were alone and are excellent alternatives to medical pesticides

Key words: *pediculosis, raw plant, sodium chloride, mercury, vinegar.*

Introduction

Head lice infection was associated with limited morbidity, but it caused anxiety among parents toward school-age)[1]. Multiple and excessive treatments to pediculosis have also promoted serious health concerns due to the lack of effective treatment to increase the resistance of lice to synthetic compound, so researchers have begun to looking for new synthetic components of treatment such as compounds obtained from plant source [2]

Although most of the active synthetic pesticides were available in the market and efficient against *pediculus humanus capitis* , but these products were expensive and toxic effect on the human nerves [3].Hence non-toxic alternative options are needed to treat pedoculosis. Natural sources remained less toxic and less expensive; therefore , natural extracts from medicinal plants were main rich source of treatment for various diseases and disorders of the human system [4].

More than 1000 species of plants had been described in many areas containing chemical components in seeds, stems, roots, leaves and flowers against insect pests but only a few plants had been used to control insects practically on a commercial scale in the past few decades. The efficient treatment of the pesticide to kill head lice and eggs, followed by manual removal of eggs is the most effective procedure for eliminating head lice[5]

Lawsonia is a shrub and dicot plant belong to the Lythraceae family ,has only one species(*L. Inermis*) but it has several names such as Henna, Mendi, Shudi, Madurang, Manghati, Madayantika and Goranti[6]. It is widely cultivated throughout Tropical regions as an ornamental plant and although the plant was used in the dye and small number of studies had been recorded in treatment of many diseases like anti-diabetes ,immunomodulatory and liver activity[7].

Mercury is a chemical element previously known as a heavy silver mercury element , liquid in standard conditions of temperature and pressure. It was used in cosmetic recipes such as whiten the skin, treat pimples and freckles in the face, treat sores, warts and skin infections[8].

For long time, the onion plant (*Allium cepa*) was highly valued for its therapeutic properties, a medicinal plant used , but lately used for its effectiveness of heart vessels, anti-hypertensive and anti-diabetic by a few researchers[9] .

Curcuma long belongs to the Zingiberaceae family and is considered to be very cheap, available, effective and acceptable in developing countries, without toxic or harmful reactions. The active ingredients known as curcumin have been shown to be highly therapeutic when used in recommended quantities[10].

In our study, 6 substances were studied, some of which were extracted from the plants, in addition to other substances, where each extract was mixed with another for the purpose of studying its advers efficacy of extracts and their use as a human hair pesticide. In the absence of a similar study, the idea of the study came as follows:

1- Study the effectiveness of *Lawsonia* plant mixed with mercury as a lice pesticide

2 – Study the effectiveness of *Allium cepa* juice mixed with *Curcuma longa* plant (Al-Korkom or Curcumin)

3 - Study the effectiveness of vinegar mixture with sodium hloride **MATERIALS AND METHODS**

A total of 45 randomized samples infected with pediculosis were collected with different ages ranging from 8 - 30 years, Ones were excluded before the examination weren't eligible for inclusion in our study who used any form of head lice treatment for at least four weeks or any local medicine for 48 hours prior.

The experiment was conducted at room temperature 25C and a relative humidity of 45%. The blended Materials was placed on the hair of the affected women using the brush starting from the scalp with continuous combing the end of the hair and then wrapped in a plastic bag for two hours and then rinsed the hair with empty water with combing to get rid of dead lice And eggs.

Then hair was examined and the experiment was repeated on the second and third day if the lice hadn't completely eliminated. People were also examined for the side effects of treatment on the skin and eyes, and recorded their impressions regarding smell, itching, etc., during and after treatment. The second test was performed 10 days after the first treatment to determine whether all lice were eliminated in the hair or not. preparation of experimental materials

1- *Lawsonia* paste and mercury

Lawsonia leaves and mercury were bought from herbal stores and taken 110 g of ground *Lawsonia* leaves mixed well with 200 ml of water. Then add 5g of mercury to get the henna paste.

2- A mixture of onion juice with ground turmeric:

Red onion (150g) sometimes called purple (*Allium cepa*) peel then squeeze to get onion juice, with a concentration of 100% .Then add 10 g of turmeric (after grinding the turmeric stalks) to the onion juice and mix well .

3- mixture of vinegar and sodium chloride

Concentrated vinegar (250 ml) was taken from the Al-Badawi factory (Iraq) and mixed with salt (25 g) .The mixture was added to the vinegar and the salt was well dissolved.

Result

45 patients were successfully treated with natural treatments divided into 3 groups and each group contained 15 persons for each combination of experiment materials. The adults and nymphs head lice mortality rate was evaluated after two hours of treatment with Therapeutic materials. Table results show that henna blended with mercury had a high toxic effect in killing lice and eggs by 100% of the first usage, followed by mixture of onion and turmeric plant by 80% of the second usage, while the mixture of vinegar and food salt recorded 46.66% of the third day .The number of lice in the hair has decreased on the first day and the second for the last mixture.

Table showing effect of tested materials on *pediculus humanus capitis* in vivo.

Tested materials	**percentage of healing cases**		
	First try	**Second try**	**Third try**
	First day	**Second day**	**Third day**
Lawsonia plant with mercury	100%(15)	-	-
onion juice with ground turmeric	80%(12)	20%(3)	-
vinegar and sodium chloride	46.66%(7)	33.33%(5)	20%(3)

Discution

The Henna leafs paste is used as a coloring agent for hair, At the same time, the phytochemicals present in the leafs have a toxic effect of head lice. Our results are consistent with a study conducted by[2], that the phytochemical constituents of *L.inermis* by GC-MS*) Gas Chromatography- Mass Spectrometry* (, where it revealed the presence of 72 compounds with different molecular weights. In another study, they found to contain naphthoquinone, xanthones, coumarin derivatives, fatty acids, amino acids and other components. It had been shown that the Naphthoquinone which obtained from *L.inermis* leaves had a large immune effect. Quinonic compounds extracted from Henna have also been studied in vitro and have been shown to possess antimicrobial properties. Lawson isolated from *L.inermis* leaves showed a significant antifungal effect[11].

[12]confirmed that it had anti-oxidant, antiviral and parasite effect and reduce larvae activity of some insects, anti-inflammatory, inhibition of enzymes activity, anti-coagulant effect, wounds healing and the activity of inhibition of protein

Since ancient times, Henna paste has been placed on hands and feet to protect against fungal and to control lice and crust. In a study conducted by[13], 70 phenol compounds were isolated from different parts of the plant, Naphthaconon has been associated with many pharmacological activities, while terpenes and β ionone are responsible for the odor of essential oils isolated from flowers. In addition to other volatile terpenes, some types of non-volatile tryboinoid and two alkaloids and dioxin derivatives have been isolated from the plant. Henna is an important medicinal plant with important biological activities in vitro and in vivo. Although a myriad of pharmacological activities have been documented, the antioxidant and antimicrobial activities are most carefully researched.

[14]found that Henna was used in the treatment of lice mixed with several plant extracts such as wormwood(100%), helba 75% or karkada (50%), Head lice completely disappeared within a week between these patients .

As for mercury, it is known to be a poisonous substance, especially on insects. Thus, mixing it with henna paste gave an excellent result. It is one of the toxins that affects topically by its contact with the body, and affects after absorption on the various organs of the body and some of them called poisonous irritants and is considered a toxin of the nervous system and toxins reproductive system, affecting the activity of the reproductive system in both male and female causing infertility.

In a study conducted on a mummy of Ferdinand II, where samples were taken from the head and pubic hair on the mummy, and then tested for The presence of lice in the hair and mercury concentration, where it tended to accumulate in head hair as well as the presence of mercury in the liquid used for hair washing. This confirms the possibility of applying minerals externally.

Further toxicity tests were conducted to verify the presence of mercury on the skin, body cavities and pubic hair, where the results showed very low values. Therefore, the presence of these elements in the king's hair could prove exposure to the metal for the purpose of killing the lice and through microcroscopic and radiographic examination No traces of mercury were shown in cavities of the skull or body in the Ferdinand mummy. Results revealed that parts of the abdomen of adult and seven unfinished had attached to the hair, parts of the lice eggs. The presence of massive mercury in Ferdinand II hair was explained by the use of quicksilver for artificial mummification For the corpse, Considering that there is no trace of the metal in the mummy except in poetry.

While the effects of mercury have been found in all hairs and it seems reasonable to attribute the high value of mercury to the use of solutions and ointments against lice , And the decrease in the percentage of mercury in pubic hair indicates that he has lice as well as the head, and to prove that this region has not received any treatment to control lice[9].

Furthermore, indicators of mercury therapy from other diseases such as ringworm and scabies are described as localized use of mercury on the skin lesion alone[15]

The absence of redness of the skin cells(the crust layer) in human treated with a mixture of henna with mercury is a sign of non-sensitization of this region and is evidence of the lack of absorption of cells of this material and thus non-penetration of the skin, indicating that the effect of this material on the parasite and the possibility of use for external use.

Comparing the results of the current study with a study conducted by[6], where they studied the effectiveness of onion extract in the killing of nymphs and lice in the laboratory and found that the mortality of head lice 10% and 20% after 30 and 60 minutes respectively.

Onion plant has many biological activities including antimicrobials, antioxidants, anti-cancer and anti-inflammatory[16].

[17]conducted that the onion plant as antimicrobial with different concentration of essential oil extracts of three types of green, yellow and red onion tested against two bacteria (*staphylococcus aureus* and *Salmomella enteritidis*) and three types of fungus where he was found that the essential oil of green onion led to a decrease in inhibition of bacterial activity when fungal activity was stopped significantly, especially in low concentration.

The onion plant contains two groups of compounds, which form the majority of active substances, sulfur compounds such as Allicin, Allyl propyl disulfide, Flavonoids such as Quercetin. Allicin shows its antimicrobial activity mainly through immediate and total inhibition of DNA and RNA and protein synthesis[18].

Oil products, especially those containing essential oils, may also prevent lice respiration or slow movement, making it easier to remove them from the hair with the soft comb, this is consistent with[19]

It has been suggested that essential oils as an alternative source of insecticide because they are rich sources of biologically active chemicals are commonly used as flavor and flavoring substances for food and beverages[20], because of this emphasis has been placed on plant essential oils or chemicals as potential sources for control of head lice[21]. The activity of pesticides from aromatic oils has been well described by[20].

The Turmeric plant was used as a paste for treatment of scabies at the rate of 97% during 3-15 days of treatment and curcumin is the product obtained by dissolving the turmeric extract i.e., the ground rhizomes of *Curcuma longa L*. (Curcuma domestica Valeton) and purification of the extract by crystallization, it also possesses anti-oxidant properties[22].

Curcumin was soluble dye in oil and alkalis, stable at high temperatures and in acid, more effective than other spices in its ability to prevent fat peroxidation and its antioxidant effect was eight times stronger than vitamin E[23].

The mixture of vinegar and food salt may be attributed to killing of lice and eggs in the hair of the injured that the acid may work to soften the protective sheath of lice covers and attaches the egg on the hair and this is consistent with[24]. The mechanism of action of sodium chloride on lice in laboratory studies is not fully known, but it has been noted that the tear in the digestive system of the lice with the application of food salt and this explains the drought when exposed lice for two hours of sodium chloride and this is consistent with[25].

Conclusions

Use plant raw materials and mix them with more than one substance to get better results in the treatment of pediculosis

Acknowledgment: The authors thank to all patients for their help

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

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