

The national health relevance of the most common skin changes and the possibilities for preventing them

Doctoral thesis

Éva Zitás

Semmelweis University
Doctoral School of Pathological Sciences



Consultant: Dr Judit. Mészáros CSc., college professor

Official judges: Dr. Ibolya Tulkán Ph.D., college associate professor

Dr. Márta Marschalkó Ph.D., professor

Chairman of the comprehensive examination board:

Dr.Iván Forgács CSc., professor emeritus

Members of the comprehensive examination board:

Dr. Erika Erdősi Ph.D., college associate professor

Dr Timea Tóth PhD, college associate professor

Budapest
2017

Introduction

The economic and social changes of the last decades have resulted in a significant increase in risk factors (alcoholism, smoking, improper diet, physical inactivity) in the general population. The immense technical and informational development has led to a decrease in people's physical activity. Due to inadequate life styles, diet and physical exercise, young people's physical and mental capacity shows lower than desirable levels. So, despite rising standards of living, the population's state of health has deteriorated both on the physical and mental levels. Extensive social collaboration is needed for the improvement of the state of health of the general population, the success of which greatly depends on the coordination between the health education activities of the ancillary workers and the patients' health behaviour.

In my dissertation, I have summarized typical skin changes of the different age groups, those that have significant relevance to national health. I have carried out the examinations in the subjects of atopic dermatitis (AD) and verruca vulgaris (VV). I have chosen these diseases because the most common skin disorder in infancy and babyhood is AD, while VV occurs most frequently among older children and young people. Both diseases are of great prevalence and importance regarding national health, where the success of the treatment as well as the efficiency of prevention may be increased by adequate health educational methods. Apart from education, it is an essential task of the ancillary workers to extend the knowledge of those concerned, to make the acquired knowledge part of their daily hygienic routine, to increase the levels of health culture, to establish proper health behaviours, and to improve and increase compliance.

Study I.

Investigating the effects of external and internal factors regarding the skin symptoms of atopic dermatitis, the most common skin disorder in infancy and babyhood

Study II.

Presenting the results, achieved by applying combined treatment methods of verruca vulgaris, and the possibilities for its prevention by means of general health education

Objectives

The aim of the research is to investigate the possibilities for involving the patients (and their parents) in their own treatment, which can be attained by increasing adherence, and establishing appropriate health behaviours.

- Achieving active cooperation on the patients' part.
- Teaching the steps of home treatment.
- Making people aware of the prevention possibilities, and preventing the spreading of the disease by means of health education methods.

Methods

Study I.

Choice of samples

The quantitative research took place in the 11th district of Budapest between 1 September and 31 December 2015, during dermatology outpatient consultation hours. In the framework of the research – applying non-random sampling-, I compiled and processed the skin symptoms, as well as the data related to the symptoms, of 230 children, all under the age of two.

Methods

I carried out the investigation based on the evaluation of questionnaire data. The questions pertained to five main subject matters:

- skin symptoms
- skin care practices
- the material of clothing and toys
- living environment
- feeding practices

The statistical calculations were made in the 2010 version of Microsoft Office Excel. The degree of the connection between the ratio scale variables was measured with Pearson's correlation coefficient, chi-square test showed the existence of a connection between the nominal variables, Z-test measured the difference in frequency (ratio) of the individual events in the two surveyed groups, the difference in the average number of treatments was checked with a two-sample t-test.

Study II.

Choice of samples

The participants of the investigation were 124 patients ($\Sigma np=124$), with altogether 635 ($\Sigma nv=635$) verruca vulgaris, registering in Budapest at the 11th district dermatology outpatient consultation hours between September 1 2014 and June 30 2015.

Methods

Selection of patients

The selection of the patients was based on the following criteria:

- the number of verrucas per patient ≤ 12
- the diameter of the verrucas ≤ 8 mm
- adequate willingness for cooperation (in the case of minors, on the part of the parents)

Informing the patients about the nature of the disease, and about the possibilities for treatment and prevention

During my work, I gave high priority to the extensive education of the patients about the steps of conservative treatment to be self-administered since the success of the therapy depends to a great extent on the active participation of the patients in the treatment. Making people aware of prevention is essential in order to reduce the possibilities for the spreading of the disease.

Taking medical history and registering status

The test data and the handling information were documented on personal data sheets.

Designing tailored treatment plans

I informed the investigation participants about the treatment options of VV, as well as the advantages and the disadvantages of conservative and radical treatment methods.

Choosing the optimal **cryotherapy methods**: During cryotherapy, liquid nitrogen, at a temperature of minus 195 degrees Celsius, is sprayed on the verruca for 1-3x10-20 seconds. As a result of deep freezing, a tangible ice

ball is formed on the treated area, whereupon the cells, infected by the virus, will suffer irreversible damage (2nd and 3rd degree frostbite).

Describing the **steps of conservative treatment (to be carried out at home)**: Once a day, generally in the evening, with keratolytic solution. The patient receives thorough education about the effectuation of the treatment.

The best results can be achieved by the **combination** of conservative treatment and cryotherapy, reducing the time for the wound to heal as well as the pain caused by cryotherapy. The applied treatment – conservative treatment, cryotherapy, or the combination of the two – was chosen based on the pain tolerance of the patient.

Outcomes

Study I.

Research data regarding skin symptoms

Skin symptom types: The leading symptom in the case of 35 children (15.2%) was skin dryness and desquamation; 71 children (30.9%) had dermatitis (erythema), 69 children (30%) had rashes (papula and vesicles), 34 children (14.8%) had pruritus, 10 children (4.3%) had urticaria and 11 children (4.8%) had sloughing.

Diagnosis: The diagnosis in the case of 96 children (41.7%) was diaper dermatitis (DD), with 89 children (38.7%) it was atopic dermatitis (AD), and 45 children (19.6%) were taken to the surgery with other skin disorders.

Localization of the skin symptoms: The skin symptoms appeared on the face and hairy scalp of 68 children (29.6%), on the limbs of 25 children (10.9%), on the trunk of 12 children (5.2%), on the gluteal region of 96 children (41.7%), and all over the body of 29 children (12.6%).

The time of appearance of the first symptoms: in the case of 59 children (25.7%) the first skin symptoms appeared under the age of 2 months; with 86 children (37.4%) between the ages of 2-6 months; and with 85 children (36.9%) after the age of 6 months.

The seasonality of the skin symptoms: in the case of 45 children (19.6%) the first skin symptoms appeared in spring, with 64 children (27.8%) in summer, with 74 children (32.2%) in autumn, and with 47 children (20.4%) in winter.

The frequency of recurrences: in the case of 119 children (51.7%) the skin symptoms were first occurrences, not recurrences, with 21 children (9.1%) they appeared for the second time, and with 90 children (39.1%) the symptoms were repeated recurrences.

Skin care practices

Based on the data of the first research, bathing time lasted more than 10 minutes in 89.1% of the cases. 73.9% used soap, 100% used baby bath products (bubble bath and baby shampoo), 26.1% applied washing cream from the pharmacy (Ung. Hydroph.non-ionic. Fo.No), nobody used bath oils. Based on the data of the research of the recurring cases, daily bathing time was longer than 10 minutes in 54.6% of the cases, and 14.3% used soap, 38.7% used baby bath products, while 26.1% already used bath oil too, and 90.8% applied wash cream.

The material of clothing and toys

Underwear was made from cotton in 87.8% of the cases and from mixed fibre material in 12.2% of the cases, 77.8% of the outerwear was made from cotton and 22.2% was made from mixed fibre and other material. The children's toys were all made from synthetic fibre.

The living environment

Heating: District heating 53.9%, own central heating 23.9%, gas convectors 17.8%, electric and traditional heating 2.2-2.2% of the surveyed families.

Water: 100% of the families use piped (hard) water.

Vaporizing: 52.2% of the families do not use vaporizers, 41.7% use vaporizers installed on the radiators, and 6.1% use electric devices.

Detergent: 83% of the families use washing powder and 17% use liquid detergent for washing. Every family uses fabric conditioner.

Free time: According to the survey, each child spends a minimum of one hour on average in the fresh air daily.

Pets: 27.8% of the families own a pet (hamsters, guinea pigs, dogs, cats), 72.2% do not.

Feeding practices

Breast feeding pattern: 35 children (15.2%) were breastfed up to the age of 1 month, 69 children (30%) for 2 months, 7 children (3%) for 4 months, 84 children (36.5%) for 6 months, 21 children (9.1%) for 8 months, and 14 children (6.2%) for 10 months.

Feeding with baby formula: 28 children (12.2%) were not given baby formula at all, 71 children (30.9%) were given baby formula for 1 month, 68 children (29.5%) for two months, 37 children (16.1%) for 4 months, 21 children (9.1%) for 6 months, and 5 children (2.2%) for 8 months.

Study II.

The number of patients per age group and gender:

9-12 yrs: 9 girls and 12 boys; 13-16 yrs: 5 girls and 14 boys; 17-20 yrs: 19 women and 7 men; 21-24 yrs: 13 women and 9 men; 25-28 yrs: 11 women and 6 men; 29-32 yrs: 4 women and 3 men; 33-36 yrs: 8 women and 4 men.

The number of verrucas per patient:

8 patients had 1 verruca each ($n_v=1$), 14 patients had 2 verrucas, $n_v=2$, 19 patients had $n_v=3$, 18 patients had $n_v=4$, 21 patients had $n_v=5$, 8 patients had $n_v=6$, 8 patients had $n_v=7$, 11 patients had $n_v=8$, 6 patients had $n_v=9$, 5 patients had $n_v=10$, 3 patients had $n_v=11$, and finally, 3 patients had $n_v=12$ verrucas.

The number of verrucas according to diameter:

243 of the 635 verrucas were small (2-4mm), 236 were of medium size (5-6mm), and 156 were larger than that (7-8mm in diameter).

Localization:

Based on the examination of the verrucas according to the breakdown of their localization, it can be observed that the verrucas appeared on the hands of 78 patients, around the fingernails of 13 patients, on the sole of the feet of 18 patients, around the toe nails of 9 patients and on other areas (knee, calf, the crook of the arm) of 6 patients.

The time of appearance of the symptoms:

During the examination of the time of appearance of the first symptom, it was stated that the verrucas appeared within 6 months in the case of 9 patients, between 6-12 months with 37 patients, 1-2 years ago with 48 patients, 2-3 years ago in 29 cases, and only in 1 case did the first verruca appear more than 3 years ago.

The tracking and documentation of the treatments and follow-up examinations

The examinations carried out in the surgery and the parameters of the treatments were documented on the patients' personal data sheets. The follow-up examinations and the cryotherapy treatments were carried out every three weeks.

$n_v=173$ of the 243 small (2-4mm) verrucas healed as a result of *conservative treatment* (71.2%). In the case of $n_v=110$ of the 236 medium sized verrucas (5-7mm \varnothing) *only cryotherapy* treatment was applied, while a combination of treatments was used in the case of $n_v=126$ verrucas for comparison purposes between the results of the two treatment methods. Large verrucas (8mm $\leq \varnothing$) were treated with the combination method in each of the 156 cases.

Conclusions

Study I.

The course and recovery of AD, as well as the prevalence of recurrences are greatly influenced by **skin care**. Therefore, establishing proper skin care practices is of utmost importance.

In the case of babies and infants, the hydrolipid film has not yet developed completely, resulting in a more frequent occurrence of skin infections. The protective film is genetically incomplete in AD, that is why it is important to avoid the use of any kind of skin care products that have a drying effect. Instead of soap, the application of wash cream (Ung. Hydrophylicum non-ionicum Fo.No.) is recommended even in symptom-free periods of AD.

Air and sunshine both have a beneficial effect on the majority of childhood skin diseases, even more so in the case of AD. As can be seen from the survey results, recurrences are much less frequent in the summer. Caution must be exercised, though, and especially in the case of fair skinned, blue-eyed children with fair or red hair, the use of sunscreen emulsion is recommended. In autumn and winter, heating causes low humidity, which

increases the dryness of the skin, and leads to the recurrence of skin symptoms. For prevention purposes, using a vaporizer is recommended.

There is no common stand as regards feeding practices. It is emphasized by all authors that babies should be breastfed at least up to the age of 6 months. It is important that nutritive allergens – that are among the first of the special provoking factors- should be introduced in the child's diet as late as possible. Eggs, cow's milk and soy are to be avoided up to one year of age.

Vitamin F (unsaturated fatty acids, linoleic, linolenic and arachidonic acids) is essential for the formation of the hydrolipid film of the skin surface, giving it to all children with a skin disease – as a food supplement or mixed with emollient– is recommended. Evening primrose oil is found in oily seeds.

The frequency of AD recurrences and the gravity of the symptoms are greatly influenced by psychological factors. If need be, the home visitor will refer the patients and their family members to support communities and foundations.

Study II.

Based on our observations during treatment, it can be stated that conservative treatment should be chosen primarily – or exclusively – in the case of small VV ($n_v=173$ cases among our patients), as well as in treating VV, irrespective of size, appearing on the sole of the feet and in the nail-bed. Depending on the patient's pain tolerance exclusive cryotherapy is recommended in treating VV, small in numbers and of medium size ($n_v=110$). However, in the vast majority of the cases, a combination of the two methods is necessary ($n_v=352$).

The optimal treatment method of VV, therefore, is the combination of the conservative treatment and cryotherapy, bringing together the benefits of both methods: healing is more effective, less painful, and faster, and better aesthetic results can be achieved than when applying monotherapies.

Although choosing the optimal combination of treatments that varies from person to person, is the responsibility of the medical professional, the success of the therapy greatly depends on the knowledge of the ancillary workers and the active cooperation of the patients. During busy surgery hours of the practitioners, valuable doctor's time may be made free and devoted to patients needing more complex solutions if patients are given

adequate advice by properly qualified home visitors, specialist nurses, and assistants.

Due to the national and public health implications of the topic, I suggest that the range of subjects in training ancillary workers should be extended with the possibilities of the combined treatment and prevention of VV.

Novel outcomes

All the results and the conclusions in my thesis, related to the combined treatment of verruca vulgaris, are the outcomes of my own investigations and entirely unprecedented since our combination method of the therapy procedures has never been published.

1. The results of both investigations prove that the knowledge of the patients and their parents, regarding both the nature of the disease and the possibilities for its treatment and prevention, is rather inadequate.
2. Thence the statement can be made that the patients, suffering from verruca vulgaris, turn to specialists at a fairly late stage. Those with numerous but small verrucas seek medical help sooner, while in the case of developing a small number of verrucas, even years may pass before seeking help; I found an inverse proportionality between the number of the verrucas and the time period that passes before treatment is sought.
3. It was proved true by the treatment parameters that in the case of verruca, freezing time is longer when not applying a conservative treatment. When applying a combined treatment, both freezing time and the number of further cryotherapy treatments are reduced.
4. The treatment results, as presented in my thesis, prove the crucial importance of health education. Significantly better results can be achieved through education and the properly chosen combined therapy, than through applying monotherapies.

List of own publications

Publications relevant to the topic of my dissertation:

1. **Zitás É**, Mészáros J. (2016) Napsugárzás által okozott leggyakoribb bőrártalmak. Orvosi Hetilap, 157(3): 94-97.
2. **Zitás É**, Mészáros J. (2016) Prevention possibilities of the most common childhood skin disorders. New Medicine, 20(1): 15-18.
3. **Zitás É**, Mészáros J. (2016) The most common childhood skin diseases. Our Dermatol Online. 2016;7(2):213-218.
4. **Zitás É**, Mészáros J. (2016) A festékes anyajegyek veszélyei. Nővér, 29(2):33-35.
5. **Zitás É**, Mészáros J. (2016) A verruca vulgaris kezelése konzervatív és krioterápia kombinálásával. Nővér, 2016, 29(4), 26-32.