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NEEDS, OPPORTUNITIES AND SUSCEPTIBILITY TOWARDS TELEDERMATOLOGY FOR MANAGING SYMPTOMS OF ACNE IN ESTONIAN SCHOOLS

Master's thesis

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TELEKONSULTATSIOONITEENUSE RAKENDAMISE VAJADUS, VÕIMALUSED JA VASTUVÕTLIKKUS AKNE NAHAHAIGUSE KÄSITLEMISEL EESTI KOOLIDES

Magistritöö

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I hereby certify that I am the sole author of this thesis and this thesis has not been presented for examination or submitted for defence anywhere else. All used materials, references to the literature and work of others are been cited.

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The work meets and stated requirements for Master thesis.

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Abstract

Acne is a chronic long-term skin disorder that occurs when hair follicles become clogged up by oil from the skin and dead skin cells. Although acne frequently also continues into adulthood, it is a disease that is more common among adolescents, with over 80% of females and 90% of males being affected by the age of 21 years. Addressing and solving the problem at the younger ages could significantly prevent serious effects of untreated acne. Due to the fact, that acne is most common among adolescents, acne-related management is also needed in school settings.

The aim of this study is to assess the implementation needs and perception towards teledermatology for managing symptoms of acne between school physicians/nurses and dermatologists. For reaching the aim of this thesis and gathering the information from school medical workers', dermatologists' as well as school children's perspectives, three different research methods (questionnaires, interviews, document analysis) were used.

Results revealed that symptoms of acne among students are repeatedly noticed by all the school nurses participated in this survey. Students with acne-related issues are referred to dermatologists or GPs or managed by the school nurses themselves, 85%, 77,5% and 17,5% respectively. Therefore, necessary acne treatment for considerable number of students is dependent on the matter how many of these referrals eventually reach to the specialist care settings. As statistics show, that only 50% of referred students seek the specialists' assessment they are recommended, specialists' help itself should be brought closer for the students affected with acne. Results of the thesis revealed that 80% of the participated school nurses would be open to improve cooperation with dermatologists in managing symptoms of acne with the usage of teleconsultation solution. Also, 84,8% of the pupils' questionnaire respondents would be ready to reach specialists' opinion for their symptoms of acne through teledermatology in Estonian school settings. The thesis is written in English and contains 45 pages of text, 4 chapters and 14 figures.

Annotatsioon

Magistritöö originaalpealkiri: “Needs, opportunities and susceptibility towards teledermatology for managing symptoms of acne in Estonian schools”.

Akne on pikaajaline krooniline nahahaigus, mis on põhjustatud nahalt erituva õli ning surnud naharakkude ummistavast kuhjumisest nahapooridesse. Väliskirjandusest lähtuvalt on enne 21. eluaastat akne nahahaigusest mõjutatud üle 80% naistest ning 90% meestest. Haigekassa andmete kohaselt diagnoositi Eestis 2017. aastal akne 14 294 inimesel. Nimetatud diagnooside arvust moodustasid 35% 15-19 aastased noored. Kuna aknest on mõjutatud suurem osa koolinoortest, on oluline probleemi käsitlemisele täiendavat tähelepanu pöörata ka põhi- ning keskastme õppeasutustes, kooliarste/õdesid seejuures kaasates.

Antud magistritöö eesmärgiks on uurida telekonsultatsiooniteenuse rakendamise vastuvõtlikkust akne nahahaiguse käsitlemisel kooliarstide/õdede ning dermatoloogide vahel. Töö eesmärgi saavutamiseks ning antud teemasse hõlmatud eri osapoolte (sh kooliarstid/õed, dermatoloogid, kooliõpilased) seisukohtade kogumiseks on töös rakendatud kolme erinevat uurimismeetodit: küsimustikud, intervjuud ning eelneva kirjanduse analüüs.

Kuigi aknega seotud probleemide korral toimub üldiselt õpilase suunamine dermatoloogile (85%) või perearstile (77,5%), jõuavad eriarsti vastuvõtule vaid 50% suunatud õpilastest. Probleemi lahendamiseks on oluline tuua eriarstiabi kättesaadavus kooliõpilastele võimalikult lähedale. Uuringust ilmnes, et 80% kooliõdedest on huvitatud teledermatoloogiast, et seeläbi teha koostööd dermatoloogidega akne nahaprobleemide käsitlemisel Eesti koolides. Samuti on teledermatoloogiat valmis kasutama 84,8% õpilaste küsimustikus osalenutest. Antud magistritööga tõestati, et vastuvõtlikkus teledermatoloogia teenuse juurutamisele Eesti koolides kooliõdede, dermatoloogide ning õpilaste seisukohast lähtuvalt on arvestatav. Käesolev lõputöö on kirjutatud inglise keeles ning sisaldab teksti 45 leheküljel, 4 peatükki ning 14 teemaga haakuvat joonist.

List of Abbreviations

EHIF – Estonian Health Insurance Fund

GAGS – Global Acne Grading System

GP – general practitioner

IT – information technology

NAO – National Audit Office

RT – real-time

SAF – store and forward

TA – thematic analysis

YLL – Years of Life Lost

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Introduction

Acne is a chronic long-term skin disorder that occurs when hair follicles become clogged up by oil from the skin and dead skin cells. Although acne frequently also continues into adulthood, it is a disease that is more common among adolescents, with over 80% of females and 90% of males being affected by the age of 21 years [1]. In Estonia, the problem is most common between the ages of 15 to 19 year. Based on the data provided by Estonian Health Insurance Fund, there were 14 294 acne diagnosis among Estonian individuals in 2017, from which 35% were made among the 15-19 year olds adolescents.

Although acne problematic skin conditions could easily be noticed, the problem is often undertreated. The reasons for that are believed to be difficulties for reaching specialist care or the lack of knowledge among individuals, which causes the situation where acne is often misunderstood and handled as a cosmetic problem. Untreated, acne can lead to significant physical, social and emotional problems. Studies have found that about 38% of acne patients reveal the signs of depression and 34% state that they have felt anxiety. Furthermore, 21% of patients who reported depression, had also suicidal thoughts. [2] Addressing and solving these problems at the younger ages could significantly prevent serious effects of untreated acne.

One of the great influencers of misunderstandings regarding acne is the source from where the information is obtained. Due to several barriers, including heavy workload of doctors, long waiting times or personal reluctance of young patients to seek the physicians' help, medical counselling may often be hard to reach and therefore instead of medical professionals, family, friend and Internet have been found to be the main educational sources for the young individuals regarding questions about acne. [3] Within educating teenagers about acne, it is essential that the information they receive would also be relevant and in accordance with their personal condition. With unprofessional advice from family, friends and Internet, the relevance of information can be questionable and

so for receiving the most precise information about acne and its management opportunities, physicians' assessment is needed.

Due to the fact, that acne is most common among school children, acne-related health education is also needed in school settings. Closest medical caregivers for numerous school children are school physicians, therefore it is important that the medical staff in schools would be sufficiently aware about the concept of acne and its management opportunities. Despite that, school doctors and nurses are usually not involved in adolescents' acne management processes or even mentioned among the sources from where adolescents obtain their information about the problematic skin conditions. One of the reasons for that is believed to be a deficiency in acne-related knowledge among school nurses [4]. Therefore, it should be explored, whether specialists, in this case dermatologists, should be included to support the school nurses within the management processes of acne-related problems in basic, secondary or vocational school settings.

Teledermatology is an application which allows the visual communication between different physicians to exchange skin-related medical information over a distance. In this master thesis, the susceptibility towards the store-and-forward mobile teledermatology to exchange digital images of students with acne between school nurses or and dermatologist is assessed. There are no previous studies that address the usage of teledermatology within the secondary school settings, for enabling better cooperation between the school physicians and other health care professionals (GP, nurses, dermatologists). Therefore, the author seeks to explore if teledermatology could be an effective opportunity to increase the knowledge and specialist accessibility for the adolescents suffering from the problematic skin conditions and improve the overall healthcare provision in basic, secondary and vocational school settings.

The aim of this study is to assess the implementation needs and perception towards teledermatology for managing symptoms of acne between school physicians/nurses and dermatologists. For reaching the results of this master thesis, as well as to gather additional knowledge about the overall situation of acne and its management, needs and opportunities among the Estonian school students, mixed research methods are used. A cross-sectional study was conducted among school nurses using a self-reported questionnaire. For evaluating the perspectives of pupils another self-reported questionnaire was composed. For receiving specialist feedback about the topic,

a semi-structured interview with dermatologist, with previous acne-related teledermatology experience, is included.

The present thesis is divided into four main chapters. First section gives an overview about the concept and epidemiology of acne disease as well as addresses the problem and its management necessity among Estonian school students. The second section specifies the design of the study with describing the analyzing methods which were used for gathering the results of this master thesis. The results of this research are elaborated in the third chapter and topic-related discussion is carried out in the fourth paragraph. The thesis is guided in with the introduction and closed with the conclusions. Additional illustrative information is added with appendices. All the materials composed by other authors are cited under the section of references.

As no similar data has not been collected in Estonia, the findings from this master thesis will provide the unique information and broad overview about the prevalence, severity and management of acne to improve the treatment opportunities and increase the professional medical help accessibility for students affected by acne disease in Estonian school settings.

1. Background

1.1 Acne – a clinical problem

Acne, also known as *acne vulgaris*, is a long-term skin condition that occurs when oil from the skin and dead skin cells clog up the hair follicles [5]. It is a chronic inflammatory disorder of the pilosebaceous follicle, characterized by papules, cysts, comedones, nodules, pustules, and scars. The pilosebaceous follicles are generally associated with large grease-producing (sebaceous) glands. These specialized follicles are usually concentrated on the chest, back and face, which explains why acne occurs mainly in these areas. [6] Schematic picture describing a cross section of a pilosebaceous follicle is shown on the Figure 1-1 [7].

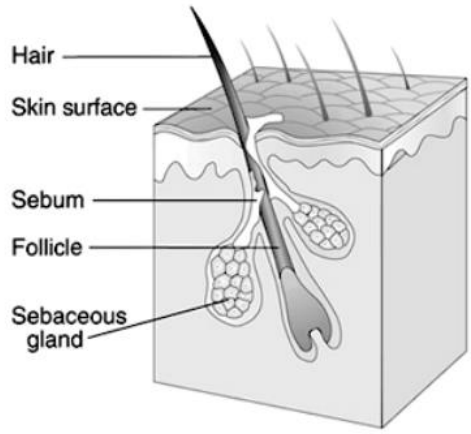

Figure 1-1. Schematic picture of pilosebaceous follicle [7].

In 80% of acne cases, the problem is associated with genetic predisposition [8]. The problem is often amplified during the puberty by the hormones such as testosterone. Common factor for acne condition is also an extensive growth of bacterium called *Propionibacterium acnes*. [9]

Although acne also frequently continues into adulthood, it is more common among the youngsters, affecting about 85% of adolescents in the ages of 15 to 17 years

[5]. Despite the fact, that acne does not cause any serious health threat, it is a disease that may last for many years and could therefore cause permanent scarring and emotional distress for the individuals suffering with this problem. Acne patients who are assessed at tertiary care centres are prone to anger, anxiety, social withdrawal and depression. These psychological and social emotions have been stated for being similar to impairments associated with arthritis, asthma, epilepsy and diabetes. [9]

1.1.1 Clinical assessment and management of acne vulgaris

Diagnosis for acne condition can be made readily. Acne is characterized by morphological features, such as closed and open comedones (whiteheads, blackhead), nodules, pustules and papules. Within the natural course of the disease, acne lesions may vary in numbers and therefore for measuring clinical severity of acne, numerous measurements, based on photographic documentation and clinical examination, has been developed. [10] The grading of acne severity is generally based on the assessment of type, number and distribution of acne lesions. Such grading is useful for helping physicians to decide, which specific therapies and treatments are needed for each individual.

The severity of acne vulgaris may vary notably from the mildest comedonal conditions to a severe and debilitating forms [9], [12]. However, no grading system has generally been accepted, The Global Acne Grading System (GAGS), first developed by Doshi and Colleagues, is widely used because its simplicity compared with other more elaborated acne grading systems [12]. According to this quantitative scoring system, acne was graded as mild, moderate, severe and very severe [13].

The mildest form of acne is comedonal acne. It is characterized by the occurrence of inflammatory lesions. [10] Besides comedones, smaller pustules and papules (Appendix 1) may also be present in small numbers (generally <10) [9]. In case of moderate acne condition, moderate numbers of comedones, pustules and papules occur (10-40) (Appendix 2). With moderate stage, symptoms of mild acne disease can also be noticed. When dealing with severe acne disease numerous pustules, papules and comedones are present (40-100), also up to 5 deeper and larger nodular inflamed lesions can occasionally be noticed (Appendix 3). Back, chest and face are areas where the spread of acne disease is usually the widest. The most severe form of acne disease is described with many painful and large pustular or nodular lesions, also numerous smaller pustules, papules and comedones are therefore present (Appendix 4). [9]

Numerous treatment possibilities are used to manage different conditions of acne disease. Besides variety of medical procedures and medications, lifestyle changes, including eating habits, are important aspects to focus. For example, eating fewer carbohydrates like sugar may help to decrease the severity of acne disease. [14] Commonly are used treatments that are applied directly to the problematic skin. Popular are for example products such as salicylic acid, benzoyl peroxide and azelaic acid. Although antibiotic therapy may result the resistance to prescribed antibiotics, it is still widely used treatment option for acne. Both antibiotics as well as retinoids are available in formulations that can be applied directly to the skin or used for the oral acne therapy. In some cases, when managing acne among women, several types of birth control bills are also used. [15]

To decrease the overall long-term disease management impact and reduce the possibility of complications, which may be resulted by the disease, aggressive treatment should be applied for the individuals suffering from acne already at the early disease formation stages [16].

1.1.2 Epidemiology of acne in the world

Over the years, acne has been represented among the top three most prevalent skin conditions in the general population, as cited in the studies within the France, USA and the UK [17]–[19]. Similar findings can also be noticed among young adults from other countries [8]. According to the findings of The Global Burden of Disease, acne was estimated to affect 605 million people globally in 2005. In 2015, the number of people affected by acne was even higher, showing almost 633 million acne cases globally and with prevalence rate such as 9.4%, was therefore ranked as the eighth most prevalent disease worldwide [20]–[21].

While acne can frequently continue into adulthood, it is a disease that is more common among adolescents, with over 80% of females and 90% of males being affected by the age of 21 years in England [1]. As stated in several findings from USA and China, some degree of acne affects nearly all adolescents between the ages of 15 and 17 years and with 15-20% of acne cases the disease is being estimated as moderate to severe stages [22]–[24]. Previous research by Luky et al. noted that 78% of girls between the ages of 8 and 12 years revealed signs of acne [25]. Another study from the same group of researchers showed that the severity of acne disease had a correlation with pubertal

maturation, with 50% of boys between the ages of 10 and 11 years having at least 10 comedones [26]. From the results of these studies appeared that the severity of acne increased with advancing puberty and maturity among both boys and girls [25], [26]. Males usually self-report acne at a lower rate than females, but population based studies address severe acne to be more common among males, particularly within adolescents between the ages of 15 to 18 years [27], [28]. Study carried out among women from USA, England, Italy and Japan revealed, that although the prevalence of mild acne was highest among women between the ages of 21-30 years, the clinical condition of this disease was more common among the woman included in age group 16-20 years [29].

The Institute for Health Metrics and Evaluation at the University of Washington has evaluated acne demographics and impact during the years of 1990-2013. Finding reveal that both men and women are suffering from acne the most during the ages of 15 to 19 years in Europe (Appendix 5). Within this age group, the measured peak rate among men was 395,5 years of healthy life lost per 100 000 people. With the peak rate such as 365,9 per 100 000 people, the prevalence of acne was somewhat lower among women. [30]

According to the data gathered from the Estonian news portal *Terviseuudised*, there are more than 700 000, therefore more than 90% of school students who suffer from acne in Baltic countries (Estonia, Latvia, Lithuania). In Estonia, the estimated number of students affected by acne is almost 142 000 and for many the disease also continues into adulthood. [31] Among Estonian adolescents, acne is the most common between the ages of 14 to 18 years. [32] Due to the matter that no other public statistics could be found about the situation and prevalence of acne within Estonian context, an information request to Estonian Health Insurance Fund (EHIF) was performed.

Based on the data provided by EHIF, there were 14 294 individuals, who had received treatment in 2017 and who had acne diagnosis in their patient history since 2010. From these diagnosis, 9673 were addressed to women and 4621 for men. [33] When comparing the prevalence of acne diagnosis by sex throughout different age groups, the ages between the 15-19 years occurred to be the most problematic for both men and women in Estonia (Appendix 6).

1.2 Managing acne among adolescents

1.2.1 Awareness of acne

Acne is frequently misunderstood by both medical community and those affected by this disease. It is often considered as a cosmetic problem or a normal part for the adolescents' development and growing up processes. While the concept of acne remains to be unclear for numerous individuals, the physical impact and significant psychological burden can cause serious distress for adolescents suffering from the problematic skin conditions. Previous findings state that acne is a disease associated with increased psychological morbidity, which has a great impact on the lives of young individuals. [1], [8], [34]–[37] Also, the severity of acne has been associated with worse psychological impact [32]. A study which assessed the prevalence of mental health problems in acne patients found that 38% of acne patients were at the same time suffering from depression and 34% revealed the signs of anxiety. Furthermore 21% of all patients who reported depression had suicidal thoughts. [5]

It has been stated that 50% of patients with acne know little or do not know anything about the condition they are facing [3]. The study from the Saudi Arabia showed, that from the 440 included students only 31,2% considered acne as a disease and 26% of students could identify it as a chronic condition [38]. The lack of knowledge about acne-related topics has also been highlighted in surveys conducted among the Chinese and New Zealand adolescents [4], [39].

Within educating teenagers about acne, it is essential that the information they receive would also be relevant and in accordance with their personal condition. Although the issue has not been investigated further in European countries, a study among Chinese adolescents showed, that the knowledge about acne was mainly obtained from the parents. Information about acne was also received from the classmates and Internet. [3] Other studies claim doctors to be the primary source of information [40]–[41]. The reason for the parents being primary source of information was believed to be the lack of family doctors and difficulty of getting a dermatologist appointment [4].

Due to heavy clinical loads and extremely high prevalence of acne among school, children specialists might not reach every adolescent, especially when the young individuals do not realize to seek medical help by themselves. The matter therefore leaves parents, friends and Internet still as the primary information sources for adolescents to gain knowledge about their skin problems. However, a question arises at this point - why school physicians or teachers were not mentioned as any kind of information source in any of these previously presented studies? Possible answers could be that high workload does not allow school physicians to provide health education and additional attention for the matters concerning the problematic skin conditions or the overall knowledge is deficient among the school physicians to manage the problematic skin conditions within their work settings. [4]

When being in a transitional phase from the childhood to adulthood, with several physical and biological changes starting to appear, adolescence is important as well as insecure development stage in most of the people's lives. Since people in this period of growth are usually vulnerable both psychologically and socially as well as know a little or do not know anything about acne, the potential harm without the proper professional guidance and early treatment could be significant. [12], [4] Numerous studies have investigated the prevalence, severity and the effect of acne among the adolescents but the lack of knowledge remains about the perception of acne among both adolescents and those responsible for their well-beings [1], [4], [5], [16]–[23], [25]–[32], [34]–[37].

Epidemiological studies, which assess if and how to educate adolescents and those responsible for providing guidance and care, are needed, as well as school physicians' perspectives and involvement within this matter should be set under further observation [4], [30], [42].

1.2.2 Communication barriers between adolescents and medical workers

Although there are millions of office-based visits among the individuals between the ages of 15 to 19 years, the most frequent presentation for the treatment is 24 years. It is also stated that 10% of visits for treatment are taking place when the patients have reached the ages of 35 to 44 years. [5] Despite the high prevalence, youngsters often do not consider acne as a medical condition, also studies in America have stated the rates of seeking help being less than 20% [43]. Several studies have revealed that misconceptions,

stigma and embarrassment are factors that likely prevent adolescents from seeking help for their problematic skin condition. Common problem with acne treatment is low adherence, particularly with the cases where the results of following treatment are slow. [44] 24% of young individuals do not follow their treatment plans properly because of their forgetfulness or due to the side effect, such as dryness and redness of skin, that provoke them to give up the ongoing treatment [45]. Barriers for seeking help for the acne treatment have also been the concerns about the overall consultation confidentiality and difficulties for reaching the general practitioners [46].

Several previous researches have highlighted that although young people would like to receive help for their health concerns, they often do not turn to their doctor with their problems [47]–[49]. A recent study from the UK also stated that majority of adolescents with severe acne condition do not turn to the doctor with their skin problem. The reasons that were mainly given by the adolescents included the feelings that their acne was not severe enough and the embarrassment over their problem. Answers that their doctor was too busy or unapproachable were also noted. [30] These findings have been repeatedly reproduced by other previous surveys [31]. Literature also shows that anxiety, specifically associated with acne, can impact young individuals in seeking help from the medical professional in the first place [32].

1.2.3 Managing acne among adolescents in Estonia

Dermatologist Dr. Kairi Nurm from The North Estonia Medical Centre stated in an article about the consequences of acne, as well as numerous previously presented studies have shown [24]–[27], [34]–[48], that with the cases of acne, the problem is not just cosmetic and the right way to handle it would be a referral to a doctor's appointment. Dr. Nurm added that there is a possibility that acne disappears also by itself but if the treatment is not found in time, scars or other effects of acne, which are later very difficult to treat, might occur. [28]

According to the data received from the EHIF, 36% of the patient with acne diagnosis have also diagnosed with some form of psychological disorder (F00-F99) at some point in their lives. Two studies have been carried out in Estonia, in which psychological impact of chronic skin diseases, including acne, has been studied. One of them compared the emotional state of severe acne patients within the same age group in

general population and observed the changes of feelings before and after the skin disease treatment. Results revealed that before the treatment, patients with skin diseases had significantly higher levels of depression, social anxiety, tiredness and insomnia than after the treatment was applied. [50] The second study also reflected the considerable emotional impact of skin diseases and associated acne and several other skin diseases with neurotic symptoms of personality traits [51].

As stated by Dr. Nurm, adult acne is increasingly noticed by the dermatologists in Estonia, therefore it is necessary to treat pimples and problematic skin conditions already at the younger ages. Addressing and solving the problems with acne among teenagers could significantly prevent several effects of untreated acne, such as scars on face, and therefore distressing impact that complication of untreated acne is believed to have on the well-being and confidence of individuals [1], [4], [5], [37]–[41] could be avoided. [28] For the most effective management of acne, the problem must be detected at its early development stages, therefore it is necessary that the knowledge about the disease among young individuals would be sufficient and the information provided to them also accurate. For receiving the most precise information about acne and its management opportunities physicians' assessment is needed.

Due to several barriers, including heavy workload of doctors, long waiting times or personal reluctance of young patients, medical assessment may often be hard to reach. However, it is unclear why school physicians or nurses who are one of the closest medical workers for the most school children, and could therefore play an essential role in guidance and management processes for adolescents affected by acne, have not been included or have hardly even mentioned within this subject. Previous studies have assumed the reasons such as high workload of school physicians that does not allow them to provide health education and additional attention for the matters concerning problematic skin conditions or the overall knowledge is deficient among the school physicians to manage problematic skin conditions within their work settings. [4,] [45] The exact proven justification about the management of acne in schools and issues that arise within this matter remain yet unknown at both global as well as Estonian level. There are no reliable information or previous studies to address, where the management of acne in schools and issues related to it would be described from the school medical workers' perspectives and therefore further investigation within this subject is more than needed.

Issue that also arises within the overall disease management processes in Estonian schools is that even if the adolescent is directed by the school physician to the specialist for further assessment, the referral to the doctor's appointment is often not followed. An analysis by the National Audit Office of Estonia (NAO) showed that in 2014 the most referrals by the school nurses were done to the ophthalmologist's, dentist's and family doctor's offices. Among these referrals 48% reached to the ophthalmologist, 65% to the dentist and 41% to the family doctor. Only 50% among all the children who were directed to the doctor's appointment went to seek for the help they were recommended. Reasons were stated to be poor access to specialized medical care (distance, long waiting lists), insufficient information movement between different professionals and parents as well as ignorance and/or carelessness of parents. Similar results can also be expected within referrals made for other health problems, including problematic skin conditions and acne. [52]

Although the reasons why the school physicians are almost fully not included to the acne management processes should be investigated beforehand, the need for measures that could improve the disease management arrangements in Estonian schools can already be noticed. One way to improve information movement and the assessment capabilities in Estonian schools could be the implementation of telemedicine services, such as teleconsultation, between the school nurse and other health care specialists.

1.2.4 Telemedicine as a supportive tool for school physicians/nurses

Telemedicine, as stated by the Word Health Organization, is a term for healthcare communication technologies to provide the exchange of medical research, prevention, treatment, education and evaluation from a distance [53]. One of the first telemedicine services, originated in 1995, has been teledermatology [54]. With teledermatology, telecommunication applications, visual and audio communication are used to exchange medical information concerning problematic skin conditions over a distance. Due to a visual characterization applied in dermatology, it is a well-suited branch of medicine which to use in telemedicine. The extent of skin lesions and colors of the skin provide clues and indications for accurate diagnoses for rashes and lesions. [55] Teledermatology can be classified by its usage purposes: education, follow-up, triage and consultation. Also, by its usage for rashes and wound treatment, screening (of melanoma), obtaining second opinion from other physician, knowledge exchange between different

professionals of healthcare and referrals prevention. [56] Besides melanoma, wounds and rashes, teledermatology has been found to be effective management tool also for acne disease cases [57]. Treating dermatological conditions, concerning diagnosis, management and clinical outcomes, with telecommunication applications, has proven to have comparable accuracy rates with usual in person face-to-face healthcare provision procedure [58] s.

Teledermatology is currently used in all kinds of different medical settings, including primary care, hospitals, home care and nursing. Teledermatology is applied in countries (e.g., USA, Netherlands, Switzerland) which are known for their capacity limits for dermatologic consultation or/and for long waiting times for patients, to reduce these mentioned limitations for the healthcare delivery processes. It has also been used in maritime and military settings as well as delivering care to patients in developing countries, where the is no proper access to (dermatologic) care. [59]–[61]

There are three main teledermatology modalities: real-time (RT) interactive, store and forward (SAF) and hybrid (combined with RT and SAF). In dermatology, the most used modality is SAF. [58], [60]–[62] With store and forward modality, high quality digital images are exchanged between general practitioner or nurse and a dermatologist. SAF technology is characterized as time independent, making it more flexible in practice when its usage can be fitted conveniently into physicians' daily workflow. It is proven that tablets and mobile phones can be used effectively for exchanging dermatological images between different physicians, making the usage of the teledermatology even more user friendly and convenient. [63]

Although, there are no previous studies, which address the usage of teledermatology within the secondary school settings to enable better cooperation between the school physicians or school nurses and other health care professionals (GPs, nurses, dermatologists), the author argues, that it could be an effective opportunity to improve the healthcare provision in secondary school settings, with increasing the knowledge and specialist accessibility for the adolescents suffering from the problematic skin conditions. Since no existing information can be addressed about this kind of intervention within school institutions, the perception towards teledermatology for managing acne between school physicians/nurses and will be analyzed in this research.

2. Methodology

2.1 Study design

The aim of this study is to assess the implementation needs and perception towards teledermatology for managing symptoms of acne between school physicians/nurses and dermatologists. This study has set its focus to evaluate the current situation and opportunities in management methods of acne-related conditions in basic, secondary and vocational school settings. The age group that was under the investigation of this thesis, was limited to 15-19 because incidence of acne in Estonia is greatest among the individuals between the ages of 15-19 years.

For evaluating the situation within this age group, four information sources were used. 1) Data was gathered from the school medical workers who have the biggest responsibility for health care provision in Estonian school settings, also one of the closest medical care givers for most of the adolescents between the ages of 15-19 years and therefore the most valuable information source within this study. 2) For receiving a broader overview about the topic, information from the individuals who are currently acquiring or have already finished their studies in basic, secondary or vocational school settings were included. 3) Specialist's viewpoints were gathered from the dermatologists. 4) Supportive knowledge from previously conducted studies was also included to the discussion. The credibility and suitability of previously conducted studies as well as the suitability of questionnaires and interviews used in this paper are critically assessed by the author of this thesis and are considered as sufficiently valid information sources which to use during the formation of this master thesis.

As the management of acne-related skin conditions involves several different parties (school physicians/nurses, doctors, students), the topic itself should be analyzed by combining different viewpoints from these mentioned stakeholders. Although the main focus of this study is to assess the needs and perception towards the teledermatology

for managing symptoms of acne between school physicians/nurses and dermatologist, supporting aspects and additional questions are also included. Due to the fact, that there are no previous studies assessing acne prevalence and management among Estonian adolescents, supporting questions are needed to create connections and draw conclusion with other topic-related surveys carried out in other countries worldwide.

Both qualitative and quantitative data is analyzed and mixed research methods are used in this paper for combining different viewpoints of the topic-related stakeholders as well as information gained from previous studies.

2.2 Methods

Three different research methods (questionnaires, interviews, document analysis) were used to gather the information necessary for understanding the needs and perception towards the teledermatology for managing symptoms of acne between school physicians/nurses and dermatologist. The methods used in this paper are chosen by the author based on the aim and research questions stated for this master thesis. Although other methods, for example meta-analysis, were considered within the creation of this research, due to the scarcity of suitable previously conducted studies, author decided to gather the information from the topic-related stakeholders directly and therefore besides existing materials, questionnaires and interviews were included. A cross-sectional study was conducted among school nurses using a self-reported questionnaire (Appendix 7). For evaluating the perspectives of pupils another self-reported questionnaire was composed for individuals with basic, secondary or vocational school background (Appendix 8). For receiving specialist feedback about the topic, a semi-structured interview with dermatologist, with previous acne-related teledermatology experience, is included. Although there are no previous studies that address acne-related topics in Estonia, suitable and reliable literature about acne could be found from other countries worldwide. [1]–[30], [34]–[49], [53]–[63]

Both qualitative and quantitative data will be gathered with these research methods. All the information collected will be combined to draw the conclusions and summarizing results for reaching the aim stated for this master thesis.

2.2.1 Questionnaires

Two separate questionnaires were composed for assessing the severity of acne-related problems, its current handling needs and opportunities as well as its future management possibilities within the Estonian school settings. With these questionnaires two different stakeholder positions, essential from school settings perspectives, were assessed. First questionnaire was addressed to school nurses/physicians' who play a great role during the school adolescents' health management processes (Appendix 7). Besides school nurses/physicians' perspectives, student viewpoints were also very important to take into consideration and so the second questionnaire was addressed to individuals with former or current background of basic, secondary or vocational education (Appendix 8).

For measuring the consistency and accuracy of the questionnaires conducted within this study, several validity and reliability methods were applied. Methods for testing the validity of the questionnaire were chosen among both theoretical as well as empirical subtypes of validity test forms [64]. From theoretical construct face and content validity were applied [64], [65]. With face validity author and her supervisors assessed if the measuring items (questions) will match with the stated thesis concept and with the objectives stated for the questionnaires. Within the development of content valid instrument author and her supervisors reviewed all the items of the questionnaires for clarity, readability and comprehensiveness to reach an understanding and agree, which questions should be included to the final version of the questionnaires. To measure how well the findings from questionnaires stack up against other instruments, criterion-related validity from empirical construct was used. [66], [67] Reliability of the questionnaire was assessed with using the alternate-form reliability method [68], which was measured through two types of questionnaires with similar research objectives but among different group of respondents.

After receiving the responses from the participates, data analysis was conducted to enable relevant further conclusions towards the aim of this master thesis. Data analysis within these questionnaires included data validation, response clustering and data coding. The reason for data validation was to ensure that the questionnaires transmitted were complete and the questions included to further analysis answered by the considerable number of participants. For simplifying the analysis process, response partitioning and data coding were applied for both closed and open-ended questions. Unlike closed-end

questions, open-ended questions were more difficult to code since the author's expertise to ascertain if one response is equivalent to another was needed. Data was classified with nominal analysis (gender, age, region affiliation) [69]. Computing for the proportion of variables was included within standard data analysis [70]. As both qualitative and quantitative data was gathered with these questionnaires, the qualitative aspects of the survey were in most cases connected with the numerical data (for example responses and the number of respondents) for statistical analysis with an aim to help the author to draw the right conclusions and inferences for this master thesis. The main type of variables used in this study were discrete variables. After the gathered data was processed, descriptive statistical analysis as well as comparative analysis were applied for making connections and drawing conclusions with including the findings from other previous studies from other countries. [69]

2.2.1.1 Questionnaire for school physicians/nurses

In order, to target the main aim of this study, two objectives were stated for the questions addressed to the school nurses. Primary objective of the school nurses' questionnaire was to investigate the prevalence, current and future management needs as well as opportunities of acne-related skin conditions within the Estonian school settings. Points highlighted under the primary objective were essential to ascertain the secondary objective of this questionnaire, which had an aim to find out school nurses perspectives towards the needs, opportunities and susceptibility of teledermatology technology for managing symptoms of acne between the school physicians and other health care professionals.

Based on the content of this paper and to maximize the information collected with this method, specific criteria were determined for the school physicians' questionnaire. Criteria included:

- All the questions presented in this questionnaire are justified and needed from a perspective of this master thesis. No unfounded questions will be included.
- Questionnaire had to include such questions, which could gather the information, necessary for answering the primary and secondary objectives, that were previously stated for this questionnaire.

- The questionnaire is presented in Estonian language and is only meant for gathering the answers form Estonian school physicians (doctors/nurses).
- School physicians will be contacted through school health service providers. The online questionnaire link will be sent electronically to all the school health service provides, with an aim to gather the answers from school physicians from different locations across the country.

Due to the fact, that there are no previous studies conducted among school physicians that would exactly match with the topic handled in this paper, preassembled questionnaires could not be found and so the main structure of the questionnaire was composed by the author of this thesis. When keeping in mind the aim of this study and objectives stated for this method, the questionnaire was built upon a topic-related knowledge gained from previous literature from other countries. After the first version was established, the questionnaire was transmitted to the leading nurses of Tallinn Health Care at School Foundation to receive the professional feedback for further question improvements. In cooperation with leading nurses several corrections were made and the final version of questionnaire was accomplished.

The questionnaire consisted of nineteen optional questions, including both closed (16) and open-ended (3) answering possibilities (Appendix 7). Questions were divided into three main sections. Questions 1-2 had an aim to provide the information about the prevalence of acne in Estonian school settings. Following 3-12 were targeted towards the acne management processes and questions 13-19 were seeking the knowledge about the needs, opportunities and susceptibility of teledermatology technology for managing symptoms of acne in schools from school physicians' perspectives. Although all the questions presented in this questionnaire were optional, specialty (doctor/nurse), age, region (county, city) and the number of students managed by the respondent were required to be filled beforehand.

For reaching the school physicians more easily and faster, the online questionnaire link with topic-related explanations about this master thesis were firstly electronically sent to school health service providers with an aim that this information would be then forwarded to school physicians by the institution to which they are currently working for. A complete list of Estonian school health service providers is publicly available in the Estonian Health Board online database.

2.2.1.2 Questionnaire for pupils

The primary objective of the second self-reported questionnaire was to investigate from adolescents' perspectives how and in which extent school physicians should be included into school children's acne-related problematic skin conditions management processes. Also, what is the current situation regarding with this matter. For the purpose to support the primary objective of this questionnaire also, to provide a valuable information for the entire study, secondary objective was stated with an aim to gain knowledge about the prevalence, severity as well as help seeking behaviours towards symptoms of acne among Estonian school children. The criteria for this method included:

- Questionnaire is conducted in a way it could provide all the information necessary for making the conclusions about the previously stated objectives and give a maximum value for the entire thesis, without no unjustified questions added.
- The questionnaire is presented in Estonian language and is only meant for gathering the answers form Estonian citizens with the educational background from basic, secondary or vocational school settings.

Although there are no previous questionnaire templates that would entirely cover the criteria stated for this questionnaire, mainly because school physicians' involvement within acne-related concept has not yet been discussed in depth, several valid questionnaire examples can be found about topics regarding acne prevalence, severity and help seeking behaviours of young individuals. While keeping in mind the aim of this thesis and objectives stated for this method, two questionnaires from previous studies [2], [24] were combined with author's own questions, included for gathering all the information needed to maximize the outcome of this this method.

The questionnaire consisted of fifteen questions, with both closed and open-ended answering possibilities represented (Appendix 8). Questions 1-4 had an aim to provide the self-reported information about the prevalence and severity of acne-related conditions. Help seeking behavior was examined by the questions 5-9 and following 10-15 were seeking the knowledge about the need for school physicians' involvement within the acne management processes. Although all the questions represented in this questionnaire were optional, gender and age of the respondent were required to be filled

beforehand. Due to the fact, that acne-related issue and its management with IT solutions has previously not used nor investigated in Estonian school settings, and therefore the situation similarly unfamiliar for most of the individuals, no additional age restrictions have been set on the participants. Also, author assumes, that since the questionnaires have transmitted and answers gathered virtually via the Internet, the concept of IT itself is not unknown for the ones enable to participate in this survey.

2.2.2 Interview

A semi-structured interview was used for gathering the information from dermatologist perspectives. Semi-structured interview is a research method for including the questions around the topic and the aim of the study, while keeping the wording for creating the questions and further answering possibilities flexible [71]. Due to the matter that there are no previous topic-related materials which to use for creating the framework of this interview, directing keywords and questions were chosen according to the objectives of this thesis by author herself.

Three main topics were set in focus with the 9 initial questions of this interview. First section of the questions was meant to gather the information about the age-specific prevalence of acne-related skin conditions. The second section observed the matters related to the necessity and current cooperation possibilities between the dermatologists and school physicians. Third set of the questions on the other hand were aimed to seek the knowledge about the needs and susceptibility towards the teledermatology technology for managing symptoms of acne among school children between the school physician and dermatologists.

The criteria stated for this method included the aspect that all the questions presented in this interview are justified and needed from a perspective of this master thesis, therefore no unfounded or off the topic questions will be involved. Secondly, the interview will be only carried out with Estonian dermatologists, who have a previous usage and handling experience with acne-related teledermatology service. Author also leaves herself with the opportunity to change or adapt the questions according to the course of the interview. The interview will be carried out during telephone and e-mail communications.

For analyzing the dermatologists' answers gathered within the conducted interviews, thematic analysis (TA) was applied [72]. The approach consists of six phases. Firstly, author got familiar with the data (reading/re-reading) and then coded the texts provided by the participants. After labeling the data, author searched the themes to examine the collected data for identifying the broader patterns of meaning. In next phase, the collected themes were reviewed to make sure that they fit the dataset and are in accordance with the objectives, previously stated for this interview. Marked out themes were refined and named, some of them discarded, split or combined. In the final phase of TA data extracts and analytic narrative were combined and the analyze itself contextualized with existing literature and other research methods presented in this thesis. Similarly to questionnaires, validity of the interviews was assessed with using the face, content and criterion-related approaches. [66] Also, interviews' reliability was measured while engaging the alternate-form reliability method [68].

2.2.3 Document analysis

Due to the limits of time, finances and human capabilities a great amount of secondary data from previous studies will be compared and used for making the conclusions and receiving the aim of this master thesis research. Searching and reading different documents, studies and records enabled to gain the ultimate broad picture about the overall topic-related issues from different stakeholder perspectives. Also, extracting data around the topic-related matters created the prerequisites essential for choosing out the further research methods (framework of questionnaires and interviews used in this thesis) and exact terms for their implementations for acquiring the needed information, which was not studied, presented or enabled by any of the previous literature sources.

Seventy-two different literature sources were included within the creation of this master thesis. Because of the scarcity of suitable previously conducted studies, no additional limits for the articles' publication dates were set. To avoid mistakes in information interpretation, that might be caused by the language barriers, only literature written in English or Estonian was considered. Although most of the previous studies were originated from foreign countries and were presented in English, five literature findings from Estonia were also included. For reaching the epidemiological data concerning acne-related situation in Estonia context, an information request was made and the knowledge perceived from the Estonian Health Insurance Fund.

With secondary data research, the purpose of the information collection was indicated and determined beforehand. After the sought information was located, the relevance of the source was evaluated. Validity and reliability of previous studies were assessed by the author and her supervisors of this master thesis. Considered were aspects like original purpose of the data collection, when and during which period the data was collected, suitability and size of target population, sampling strategies, protocols for data collection, asked questions, operationalization of concepts as well as shape and form of the data. The credibility of the information was assessed with verifying the credentials of the original researchers, looking for full explication of the research methods and if any problems were encountered within the chosen methods. Also, the possibilities if the handled secondary data had been previously used in any credible published research was discovered. Secondary data analysis was conducted for creating a broad overall picture about the topic in general, as well as to use it as a supportive tool within further primary data analysis.

3. Results

3.1 Perspectives of school nurses

Forty responses were received from the 30-78 years old Estonian school nurses during a three-week answering period. 39 questionnaires were filled online and one form was completed on a printed paper and delivered directly to the thesis author. According to the data received from the National Health Insurance Fund, there are 114 individuals currently working under the school nurse specialty. The survey included the answers from 40 school nurses, who together provide the school healthcare service to 25 161 students from ten different Estonian counties (Figure 3.1-1). Based on the entire number of school nurses and the number of nurses participated in this questionnaire, the calculated rate of responses was 42,4%.

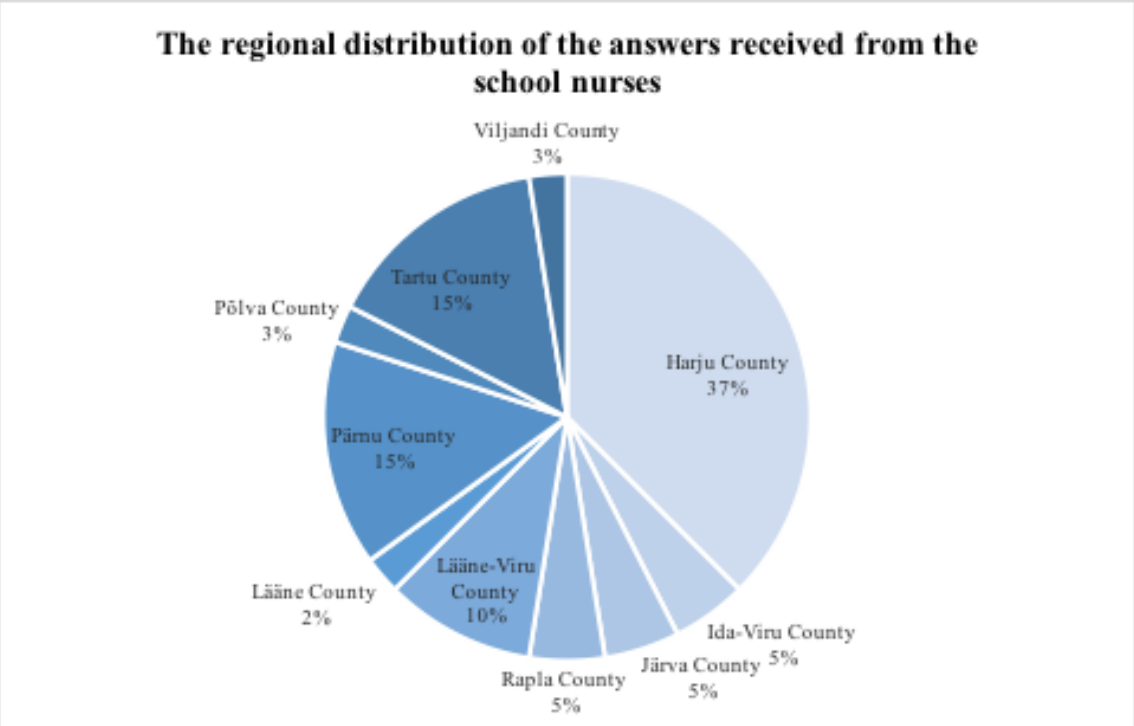

Figure 3.1-1. Responses received from school nurses represented by percentage of Estonian counties.

The results of the questionnaires revealed that acne-related skin conditions among the school adolescents are repeatedly noticed by all the school nurses participated in this survey. 12,5% of the respondents stated that acne-related issues among school students can be noticed every day, 32,5% that the problem can be recognized often (1-2 students in a week) and 42,5% that acne-related conditions occur from time to time (1-2 students in a month). 12,5% of the school nurses therefore noted that only few acne-related skin conditions in a year can be recognized among the school children they are working with daily bases.

The results showed that school physicians meet acne-related problems the most in situations where the students turn to school physicians with other kind of health problems, also during the compulsory medical examination or in the occasions when students seek help for their acne-related skin conditions from school nurses on their own initiative (Figure 3.1-2). The answer: "Acne is noticed when the parent or class/subject teacher turns to school nurse with student acne-related condition", appeared to a lesser extent. One school nurse also stated, that if the student with skin problem is spotted outside the school physician's office, the student will be questioned, whether she/he has sought help for the noticed skin problem. One participated nurse on the other hand marked that she does not have any contact with acne condition in her school settings.

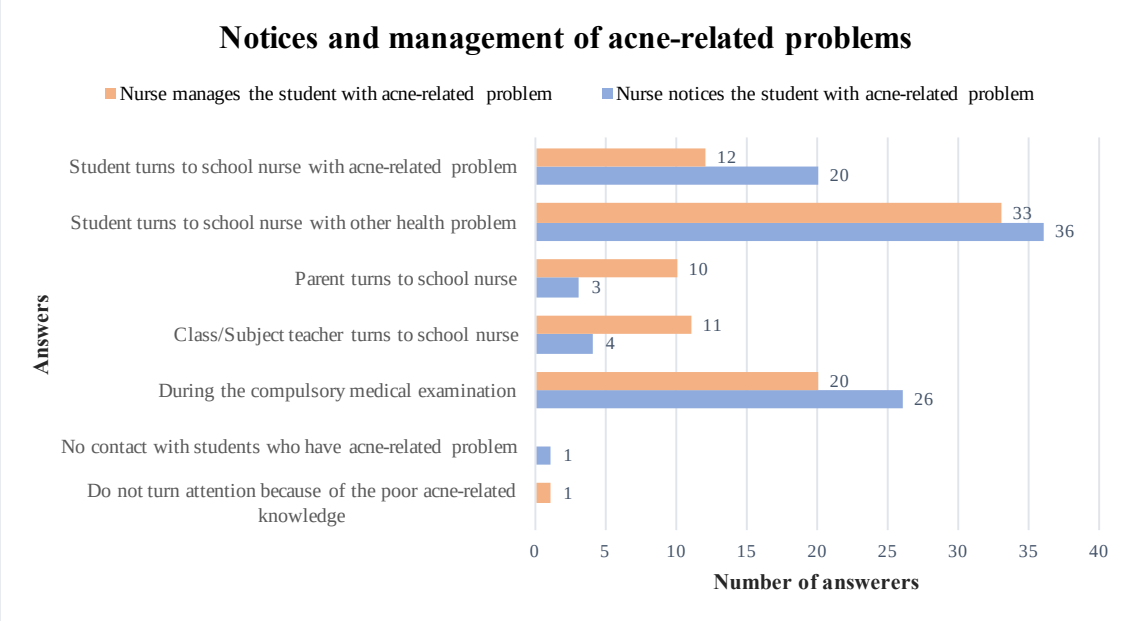

Figure 3.1-2. Notices and management incentives of acne-related problems among school nurses.

Similar pattern of responses can also be noticed within the activities that initiate school nurses to take the management actions among the students with acne-related problems (Figure 3.1-2). The problem is managed the most when the student turns to school nurse with other kind of health problem. The cases where the problem is managed because of acne-related issue is addressed by the parents or other school teachers are represented the least. One participant also noted that the problems with acne are mainly not taken into notice, because of the poor acne related knowledge among school medical workers.

As shown on the chart below (Figure 3.1-3), most of the school nurses choose to direct the students with acne-related problems to family physician (77,5%) or dermatologist (85%) appointments. Few of the nurses would also contact or consult directly with physicians from outside the school themselves (12,5%) or start the issue management with informing the parents of the student with acne-related symptoms (20%). Seven participants (17,5%) on the other hand stated they recommend treatment on their own. Two answers were also entered under the response option "Other". One nurse noted that if the specialist appointment turns out to be hard to reach, the student with acne-related problem would be recommended to contact with cosmetic. Another nurse said they would make the recommendations to use over-the-counter medicines.

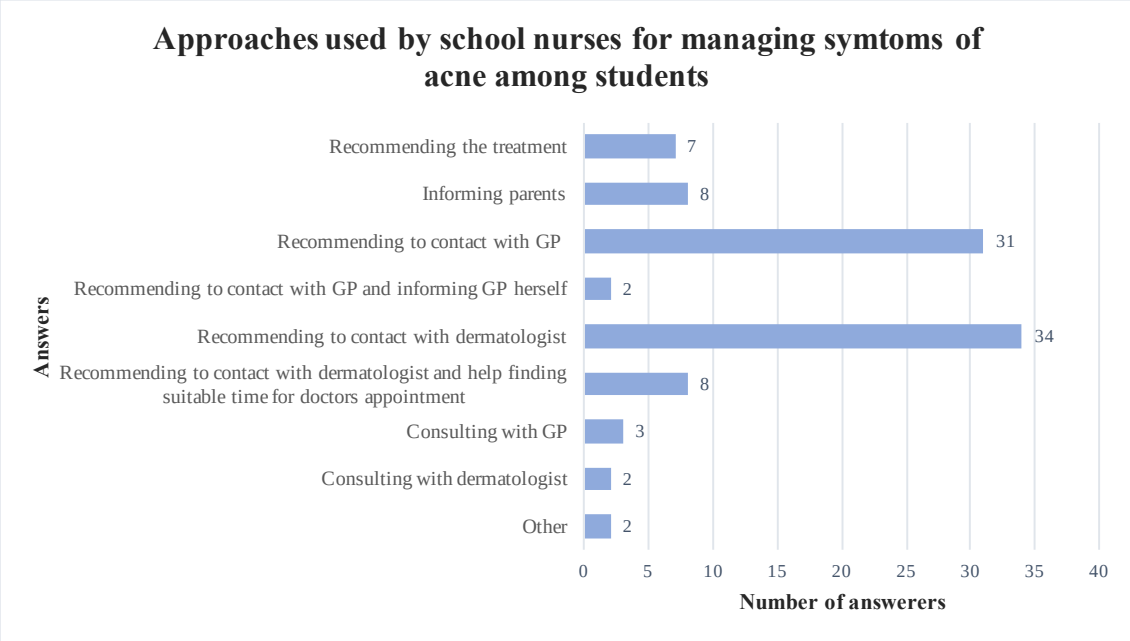

Figure 3.1-3. Approaches used by school nurses for managing symptoms of acne among Estonian school students

The study among the school nurses revealed that 97,5% of participated nurses (39 from 40 participants) have used at least one kind of measure, to manage the adolescents with acne-related condition in their school settings (Figure 3.1-4). Most often, management methods such as referral to doctor's appointment, skin assessment during a compulsory medical examination and student counseling to give recommendations for skin care and further improvements have been used. Almost half of the participated nurses have improved their personal acne-related knowledge with Internet-based materials for enabling students' more efficient skincare provision. Also, dermatologist consultation has been included by several participants to handle the adolescent with problematic skin condition. According to the results, the samples of skincare products have been previously shared among the students by eleven school nurses, therefore one participant added that the sample sharing would gladly be conducted if the samples would reach to school more often. One nurse on the other hand responded that since skin problems, including acne, are not issues for her school adolescents, no student with acne-related problem has previously been managed. One another participant also noted that symptoms of acne are not enough significant problems, which should be constantly handled at schools.

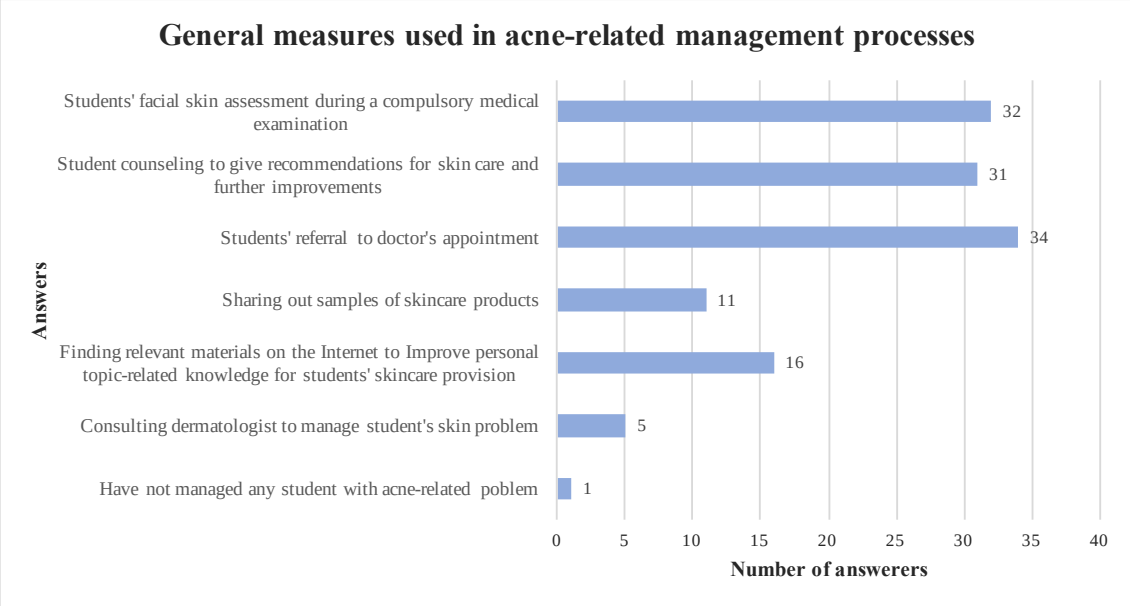

Figure 3.1-4. General measures used in acne-related management processes among Estonian school nurses.

Results revealed that numerous different measures are used for increasing the awareness of skin problems and acne-related topics in Estonian school settings (Figure 3.1-5). Although, the most popular measures are distribution of topic-related pamphlets and the usage of Internet sources, notification posters and topic handling within the

lectures/seminars among both school nurses and students are also considerably applied within several school settings. Individual counselling and referral to psychologist's consultation were additionally represented.

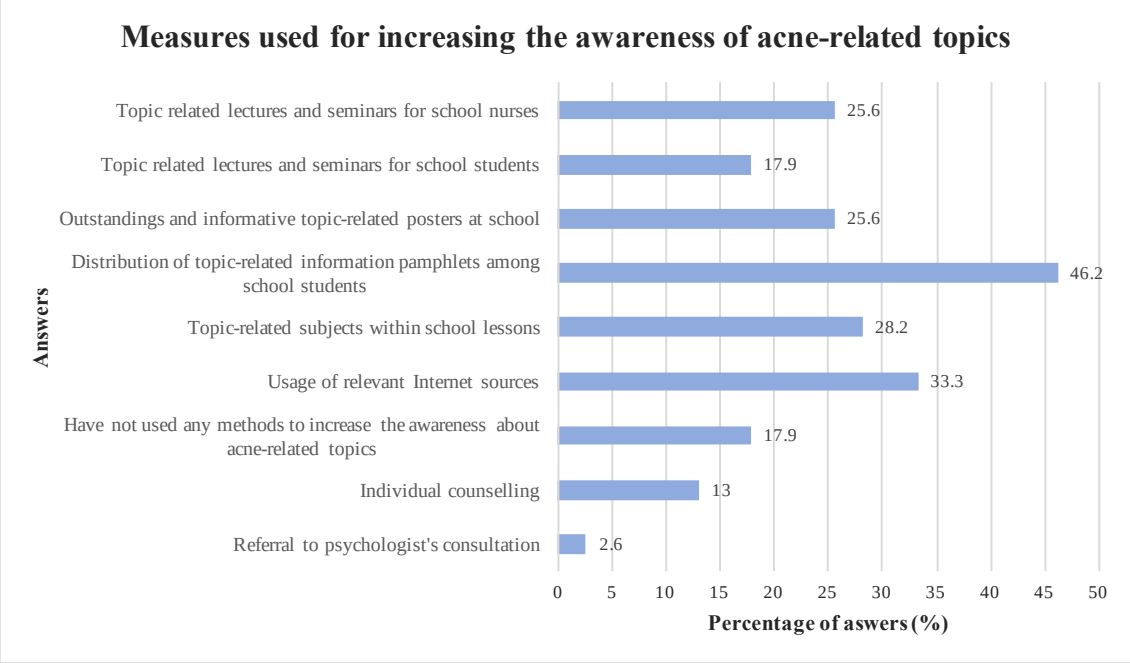

Figure 3.1-5. Measures used for increasing the awareness of acne-related topics within Estonian school settings.

17,9% of the respondents on the other hand stated that no measures have previously been used for increasing the awareness about problematic skin conditions. The justifications for that were mostly the lack of time and deficient topic-related knowledge of school nurses. Few nurses of the overall responses included the reasons that skin problems, including acne, are not that significant issues at this moment in Estonian schools to handle the topic more precisely. Also, one participant added that she has simply just not thought about this topic beforehand. Although both supportive and controversial viewpoints about problematic skin conditions management processes were represented, 95% of the school nurses were still on position that the management of acne-related skin conditions definitely needs (55%) or rather needs (45%) higher attention in Estonian school settings.

The results revealed that 45,2% that the knowledge and training is rather sufficient or sufficient. 42,5% of the participated nurses at the same time believes that acne-related knowledge and training is rather not sufficient or not sufficient. 12,5% of the respondents do not know if acne-related knowledge and training among the school nurses is sufficient or not. In the following question, the aspect if the specialist help outside the school

settings could be receptive or desired way to empower the school nurses and their knowledge within the management of students with acne-related problems, was assessed.

The results showed that almost all the participants find it necessary or rather necessary to promote the collaboration between the school nurses and medical specialists outside the school settings (Figure 3.1-6). Cooperation between the school nurse and GP is stated to be rather necessary or necessary by the 90% of nurses and rather not or not necessary by the 10% of the participated nurses. Cooperation between the school nurse and dermatologist is found to be rather necessary or necessary by the 92,5% of the respondents, only 4,5% of the responded school nurses found the inclusion of dermatologist to be rather not or not necessary.

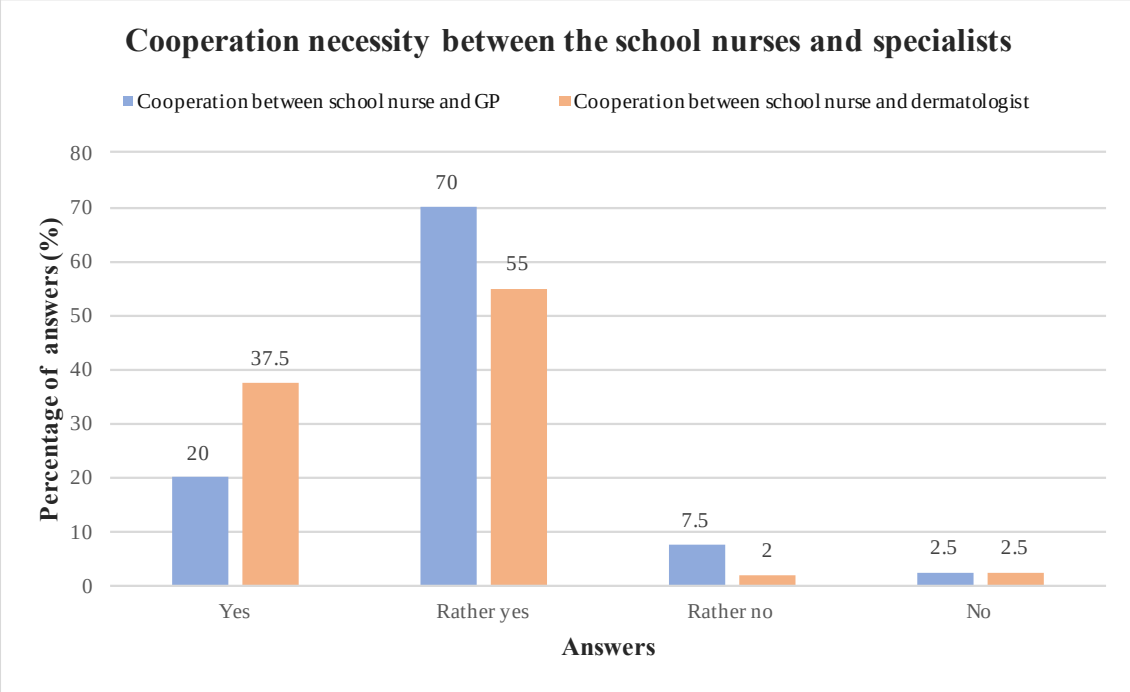

Figure 3.1-6. Cooperation necessity between the school nurses and specialists (GP, dermatologist).

The susceptibility of IT solutions among the school nurses was examined and the gathered results are presented on the Figure 3.1-7. Collected answers showed that besides the desired cooperation with specialists, most of the school nurses would also be open to gain this cooperation with the usage of teleconsultation solution to empower themselves during the acne diagnoses and management processes. Also, most of the participants were in favor of opinion that IT solution would be helpful tools for solving students' skin-related problems in Estonian school settings (Figure 3.1-7).

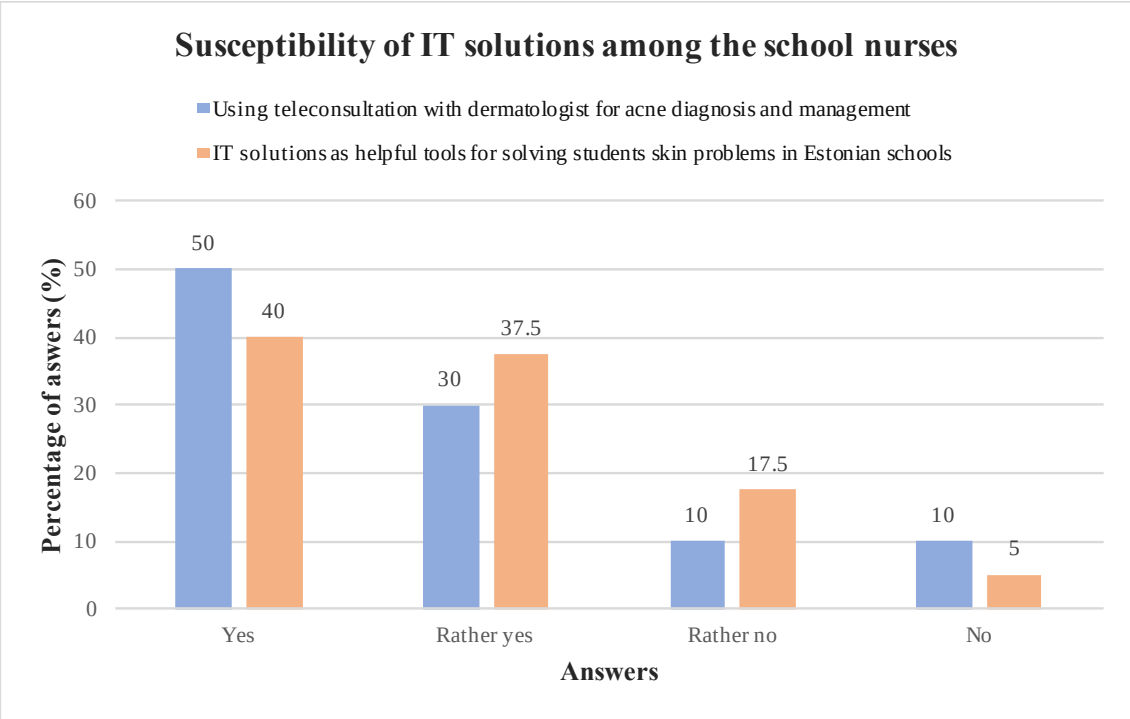

Figure 3.1-7. Susceptibility and usage of IT solutions among the school nurses to diagnose and manage the symptoms of acne in Estonian schools.

Besides having the opportunity to use the teleconsultation service for communicating the dermatologist on daily basis or receiving the specialist's opinion during the students' compulsory medical skin examination, the participants would also like to have an opportunity to use this service for receiving the dermatologist's (56,4%), GP's (53,8%) and pediatrician (35,9%) viewpoints also for other kind of student's health issues. Furthermore, 2,6% of the responded nurses would like to use the service for enabling the communication with psychologists or psychiatrists. One respondent stated that the communication is also needed between the school nurses and orthopedics, another one said that connection with the dietician should additionally be included. Result showed that besides managing acne-related issues with IT solutions, specialist assessment via teleconsultation service should also be involved during the management processes of other kind of skin diseases and different types of students' health issues (Figure 3.1-8). Most noteworthy diseases were obesity and other kind of skin diseases, such as rashes, warts, fungal infections, psoriasis and problems with birthmarks. Mentioned were also hypertension, postural and psychiatric disorders as well as eye diseases and migraine. Few of the school nurses would also like to use the teleconsultation service to communicate doctors within the issues related to prescribed medications and vaccination.

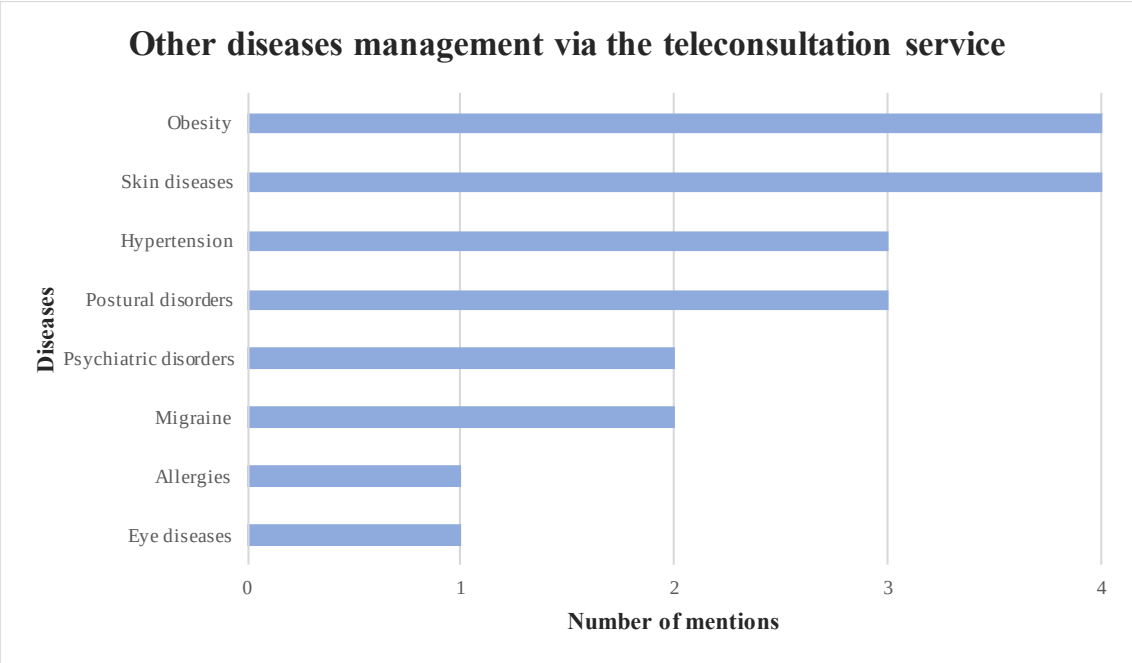

Figure 3.1-8. The possible usage of telecommunication service within the management of other kind of students' health issues.

The answers gathered from the school nurses revealed, that extra value is seen within the implementation of teleconsultation service in Estonian schools. Most mentioned aspects were quick access to doctor's appointment for students, improved quality of medical care and counselling as well as the overall increased accessibility to medical specialist which could at the same time save time and money for students as well as for the medical workers themselves. With the opportunity for specialist's consultation, the knowledge of school nurses about the diagnosis and management of different diseases is believed to be improved and their confidence levels to provide the students' medical care assessment therefore increased. Respondents also mentioned that the teleconsultation service would enable better overview about the students' medical history, their health data further transmission to patient portal *Digilugu* and treatment monitoring when receiving the specialist feedback about the results of referred students. Service value is also seen within the students' quicker access to prescribed medicine (digital recipe) as well as with solving the issues related to vaccination, which occurred to be a problematic aspect in different Estonian schools.

Because of the heavy workload of school nurses, lack of time is believed to be the biggest barrier for the implementation and usage of teleconsultation service in Estonian schools. Due to the matter that almost no previous contact with teleconsultation solutions can be noted in Estonian school settings, deficient knowledge, skills and experience of

school nurses are thought to be problems within this topic. It is presumed that the teleconsultation service will increase the workload of specialists, also that the medical experts do not have enough motivation to use this service for cooperating with school nurses. It was mentioned that outdated information systems may not be compatible with other IT systems and therefore information exchange barriers between the school and medical institutions might occur. Besides insufficient financial resources, issues related to data protection and getting the treatment permission from the school students' parents were also concerns of school nurses participated in this questionnaire.

Almost all the school nurses were on the position that the management of acne-related skin conditions definitely or rather needs an elevated further attention in Estonian school, as well as specialists (GP, dermatologist) involvement within this matter should be included. Although lack of money, time and experience as well as technical and legal issues are believed to become barriers of the teleconsultation service implementation in school, most of the nurses would still like to have an opportunity to empower themselves with this solution to communicate the medical specialists. Considerable number of respondents believe that the teleconsultation service would on the other hand improve and encourage the management of acne-related issues, as well as promote the handling of other diseases (obesity, hypertension, postural disorders) that are common among the adolescents in Estonian. Prevalent concerns related to vaccination and treatment tracking after the student's referral to specialist [50] are also expected to find a solution with the usage of teleconsultation between the school nurses and medical specialists.

3.2 Perspectives of pupils

The aim of this questionnaire was to investigate the adolescents' perspectives how and in which extent school physicians should be included into school children's acne-related problematic skin conditions management processes. 86 responses were received for the questionnaire addressing acne related issues among pupils. Answerers included both men and women, 82,5% and 17,5% respectively, between the ages of 12-45 years. From these 86 respondents, 7 individuals marked that they have not had any acne-related skin problems previously and were therefore eliminated from further analysis. The exclusion was made on assumption that the answers they provided during this survey would have been somewhat different in case they would have had a personal experience

with problematic skin condition during some period in their lives. Further result assessment was conducted with responses from 79 individuals.

According to the results of the pupils' questionnaire, high prevalence of acne-related issues among Estonian individuals could be noticed as well as that most cases the problems with symptoms of acne begin before reaching adulthood. the numbers from Estonia showed that within 36,7% of the cases, the issues with symptoms of acne started already before the age of 13 years, 43% that the problems first occurred between the ages of 13-15 years, 16,5% that between the ages of 16-18 years and only 3,8% that the problems started after the age of 18 years. The results from the questionnaire conducted within this thesis also revealed that the most problematic period of acne-related issues among Estonian individuals are the ages between the 15-19 years (Figure 3.2-1).

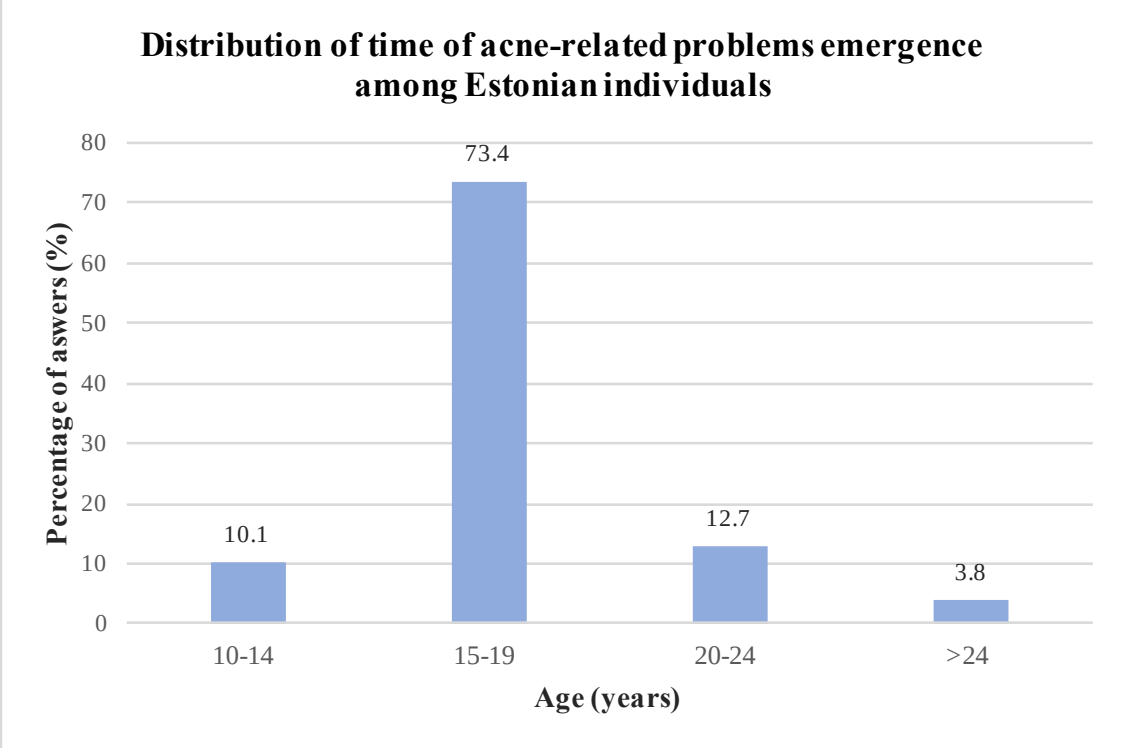

Figure 3.2-1. The most problematic ages of acne-related issues among Estonian individuals. Results according to the data gathered from the Estonian individuals with previous acne-related personal history and confirmed educational background from basic, secondary or vocational school settings.

While 59,5% of the respondents stated that they have also turned to a doctor to find help for their acne-related symptoms, 40,5% of the individuals with previous acne-related issue had never sought medical help because of their skin problem. The main reasons why the help from medical specialists was not sought was individuals feeling that the problems with skin did not seem serious enough. The reasons such as a lack of time

and uncertainty about whom to contact were also mentioned. The matter could be also connected with the findings that only 13,9% marked their symptoms of acne to be severe. By 60,9% of the participants the issue was evaluated as moderate and by 25,3% as mild, therefore it could be assumed that if the prevalence of severe acne would have been higher, also the tendency to medical attention would have been greater. With the 85,2%, the medical help from the dermatologist was sought the most. 25,9% of the respondents had equally turned to GP. Dietician, endocrinologist or gynecologist help was received by one person. 53,7% of the participants on the other hand stated the help for their acne-related issue was looked from the cosmetic.

The matter why symptoms of acne were somewhat underestimated and handled as cosmetic problems could be related to poor topic-related knowledge of individuals affected by this issue. Although 36,7% of the participants evaluated their topic-related knowledge rather sufficient and 11,4% sufficient, more than half of the respondent said that their awareness about acne-related problems and help-seeking opportunities is rather not sufficient (40,5%) or not sufficient (11,4%). Inaccurate or insufficient information could at the same time come from the finding that the topic-related additional information among responded individuals was mostly acquired from the Internet (81%), as well as from family members (51,9%), friends/classmates (29,1%) and cosmetics (2,6%). 47 individuals (59,5%) still turned also to medical worker to obtain additional information about acne-related concepts.

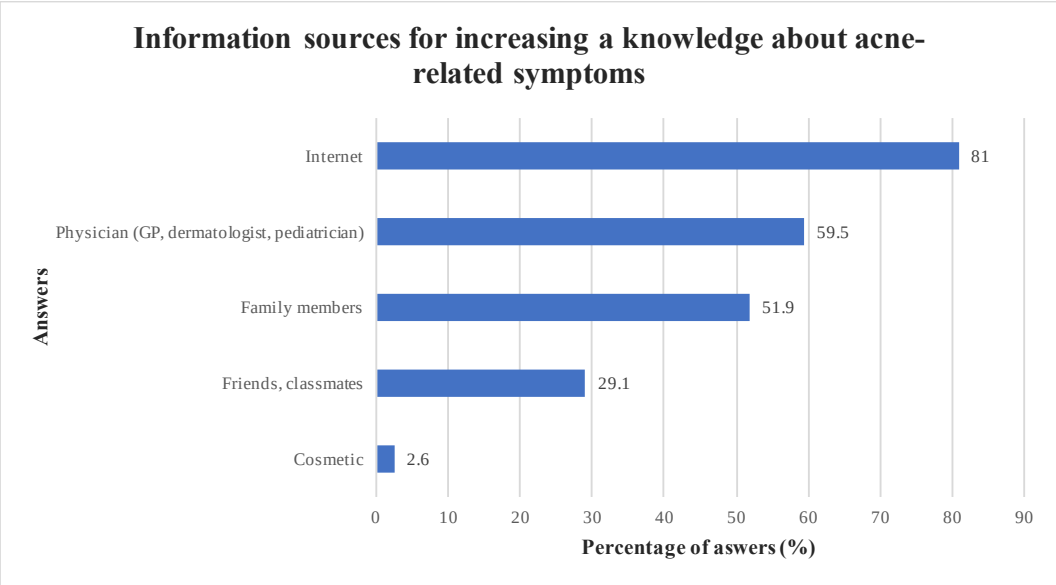

Figure 4.2-2. Information sources that were used for receiving additional information about symptoms of acne among Estonian individuals.

Although problems with acne-related symptoms were most prevalent during the individuals' school ages, almost all the respondents, except one, have not turned to school nurses with their acne-related issues. Over half of the answerers (58,4%) also stated that they would not have wished that their acne-related problem would have been pointed out and additionally managed by the school nurse herself. 41,6% on the other hand would have liked to receive additional management and consultation from school nurses towards their skin issues.

The main reason why the help from school nurses was not sought was the matter that individuals did not realise to include school nurses within their acne-alike problem, as well as skin problems are not the issues which should be handled by the school medical worker. Assumptions such as insufficient management measures, deficient topic-related knowledge and poor access of school nurses as well as the matter that skin problem did not seem severe enough were stated. Few respondents also revealed that the embarrassment over the skin issue was the reason why the help from school nurse was not sought. One participant also responded that problems with acne started after the school years.

Although half of the participants (50,5%) stated that they would have not or rather not needed more help for their acne-related problems within school settings, 63,3% of the respondents would still have been ready to use teleconsultation service between school nurse and dermatologist for the purpose to evaluate their acne-related symptoms more precisely (Figure 4.2-3), also 21,5% would have used the service if the school nurse had personally recommended it. By 15,3% of the participated individuals, the teleconsultation service would not have found the usage even when the school medical worker had suggested it.

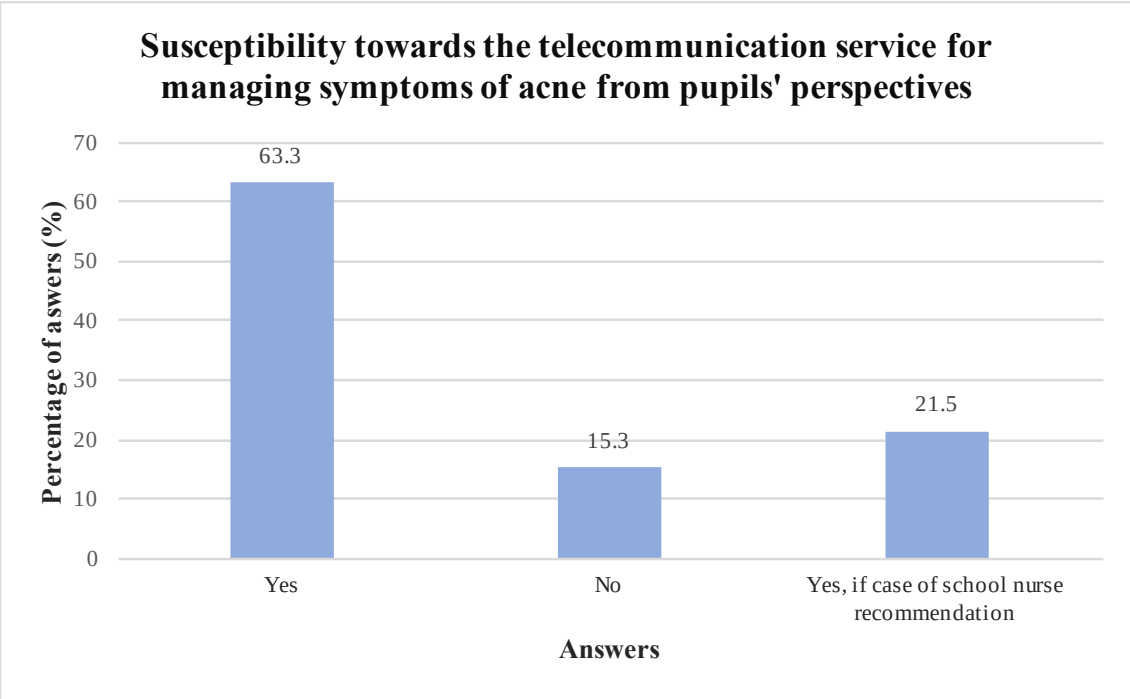

Figure 4.2-3. Susceptibility towards the telecommunication service between the school nurse and dermatologist from pupils' perspectives.

The reasons that acne-related problems should not be included in school nurses job responsibilities as well as that the school nurses are not competent enough to deal with these kind of issues, were mentioned by the individuals who would not use the teleconsultation service within school settings. Factors that the service would be unnecessary besides the regular dermatologist appointments and the feeling that this application seems too complicated and untrustworthy to take into usage were also stated. Trust issues can at this point be caused by the matter that the teleconsultation service has not been previously used in this context and is yet unknown for the individuals participated in this survey.

3.3 Interview with dermatologists

Three Estonian dermatologists with previous acne-related teledermatology experience (acne management between GP and dermatologist from distance) were interviewed during the telephone and e-mail conversations. Results revealed that similarly to school nurses, acne-related skin conditions among school adolescents are repeatedly noticed also by dermatologists. As school nurses marked that more often 1-2 students in a month or 1-2 students in a week, 42,5% and 32,5% respectively, can be recognized with symptoms of acne, all dermatologists stated to have an everyday contact with acne problematic schoolchildren. Dermatologists' and school nurses' responses

overlapped within the situation that most acne-related symptoms among adolescents are noticed when students turn to medical workers with other types of health issues. That on the other hand could be caused by the matter that individuals affected with acne often do not consider their symptoms serious enough to seek help from medical professional, as revealed from questionnaire of this master thesis conducted among Estonian individuals. One dermatologist added that the cases when acne is noticed, although it has not been the main issue why the individual has turned to doctor's consultation, the patients are more likely to be young adults, before the age of 21 years. With older patients, the problem with acne is more frequently realized and therefore the need for medical assessment also requested.

Since the problems with acne-related symptoms are highly notable among the pupils and to ensure that the individuals with this problem would receive the proper management for their skin problems, especially in cases with severe acne, all the dermatologist found that topic-related concepts should be additionally handled also within Estonian school settings. For avoiding the misunderstandings of acne and the tendency to handle it as a cosmetic problem, the overall awareness about acne-related topics among school children should be increased. As one dermatologist stated that the management of acne in schools should include topic-related lectures from the dermatologists as well as Internet based information sharing, other two responded that encouraging and directing students to specialists' consultations is required. One specialist also added that the main information about the acne should be provided within the school lessons rather than leave it to the school nurses working duties. Dermatologists participated in this thesis were mostly on the opinion that acne-related problems are not enough serious issues to promote a cooperation with school nurses on individual level. Student informing about the necessity and opportunities of specialist assessment as well as directing them to turn to dermatologist appointment should be accomplished by the school nurses.

Dermatologists views differed within the question if teledermatology between the school nurses and dermatologists could help to manage acne-related problems among Estonian school students. As one specialist does not find the solution helpful in this context, the other considered it as rather helpful, especially to capture the images of problematic conditions in primary care level. Third participant on the other hand found that cooperation between school nurses and school doctors should be promoted for

managing symptoms of acne among school students. The main teleconsultation service benefits that were brought out resembled with the school nurses' perspectives. Mentioned aspects were quick access to doctor's appointment with faster responses for students' acne-related problems, avoiding adolescents' reluctance not turn to doctors' assessment, as well as less visit-related organizational trouble for both patient and specialists. When considering other diseases, teleconsultation was believed to have a great supportive impact within solving the schoolchildren problems related to depression.

Issues with treatment prescriptions, also financial as well as technical concerns towards the implementation of teledermatology solution in schools were manly stated out by the dermatologist. One dermatologists noted that the barriers could additionally be the lack of time and motivation of the school nurses to deal with this service as well as the matter, also revealed from the pupils' questionnaire, that schoolchildren do not turn to school physicians with their skin problems and therefore the service would maybe not be used frequently.

4. Discussion

The results of questionnaire conducted among Estonian individuals confirmed the findings from previous studies that symptoms of acne are health issues that are widely prevalent among the young individuals. According to the results of this questionnaire, 92% of the respondents had been affected with acne-related problems at some point in their lives. Besides the high prevalence of acne-related issues among Estonian individuals, the findings from pupils' questionnaire confirmed the results of previous studies from other countries [1], [21], [22] and revealed that in most cases the problems with acne-related symptoms begin before reaching adulthood.

As the figures from England indicated that over 80% of females and 90% of males being affected by the age of 21 years and the findings from the USA study stated that 78% of girls between the ages of 8 and 12 years revealed some signs of acne [21], as well as 50% of boys between the ages of 10 and 11 years had at least 10 comedones [22], the numbers from Estonia showed that within 36,7% of the cases, the issues with acne-related symptoms started already before the age of 13 years and 43% that the problems first occurred between the ages of 13-15. The results from the questionnaire also revealed that the most problematic period of acne-related issues among Estonian individuals are the ages between the 15-19 years (Figure 3.2-1). When comparing these results with previous statistics from other countries similarities in presented numbers can be noticed [23-26, 28]. The parallel can also be drawn with the Estonian Health Insurance Fund figures, which showed that the most acne diagnosis in 2017 have been made among the individuals in age group of 15-19 years.

With older patients, the problem with acne is more frequently realized and therefore the need for medical assessment also requested. Similar observations have also been made in survey conducted in England [4]. The matter at this point could be related with the findings from previous studies that refer to lack of acne-related knowledge among young individuals [41-44].

Due to the high prevalence of acne-related issues among young individuals, the management needs and opportunities of acne-related problems were observed within the school settings. Although half of the participants stated that additional help for their acne-related problems within school settings was rather not needed, 63,3% of the respondents would still be ready to use teleconsultation service between school nurse and dermatologist for the purpose to evaluate their symptoms of acne more precisely.

Since acne is frequently misunderstood it is often wrongly handled as a cosmetic problem [27] the matter was also noticed within the answers from the pupils' questionnaire. At this point similar problematic aspect with the help-seeking behavior was noticed, as 53,7% of the participants stated the help for their acne-related issue was looked from the cosmetic. The inclusion of cosmetics within the acne management processes is also mentioned in other previous studies [23]–[26], [34]–[47].

For avoiding the misunderstandings of acne and the tendency to handle it as a cosmetic problem, the standing that acne-related concepts should additionally be handled within Estonian schools was also presented by the dermatologist included in this study. Although the school nurses would rather wish to increase acne-related cooperation with dermatologist, the specialists were mostly on the opinion that acne-related problems are not enough serious issues to promote a cooperation with school nurses on individual level. Dermatologist at this point emphasize that student informing about the necessity and opportunities of specialist assessment as well as directing them to turn to dermatologist appointment are aspects that should certainly be conducted by the school medical workers. Addressing the problem of acne among school nurses more comprehensively and encouraging the acne-problematic students to turn to dermatologists' appointments, could decrease the issues revealed from the pupils' questionnaire, that specialist's help is often not sought because of the feeling that symptoms of acne did not seem severe enough or within the matter that students do not know to whom they should turn to with their acne-related problems

The results of the questionnaire revealed that school nurses notice and manage acne-related problems noticeably less as it could be expected when considering the statistics from numerous previous researches, which reflect the findings about the high acne prevalence and great severity ratings among the school adolescents [17]–[25]. Noteworthy number of participated nurses also prefer to refer students to specialists'

appointments or would like to consult with experts beforehand rather than start acne-related counseling or management processes by themselves. Possible reasons within the low acne management activities could be heavy workload as well as insufficient acne-related knowledge of school nurses. Almost 50% of respondents stated the awareness of acne among school nurses to be rather not sufficient or not sufficient. Similar reason possibilities have been noted also by other publications [43].

As individuals stated that help for their acne-related issues was almost never sought from the school nurses, questionnaire for nurses also revealed that the problem with acne is mainly noticed when students turn to them with other health issues. From students' perspectives, poor help-seeking behavior from schools is often caused by the matter that their skin problem did not seem severe enough as well as assumptions such as insufficient management measures and deficient topic-related knowledge of school nurses. Although the deficiency within acne management capabilities as well as insufficiency of topic-related knowledge of school nurses were also mentioned by the school medical workers themselves, 95% of the school nurses were still on position that the management of acne-related skin conditions needs higher attention in Estonian school settings. The modesty of handling symptoms of acne was somewhat supported with the finding that only 17,5% of the participants recommend the treatment on their own, most of the school nurses choose to direct the students with acne-related problems to family physician or dermatologist appointments.

Directing students to specialist's consultation may on the other hand bring along the problem that those individuals simply may not reach the physician's care they were directed. The problem with referring students to specialists' appointments has previously been pointed out by the National Audit Office of Estonia. The survey conducted by NAO revealed that in 2014 the most referrals by the school nurses were done to the ophthalmologist's, dentist's and family doctor's offices, from which only 48% reached to the ophthalmologist, 65% to the dentist and 41% to the family doctor. 50% among all the children who were referred to the doctor's appointment never went to seek the medical help they were directed. [52] Stated reasons were poor access to specialized medical care, insufficient information movement between different professionals and parents as well as ignorance and/or carelessness of parents. Similar results can also be expected within referrals made for other health problems, including problematic skin conditions and acne. Therefore, for avoiding the matter that students with acne do not reach the specialists'

appointments and remain without the needed professional assessment, the implementation of over a distance dermatologist consultation in Estonian school settings should be considered.

As the school nurses' competence within acne-related concepts were set under the question from the pupils' perspective, and the help towards their skin problem was therefore not sought, besides increasing the overall acne-related consultation accuracy, the involvement of specialists' opinion through teledermatology service could also improve the students' trustworthiness to seek the medical consultation to their acne-related problems quickly and easily already in the school medical worker's office. Furthermore, the issues related to poor access to medical specialists could be prevented. As dermatologist, were on opinion that symptoms of acne should rather be managed by the specialists themselves, the implementation of teledermatology service could at the same time reduce the percentage of school nurses (17,5%) who prefer to recommend the treatment for students with acne-related issues by their own initiative. That again could prevent the incidences where the acne is undertreated or handled as a cosmetic problem. The questionnaire conducted among school nurses revealed that if the specialist appointment turns out to be hard to reach, the student with acne-related problem would be recommended to contact with cosmetic. Also, the recommendations to use over-the-counter medicines were stated out by the school nurses. Both these aspects could be eliminated with empowering school nurse knowledge and acne-related management skills with dermatologists' opinions through teledermatology application.

Doubts within the implementation of teledermatology service between school nurses and dermatologists to manage symptoms of acne in Estonian school settings could be associated with the matter that the service has not been used under these terms previously. Therefore, somewhat prejudiced position among both school nurses and dermatologists, as well as among students to whom the service is directed might be noticed. Also, several organizational and technical concerns towards the mentioned solution stated out by nurses and dermatologists may be the reason why the implementation of teledermatology service created somewhat skeptical standings. Although the benefits such as quick access to doctor's appointment with faster responses for students' acne-related problems as well as low adherence to doctors' assessment were stated, issues with treatment prescriptions, also financial as well as technical concerns towards the implementation of teledermatology solution were mentioned. Besides the

lack of time and insufficient financial resources, problems related to data protection and getting the treatment permission from the school students' parents were also concerns of school nurses participated in this questionnaire.

The main limitation of this master thesis could be associated with the information gathering processes. Firstly, although study had set its focus to transmit the questionnaires to all the school medical workers in Estonia, the final number of nurses who gave the feedback for the questionnaire was 40 from 114. It is possible that the information about the survey did not reach for all the school nurses/doctors due to the matter that the questionnaires were sent to the school health care service providers not to school nurses/doctors directly. For including the larger number of participants, school medical workers should be contacted directly. Secondly, some degree of inaccuracy in gathered information could arose as the questionnaire for pupils was formed without setting an age limit for the participants. Although collecting data without the age limit enabled to reach more individuals with less time, it must be taken into account that the perspectives of current students and older graduates within evaluating acne-related concepts in school settings could be somewhat different. For avoiding possible information inaccuracy regarding this matter, the questionnaire could additionally be conducted within a certain age group of school children or when collecting the information without an age restrictions, results should be compared and analyzed also in different age groups. In both cases the general number of respondents should be increased. Although several identification aspects (sex, age, position, region) were inquired from the individuals participated in this master thesis, for receiving more reliable and trustworthy results, more precise identification method, for example using ID-cards, could be included.

The results of this master thesis revealed that most of the participated school nurses and dermatologists were in favor of opinion that IT solutions could be helpful tools for solving students' skin-related problems in Estonian school settings. Besides the desired cooperation with specialists, 80% of the school revealed to be open to gain the dermatologists cooperation with the usage of teleconsultation solution to empower themselves during the acne diagnoses and management processes. Also, while 21,5% of the pupils' questionnaire respondents would use the teleconsultation service, conducted between the school nurses and dermatologists, only if the school nurse recommends it, 63,3% of the participants would use the service without the previous direction. Although dermatologists mostly do not consider acne-related topics serious enough to communicate

with school nurses on individual levels, dermatologists desire to be the main medical care provider within these topics could considerably be improved with the implementation of teledermatology solution in Estonian school settings.

Before moving forward assumed service limitations pointed out by the school nurses and dermatologists participated the in this thesis should be elaborated and resolved beforehand. For receiving more comprehensive overview about the organizational and technical aspects related to the implementation of teledermatology service in Estonian schools, as well as eliminating somewhat doubtful prejudices towards in these terms previously unused communication service, the described teleconsultation approach should be taken into practical usage. Further suggestion towards the implementation of teledermatology service in Estonian schools by the author of this thesis would be to run a teledermatology pilot program between the school nurse and dermatologist for evaluating the symptoms of acne among school adolescents in one Estonian school. Recommendation for the future studies would be to assess the possible usage of telecommunication service within the management of other kind of students' health issues mentioned within this thesis, for example obesity, hypertension, postural and psychological disorders or other skin diseases besides acne.

Conclusion

The aim of this study was to assess the implementation needs and perception towards teledermatology for managing symptoms of acne between school physicians/nurses and dermatologists. The thesis itself is manly important for the school students, whose symptoms of acne described teledermatology service is striving to resolve. Also for school medical workers for empowering their knowledge and capabilities within the issues related to acne in Estonian school settings. As the management of acne-related skin conditions in schools involves several different parties (school physicians/nurses, doctors, students), the topic itself was analyzed by combining different viewpoints from these mentioned stakeholders. Three different research methods (questionnaires, interviews, document analysis) were used to gather the information necessary for understanding the needs and perception towards the teledermatology for managing the symptoms of acne in Estonian school settings.

The results of questionnaire conducted among Estonian individuals confirmed the findings from previous studies that symptoms of acne are health issues that are widely prevalent among the young individuals. According to the results 92% of the respondents had been affected with acne-related problems at some point in their lives. The results supported the data gathered from EHIF, that the most problematic period of acne-related issues among Estonian individuals is in the age between the 15-19. Due to the high prevalence of acne-related issues among school adolescents, needs and perception towards teledermatology for empowering school nurses within the acne management processes was assessed.

Results of this thesis revealed that symptoms of acne among students are repeatedly noticed by all the school nurses participated in this survey. Students with acne-related issues are referred to dermatologists or GPs or managed by the school nurses themselves, 85%, 77,5% and 17,5% respectively. Therefore, necessary acne treatment for considerable number of students is dependent on the matter how many of these referrals eventually reach to the specialist care settings. As statistics show, that only 50% of

referred students seek the specialists' assessment they are recommended, specialists' help itself should be brought closer for the students affected with acne.

Most of the participated school nurses and dermatologists were in favor of opinion that IT solutions could be helpful tools for solving students' skin-related problems in Estonian school settings. Although dermatologists mostly did not consider acne-related topics serious enough to communicate with school nurses on individual levels, 80% of the participated school nurses would be open to gain the dermatologists cooperation with the usage of teleconsultation solution to empower themselves during the acne diagnoses and management processes. Also, 84,8% of the pupils' questionnaire respondents would be ready to use the teledermatology service carried out by the school nurses in Estonian school settings.

Although several concerns related to the treatment prescriptions, financial, technical and organizational arrangements as well as data protection capabilities were mentioned by the specialists and school nurses participated in this thesis, the overall perception towards teledermatology for managing symptoms of acne between school physicians/nurses and dermatologists was considerably noted from all the stakeholders included in this thesis. Extra value within the implementation of the service was seen for example in quick access to doctor's appointment with faster responses for students' acne-related problems as well as in opportunity to avoid adolescents' reluctance not turn to doctors' assessment.

When solving the assumed limitations pointed out by the school nurses and dermatologists as well as receiving more comprehensive overview about the organizational and technical aspects related to the implementation, with real-life teledermatology pilot program carried out in Estonian school setting, it may be assumed that the teledermatololology approach would be an effective opportunity to increase the knowledge and specialist accessibility for the adolescents suffering from acne and improve the overall healthcare provision in basic, secondary and vocational school settings.

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APPENDICES

Appendix 1 – Mild form of acne

Multiple closed and open comedones can be noticed, with few inflammatory papules in combination [9].

Appendix 2 – Moderate form of acne

Disease is limited to the face. Predominant lesions are erythematous pustules and papules [9].

Appendix 3 – Severe form of acne

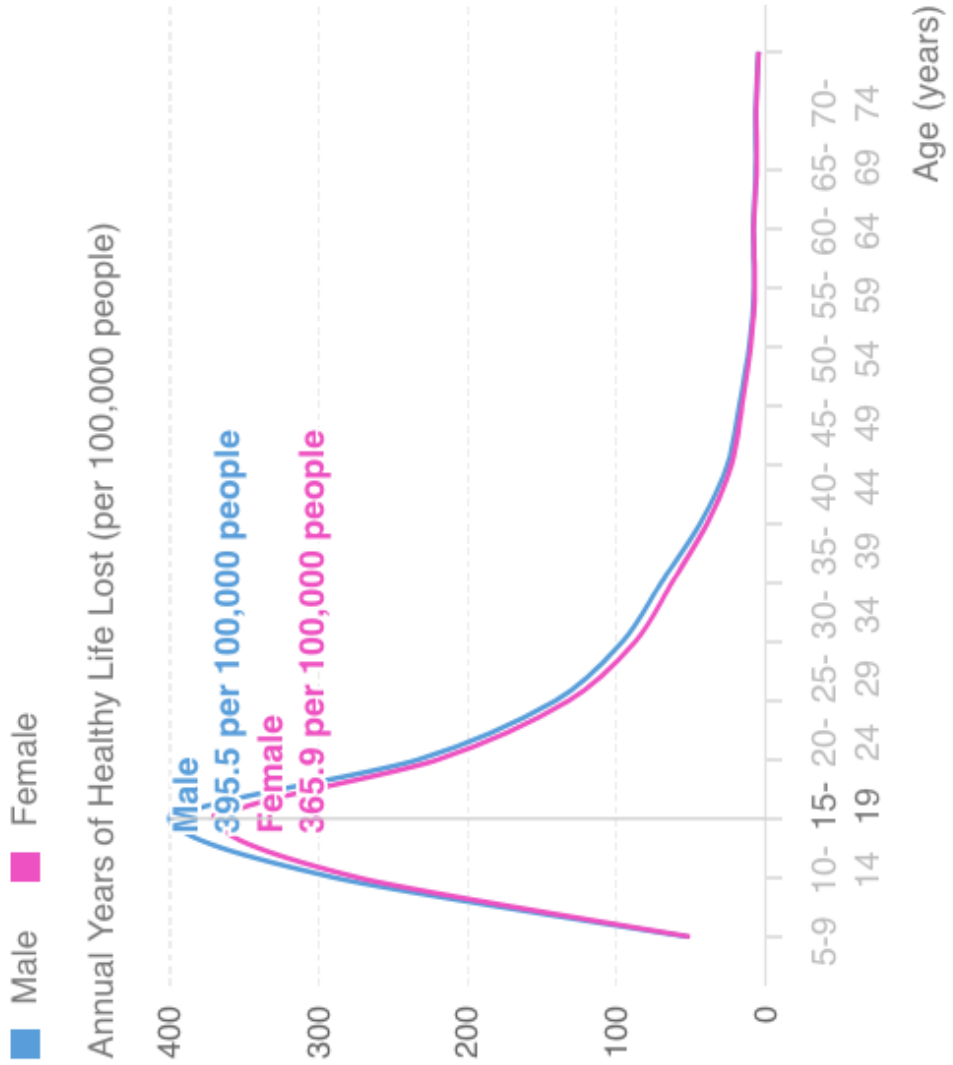
Erythematous nodules, pustules and papules occur on the face [9].

Appendix 4 – Very severe form of acne

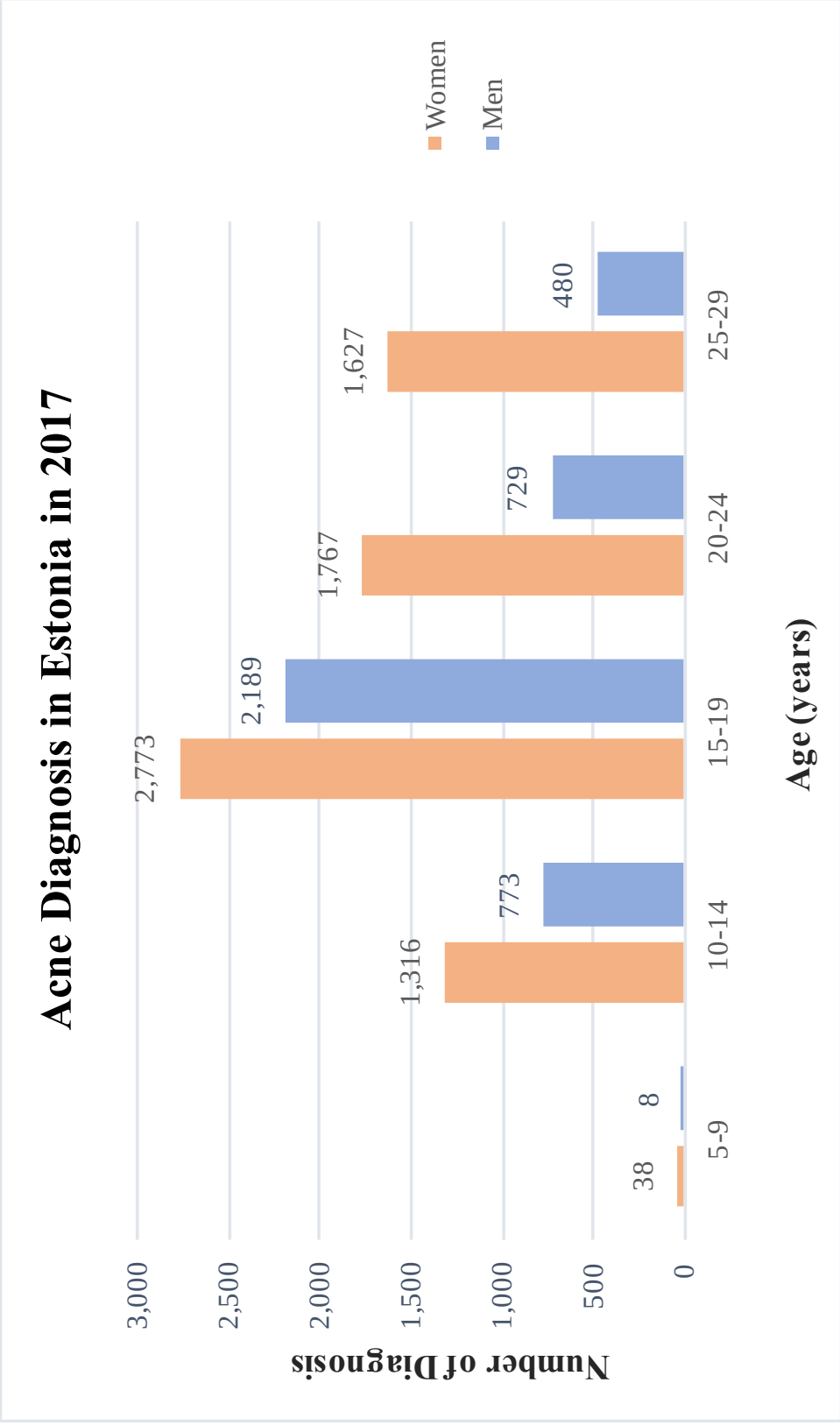
Despite of aggressive oral interventions, multiple painful nodules occur on the back, chest and face (Panel A). Response after isotretinoin treatment is showed on the panel B [9].

Appendix 5 – Acne impact in Europe by the YLLs

Figure describes acne impact in Europe by the YLLs [30]



Appendix 6 – The number of acne diagnosis by age and sex in Estonia in 2017



Appendix 7 - Questionnaire for school physicians

Magistritöö küsimustik - akne käsitlus Eesti koolides

* Kohustuslik

Amet *

- ◯ Arst
- ◯ Õde

Vanus *

Teie vastus

Piirkond (maakond, linn) *

Teie vastus

Õppeasutus

Teie vastus

Teie alla kuuluvate õpilaste arv *

Teie vastus

1. Kui tihti puutute oma töös kokku õpilastega, kellel märkate aknele viitavaid tunnuseid nahal?

- ◯ Igapäevaselt
- ◯ Tihti (1-2 õpilast nädalas)
- ◯ Aeg-ajalt (1-2 õpilast kuus)
- ◯ Üksikud juhtumid aastas
- ◯ Ei puutu üldse

2. Millisel viisil puutute oma töös kokku õpilastega, kellel võib täheldada aknele viitavaid tunnuseid nahal?

Märkige palun sobiv/sobivad vastusevariandid.

- [ ] Kui õpilane pöördub ise nahaprobleemiga kooliõe juurde
- [ ] Kui õpilane pöördub mõne muu terviseprobleemiga kooliõe juurde
- [ ] Kui lapsevanem pöördub probleemiga kooliõe juurde
- [ ] Kui klassijuhataja/aineõpetaja pöördub probleemiga kooliõe juurde
- [ ] Ainult koolis läbiviidava kohustusliku tervisekontrolli käigus
- [ ] Ei puutu üldse
- [ ] Muu: _____

3. Millisel juhul pöörate aknele viitavatele tunnustele tähelepanu ning alustate õpilase nõustamist/suunamist ravile?

Märkige palun sobiv/sobivad vastusevariandid.

- [ ] Vaid juhul, kui õpilane pöördub ise nahaprobleemiga kooliõe juurde
- [ ] Kui õpilane pöördub mõne muu terviseprobleemiga kooliõe juurde, kuid märkan ka aknele viitavaid tunnuseid nahal
- [ ] Kui lapsevanem pöördub probleemiga kooliõe juurde
- [ ] Kui klassijuhataja/aineõpetaja pöördub probleemiga kooliõe juurde
- [ ] Ainult koolis läbiviidava kohustusliku tervisekontrolli käigus
- [ ] Ei pööra üldse tähelepanu, aknele viitavad tunnused pole piisavalt suureks probleemiks
- [ ] Pigem ei pööra tähelepanu, kuna teadmised nahaprobleemidest on puudulikud
- [ ] Muu: _____

4. Kuidas toimite, kui tuleb tegeleda probleemse näonahaga õpilasega?

Märkige palun sobiv/sobivad vastusevariandid.

- [ ] Soovitan ise ravi
- [ ] Teavitan vanemaid
- [ ] Soovitan pöörduda perearstile
- [ ] Soovitan pöörduda perearstile ning teavitan ise perearsti
- [ ] Soovitan pöörduda dermatoloogile
- [ ] Soovitan pöörduda dermatoloogile ning aitan ise leida sobiva dermatoloogi juurde aja
- [ ] Konsulteerin perearstiga
- [ ] Konsulteerin dermatoloogiga
- [ ] Muu: _____

5. Kas ja milliseid meetmeid olete rakendanud oma õppeasutustes akne kahtlusega õpilase käsitlemisel?

Märkige palun sobiv/sobivad vastusevariandid

- [ ] Õpilaste näonaha hindamamine ette nähtud tervisekontrolli käigus
- [ ] Probleemse näonahaga õpilase nõustamine ja soovitused olukorra parandamiseks, näonaha hooldamiseks
- [ ] Probleemse näonahaga õpilase suunamine arsti vastuvõtule
- [ ] Hooldusvahendite näidiste jagamine
- [ ] Teemakohase lisamaterjali otsimine internetist õpilase paremaks nõustamiseks ja oma teadmiste täiendamiseks
- [ ] Nahaarstiga konsulterimine õpilase probleemi käsitlemiseks
- [ ] EI OLE KÄSITLENUD akne kahtlusega õpilast
- [ ] Muu:

6. Kui vastasite eelmisele küsimuste valikutele "EI OLE KÄSITLENUD", siis põhjendage palun oma vastust sobiva/sobivate variantidega.

- [ ] Nahaprobleemid, sealhulgas akne, ei ole meie õppeasutuses õpilastele probleemiks
- [ ] Ebapiisavad aknealased teadmised õpilaste nõustamiseks
- [ ] Puudub võimalus suhtlemiseks eriarstiga, kes oskaks anda täpsemat hinnangut õpilase probleemse näonaha osas
- [ ] Puudub motivatsioon ning huvi antud teemaga tegelemiseks
- [ ] Piiratud rahalised vahendid
- [ ] Aja puudulikkus nimetatud teemaga tegelemiseks
- [ ] Aknele viitavad tunnused ei ole piisavalt oluline probleem, millega koolides järjepidevalt tegeleda tuleks
- [ ] Muu:

7. Milliseid meetmeid olete kasutanud oma õppeasutustes, et kasvatada õpilaste hulgas teadlikkust nahaprobleemidest ja aknest?

Märkige palun sobiv/sobivad vastusevariandid

- [ ] Loengud, seminarid kooliõdedele/arstidele kasvatamaks nende akealaseid teadmisi
- [ ] Loengud, seminarid kooliõpilastele kasvatamaks nende akealaseid teadmisi
- [ ] Tähelepanu äratavad plakatid kooli infoseinal (Mis on akne? Kas mul on akne? Kuhu abi saamiseks pöörduda?)
- [ ] Teemakohaste infovoldikute jagamine õpilastele
- [ ] Nahaprobleeme käsitlevad teemad (inimseõpetuse) koolitundides
- [ ] Teemakohaste internetiallikate kasutamine
- [ ] EI OLE KASUTANUD mingisuguseid meetmeid nahaprobleemide ja aknealase teadlikkuse suurendamiseks
- [ ] Muu: _____

8. Juhul kui märkisite eelmises küsimuses vastuseks "EI OLE KASUTANUD" siis palun põhjendage oma vastust sobiva/sobivate variantidega.

- [ ] Nahaprobleemid, sealhulgas akne, ei ole meie õppeasutuses õpilastele probleemiks
- [ ] Nahaprobleemid, sealhulgas akne, ei ole piisavalt oluline probleem, millega koolides järjepidevalt tegeleda tuleks
- [ ] Kooliõdede ebapiisavad aknealased teadmised õpilaste nõustamiseks
- [ ] Puudub motivatsioon ning huvi antud teemaga tegelemiseks
- [ ] Piiratud rahalised vahendid
- [ ] Aja puudulikkus nimetatud teemaga tegelemiseks
- [ ] Muu: _____

9. Kas aknele viitavate nahaprobleemide käsitlemine koolides vajab teie arvates täiendavat tähelepanu (teavitus, diagnostika, dermatoloogile suunamine)?

- ◯ Jah
- ◯ Pigem jah
- ◯ Pigem ei
- ◯ Ei
- ◯ Muu: _____

10. Kas teie hinnangul on kooliõdede teadmised ja väljaõpe piisavad akne nahaprobleemi käsitlemiseks ning vajadusel soovituste jagamiseks kooliõpilastele?

- ◯ Jah
- ◯ Pigem jah
- ◯ Pigem ei
- ◯ Ei
- ◯ Ei oska öelda

11. Kas teie hinnangul oleks vaja edendada koostööd kooliõdede ja perearstide vahel, et akne kahtlusega patsiente käsitleda?

- ◯ Jah
- ◯ Pigem jah
- ◯ Pigem ei
- ◯ Ei

12. Kas teie hinnangul oleks vaja edendada koostööd kooliõdede ja nahaarstide vahel, et akne kahtlusega patsiente käsitleda?

- ◯ Jah
- ◯ Pigem jah
- ◯ Pigem ei
- ◯ Ei

13. Juhul kui teil oleks võimalus konsulteerida infotehnoloogilisi vahendeid kasutades nahaarstiga mõne patsiendi akne diganoosi ja raviplaani määramiseks, siis kas kasutaksite seda võimalust?

- ◯ Jah
- ◯ Pigem jah
- ◯ Pigem ei
- ◯ Ei

14. Kas infotehnoloogilised lahendused (telekonsultatsioon kooliõe ja nahaarsti vahel) võiksid kaasa aidata õpilaste nahaprobleemide lahendamisele Eesti koolides?

- ◯ Jah
- ◯ Pigem jah
- ◯ Pigem ei
- ◯ Ei

15. Kui leiate, et telekonsultatsiooniteenuse kasutamine koolides oleks vajalik, siis millisel juhul seda kasutada sooviksite?

Märkige palun sobiv/sobivad vastusevariandid.

- ☐ Nahaarstilt tagasiside/hinnangu saamine ainult kohustusliku tervisekontrolli käigus probleemse näonahaga õpilase osas tehtud sissekande kohta infosüsteemis.
- ☐ Igapäevane kooliõe ning nahaarsti vahelise telekonsultatsiooniteenuse kasutamise võimalus, et vajadusel saada kiiret tagasisidet akne kahtlusega õpilase käsitlemiseks.
- ☐ Sooviksin kasutada kooliõe ning nahaarsti vahelist telekonsultatsiooniteenust mõne muu terviseprobleemi käsitlemisel
- ☐ Sooviksin kasutada kooliõe ning perearsti vahelist telekonsultatsiooniteenust mõne terviseprobleemi käsitlemisel
- ☐ Sooviksin kasutada kooliõe ning lastearsti vahelist telekonsultatsiooniteenust mõne terviseprobleemi käsitlemisel
- ☐ Telekonsultatsiooniteenuse kasutamine koolides ei ole vajalik
- ☐ Muu:

16. Kas leiate, et arsti ja kooliõe vaheline telekonsultatsiooni teenus võiks kasulik olla mõne muu terviseprobleemi käsitlemisel? Kui "JAH", siis millise?

Kui vastate variandiga JAH, siis palun märkige järgneva variandi "Muu" all, millise terviseprobleemi käsitlemisl täpsemalt sooviksite telekonsultatsiooni teenuse olemasolu

- [ ] EI
- [ ] JAH
- [ ] Muu: _____

17. Palun kommenteerige oma vastust. Millist lisaväärtust võiks anda infotehnoloogiliste lahenduste (telekonsultatsiooniteenuse) juurutamine teie tervishoiuasutuse keskkonda?

Teie vastus

18. Palun kommenteerige oma vastust. Millised on peamised barjäärid infotehnoloogiliste lahenduste juurutamiseks?

Teie vastus

19. Muud kommentaarid/mõtted, mis seoses küsimustikuga esile kerkisid.

Teie vastus

Appendix 8 - Questionnaire for pupils

Magistritöö küsimustik - akne käsitlus Eesti koolides

* Kohustuslik

Sugu *

- ○ Mees
- ○ Naine

Vanus *

Teie vastus

Olen omandanud põhi- ja/või kesk/kutsehariduse *

- ○ Jah
- ○ Ei

1. Kas Sul on olnud kunagi probleeme aknele viitavate tunnustega nahal (nt vistrikud, komedoonid, lööbed)?

- ○ Jah
- ○ Ei

2. Millises vanuses algasid probleemid aknele viitavate tunnustega?

- ○ <13
- ○ 13-15
- ○ 16-18
- ○ >18

3. Millistel eluaastatel on probleemid aknele viitavate tunnustega olnud kõige tõsisemad?

- ○ 10-14
- ○ 15-19
- ○ 20-24
- ○ >24

4. Kuidas hindaksid tekkinud aknele viitavate tunnuste raskusastet?

- ○ Kerge
- ○ Mõõdukas
- ○ Raske

5. Kas oled pöördunud akne või aknele viitavate tunnuste tõttu arsti poole?

- ○ Jah
- ○ Ei

6. Kui EI, siis miks ei soovinud Sa abi otsida?

- ☐ Tundsin piinlikust oma näonaha pärast ega julgenud arsti poole pöörduda
- ☐ Probleem näonahaga ei tundunud piisavalt tõsine arsti poole pöördumiseks
- ☐ Polnud aega probleemiga tegeleda
- ☐ Ei teadnud kelle poole pöörduda
- ☐ Arstiabi halb kättesaadavus
- ☐ Pole olnud probleemi näonahaga
- ☐ Muu:

7. Kui JAH, siis kelle poole pöördusid abi saamiseks?

- ☐ Perearst
- ☐ Nahaarst
- ☐ Lastearst
- ☐ Kooliarst/kooliõde
- ☐ Kosmeetik
- ☐ Muu:

8. Kas oled pöördunud akne või aknele viitavate tunnuste tõttu ka kooliarsti/kooliõe poole?

- ○ Jah
- ○ Ei
- ○ Mõtlesin küll selle peale, kuid siiski ei pöördunud probleemiga kooliarsti/õe poole

9. Kui EI, siis palun põhjenda!

- [ ] Kooliõdedel nõu andmiseks ebapiisavad teadmised nahaprobleemidest
- [ ] Kooliõdedel ebapiisavad vahendid nahaprobleemidega tegelemiseks
- [ ] Ei tulnud selle peale, et kooliõe poole pöörduda
- [ ] Nahaprobleemid pole juhud, millega kooliõe poole pöörduda
- [ ] Tundsin piinlikust oma näonaha pärast ega julgenud arsti poole pöörduda
- [ ] Probleem näonahaga ei tundunud piisavalt tõsine arsti poole pöördumiseks
- [ ] Kooliõe halb kättesaadavus
- [ ] Muu: _____

10. Kas oleksid soovinud, et kooliarst/kooliõde oleks ise Sinu aknele viitavatele tunnustele tähelepanu pööranud ning probleemi edasiseks käsitlemiseks nõu andnud?

- ○ Jah
- ○ Ei

11. Kas leiad, et et Sinu teadmised nahaprobleemidest ja aknest olid koolis piisavad probleemi mõistmiseks ja selle probleemi jaoks vastava abi leidmiseks?

- ○ Jah
- ○ Pigem jah
- ○ Pigem ei
- ○ Ei

12. Milliste allikate poole oled pöördunud, et saada täiendavat informatsiooni nahaprobleemidest ja aknest?

- [ ] Kooliarsti/kooliõe
- [ ] Arsti poole väljaspool kooli (perearst/nahaarst/lastearst)
- [ ] Pereliikmete
- [ ] Sõprade/klassikaaslaste
- [ ] Interneti
- [ ] Ei ole otsinud täiendavat informatsiooni nahaprobleemidest ja aknest
- [ ] Muu: _____

13. Kas tunned et vajaksid/oleksid vajanud koolist rohkem abi aknele viitavate tunnuste käistlemiseks?

- ○ Jah
- ○ Pigem jah
- ○ Pigem ei
- ○ Ei

14. Juhul kui koolides oleks võimaldatud kooliõe ning nahaarsti vaheline telekonsultatsiooniteenus, Sinu aknele viitavate tunnuste põhjalikumaks hindamiseks eriala spetsialisti poolt, kas kasutaksid seda teenust?

* Telekonsultatsiooni käigus teeb kooliõde probleemsest näonahast pildid ning edastab need koos täiendava informatsiooniga nahaarstile, kes annab õpilase näonahale individuaalse hinnangu ja edasised soovitused probleemi käsitlemiseks või ravi alustamiseks.

- ○ Jah
- ○ Ei
- ○ Jah, kuid vaid juhul kui kooliõde ise teenust soovitaks

15. Kui vastasid eelmisele küsimusele Ei, siis palun põhjenda!

Teie vastus