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EVALUATION OF CLINICAL DIAGNOSIS WITH "STORE AND FORWARD" TELEDERMATOLOGY

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Teledermatology is defined as practical dermatology using adequate means of electronic communication and information technologies. In teledermatology, the most economical and representative method is the so-called "store and forward'' (SF) method. SF method commonly uses digital photography and history that are delivered over the Internet and is intended for consultation with a dermatologist who is spatially distant. The aim of the research was to determine the degree of diagnostic accuracy and diagnostic agreement of the diagnoses that were determined by real-time examination and diagnosis that have been set by teledermatology method in various consultative centers. Material for the evaluation of the clinical diagnosis reperesent 300 digital photographs of 100 dermatological diseases. Out of 100 diagnoses that were sent to teledermatology evaluation, four consultative teledermatology centers have set a total of 321 correct diagnosis. The obtained values of all teledermatologist individually in relation to the primary clinical diagnosis are statistically significant and may be accepted as a measure of validity of the method used. *Acta Medica Medianae 2010;49(4):23-30.*

Key words: *teledermatology, "store and forward" (SF) method*

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Introduction

In the past ten years, the development and diffusion of telecommunications systems, their integration, development, digital data processing and the Internet, its easier use and low cost components led to the implementation and development of telemedicine in many countries (1).

Therefore, the information technology (IT) has been recognized by physicians as an important factor of good clinical practice. It will in the near future, almost entirely, represent an integral part of health care in all developed countries (2.3). As a system of health care providing, telemedicine has been defined by the World Health Organization (WHO) as a practical medical care using interactive audio, visual communication and data exchange. It represents a new technological development and its main goal to improve health and health care using personal computers. It is important to point out that telemedicine is a medical process rather than pure technology. Since it is technologically feasible and economically viable, it deserves the full attention of researchers (3-5).

Teledermatology is defined as a practical dermatology using adequate means of electronic communication and information technologies. It includes diagnosis, consultation, treatment, transfer of medical information, education and training (6,7).

In teledermatology, the most economical and representative method is the so-called "Store and forward (SF) method. SF method commonly uses by digital photography and history that are delivered over the Internet and are intended for consultation with a dermatologist who is the spatially distant The progress of SF teledermatology is parallel with the development and advancement of digital cameras and the Internet (7-9). There is a need to harmonize criteria and set the standards when establishing teledermatology diagnosis. The level of diagnostic accuracy depends on the same computer techniques that are available, the level of expertise and continuous teledermatology training (10,11).

A simple S & F system of teledermatology presents the use of electronic mail (e-mail), which involves adding items to send data to the appropriate software such as Eudora, or web viewers such as Internet Explorer, Netscape Communicator, Mozila Firefox and others. Example of teledermatology system that is based on the

use of electronic mail is DORIS in Norway. Many advanced systems for teleconsultations contain an integrated database system for searching and easier handling for consultants. For example, Walter Reed Army Medical Center uses a web system for teleconsultations that connects and uses more than 100 military bases the United States and worldwide (15,16). Because the S & F teledermatology consultations have not been affirmed yet in many countries, little financial investment will be required for the development of large robust systems that would benefit a large university systems or organisations.

Currently, a number of countries and organizations in the European Union is working on establishing standards for the use tele-dermatology (17).

Numerous studies have been performed in this field of application. The ability of patients to make and send photos to dermatologist was investigated to evaluate opportunities and proposals of the plan leg ulcer treatment through pictures on mobile phones. All the studies were designed to allow patients who gravitate to a particular area of ongoing relationship with doctors in order to reduce office visits to physicians (12, 15-18). This and similar ways to provide health care advances in accessibility of doctors in reducing the time patients stay in hospital especially those who can achieve that through the S & F teledermatology (13-17).

Today, cheap digital cameras can easily reach the recommended minimum of image quality of 640 x 480 pixel resolution (2.16 to 18). The degree of diagnostic agreement between physicians who use S & F teledermatology and clinical examination ranges from 41-89%. Studies often compare the single most common response and diagnosis. The percentage of partial diagnostic agreement includes differential diagnosis and is 51-95% (9,20,21). Provision of adequate medical records or clinical information increases the diagnostic agreement and represents an essential part of the S & F system (19).

Research goal

- The level of diagnostic accuracy and diagnostic consent, diagnoses that were determined on a review of real-time and diagnoses that were applied by teledermatology in various consultative centers;
- Determination of diagnostic accuracy and statistical significance of teledermatology diagnosis.
- Establishing technological standards for the performance of teledermatology in our conditions.
- Establishing technical standards of digital records and medical records in teledermatology.

Material

Teledermatology consultants:

All participants for teledermatology consultations were specialists of dermatovenereology, minimum Masters of Medical Sciences, and until now had at least one study in the field of teledermatology.

Profile of research participants is shown in Table 1.

Table 1. Overview of teledermatology consultants

Clinical profile of participants	Clinical diagnosis
Diagnosis	K1
Consultant	TD1 TD2 TD3 TD4
Total	5

Digital photography for the evaluation of clinical diagnosis

Material for the evaluation of the clinical diagnosis involves 300 digital photographs of 100 dermatological diseases. The projection of each disease was made on three images: a photo of the whole body, characteristic changes on the part of the body and changes in the macro photography mode.

Teledermatology workstation:

The study used a personal computer system that contains the basic hardware and software elements: personal computer (with keyboard and mouse), computer monitor 15 inches or 17 inches (CRT model with cathode tubular), dial-up or ISDN modem to connect to the Internet, e-mail clients to receive tele-dermatology materials (Microsoft Office Outlook 98/2000/2003, Mozila Thunderbird 2.0, Netscape Communicator 5.0), software for analysis, preparation and comparison of digital images for electronic transfer mode (Adobe Photo Shop 7.0. ACD SE 5.0.), USB interface for connecting workstations with digital cameras and camera to switch pictures. Teledermatology workstations have different technical characteristics and configuration and meet the minimum technical requirements for conducting investigations in accordance with the standards recommended in the literature and telemedicine associations in Europe and the U.S. .

The minimum technical characteristics of teledermatology workstations: Intel Pentium / Athlon 133MHz, 32 MB RAM, 2 GB of memory space on hard drive, 4MB of graphics memory map, a CRT screen resolution 800x600 pixels, colors display of 24 or 32 bits, the operating system Windows 98SE or XP

Methods

The study was carried out by "store and forward (SF) system of teledermatology.

Clinical diagnosis: The diagnosis was done directly during clinical examination. Digital photos with a basic medical history (age, sex, brief

history of the patient's illness) are electronically sent to other consultants.

Optimizing photos were done in terms of color quality, clarity and sharpness of images. Editing the correction of digital photos that ranged from 500 kb to 1280x1024 pixels (clinical and ulcus cruris) to 1.5 Mb with 1600x1200 pixels and (dermoscopic and histological pictures) in RGB color mode (36 bit). All images are reduced to the size of 640x480 pixels in RGB color mode (24 bit) and compressed JPEG compression, which allows a fixed image quality. Compression and subsequent photographs were processed by the software Adobe Photoshop 7 (Adobe, San Jose, Calif.) at 8 JPEG compression (the value is proportional to the percentage of compression). At the end of the compressed images have a size of 48-67 kb on average (53KB) without loss of quality compared to the original image.

The size of the photographs that allows rapid transmission of electronic mail and expert evaluation of other consultants was obtained.

The diagnostic agreement of consultants was carried out in relation to the primary clinical diagnosis. The degree of diagnostic accuracy between the examiners who set the primary diagnosis and examiners who have set teledermatology diagnosis was determined according to the scale: 1. true - if the diagnosis set by consultants is identical as the primary one or is established and acceptable as a differential diagnosis. 2. incorrect - if the consultant's diagnosis is completely different from the primary diagnosis or the diagnosis has not been established.

After processing the obtained data, all diagnoses were classified according to groups of dermatological diseases and analyzed by the system correct - incorrect. Then all clinical diagnoses are classified into categories of derma-tological diseases and the degree of diagnostic agreement was determined for each disease and each group of examiners. At the end, the degree of overall diagnostic agreement of all tele-dermatologists was determined.

Electronic transmission of materials in digital form (digital photographs with patient data, dermoscopic and dermatohistologic pictures) for setting SF teledermatology diagnosis was carried out by electronic mail via an integrated e-mail client web browser Mozilla Firefox 5.0, and on-line wireless Internet (UTP networks, PSP Protocol), a speed of 256 kb / sec in Flatt regime.

After processing the material and seting the diagnosis, consultants sent their answers electronically via e-mail.

Statistical data processing and analysis of results was performed using the DAG software (Diagnostic and Agreement Statistics Software http://www.mhri.edu.au/biostats/DAG_Stat) and Analyse-It software for Microsoft Excel (version 1.68, Analyse-It Software Ltd., Leeds, United Kingdom).

Diagnostic agreement was defined by the number of investigated cases in which the obtained diagnostic agreement was divided by the total number of tested dermatoses. By using statistical analysis, diagnostic sensitivity (SE), specificity (SP) and efficiency (EF) were determined. The sensitivity of diagnostic methods is the percentage of correct answers and specificity is the difference between examiners, which presents the percentage of incorrect responses. Efficiency is the degree of diagnostic accuracy. The resulting values are determined by the values of 0-1 (0-100%). Evaluation of diagnostic agreement of all participants is determined by the degree of compliance within the diagnostic categories of disease studied and between examiners.

The degree of diagnostic agreement achieved by the method of teledermatology was determined by determining the Cohen's kappa (k) coefficients. Kappa coefficient of diagnostic agreement represents the ratio of correct and incorrect diagnoses of two or more examiners with values ranging in the interval from -1 to 1. The interpretation of the coefficient k kappa (and the determination of 95% confidence interval of the values) was performed according to the scale values of Landis and Koch, which is shown in Table 2 (22-24).

Table 2. Coefficient kappa and assessment of diagnostic agreement (Landis and Koch)

< 0	Without consent
0.01–0.20	Minor consent
0.21– 0.40	Sufficient agreement
0.41–0.60	Moderate agreement
0.61–0.80	Substantial agreement
0.81–0.99	Almost complete agreement
1	Full consent

Testing of statistical significance of difference relations of the set correct and incorrect diagnoses of all teledermatologists, diagnostic precision, sensitivity and specificity and comparison of the values was performed by z-test and nonparametric test characteristics, while testing the hypotheses about approval (independence) was performed by Mc Nemmar $\chi 2$-squared test (2x2 contingency tables) for the threshold of significance $p = 0.05$.

Place and time of research

Department of Dermatology and Venereal Diseases, Clinical Center Niš is the center in which the diagnosis was set (1 consultant). Digital photos with basic data (age, sex, brief history of the patient's illness) were electronically transmitted to other consulting centers:

Clinical Centre Banja Luka- 1 - consultant-teledermatologist

Department of Dermatology and Venereal Diseases - Belgrade Military Medical Academy - 2 Consultants – teledermatologists

Department of Dermatology and Venereal Diseases-Clinical Centre Nis - 1 consultant – teledermatologist

The survey was conducted during February 2010 - September 2010

Results

Material for teledermatology assessment of clinical diagnosis presented digitally projected 100 patients who were treated at the hospital or outpatient clinic for skin and sexually transmitted diseases in the period from February 2010 to September, 2010. Digital projection was performed in 43 (43%) men and 57 (57%) women, of whom the youngest patient was two years and the oldest 88 years old. The average age of patients evaluated by clinical diagnosis was 53 years. For purposes of statistical analysis, all the diagnosis were classified in diagnostic groups according to dermatological properties. In Table 3, reviews of the clinical diagnoses were evaluated by teledermatologists.

Out of 100 diagnoses that were sent to teledermatology evaluation, four consultative teledermatology centers set a total of 321 correct diagnosis. The total number of correct diagnoses of all teledermatologists and review of accurate diagnoses by diagnostic group of diseases is shown in Table 4.

Table 3. Dermatological diagnoses evaluated using teledermatology

1. Infectious Tinea capitis, pedis, cruris, barbae 9 Pytiriasis versicolor 4 Candidiasis 3 Folliculitis 3 Celulitis 2 Erysipelas 2 Herpes zoster 2 Herpes simplex 2 Scabies 2 Onychomicosis Condylomata acuminata Moluscum contagiosum Verucae vulgaris Ukupno: 33	4. Diseases with acne Acne comedonica 2 vulgaris, 2 pustulosa, 2 papulosa, 2 Rosacea Dermatitis perioralis Demodicosis Total: 11 5. Autoimmune Diseases Pemphigus vulgaris 3 Pemphigoid 3 Lupus erythematodes dsicoides 3 Ukupno: 9
2. Papuloskvamozne Psoriasis (vulgaris, pustulosa, inversa) 6 Lichen planus 4 Neurodermitis 3 Pytiriasis rosea 3 Psoriasis erythrodermica Mb. Darier Ichtyosis Ukupno: 19	6. Tumori kože Ca basocelulare 2 Ceratosis actinica 2 Keratoacanthoma 2 Naevus sebaceus Metastasis cutis Ukupno: 8
3. Alergijske bolesti Erythema multiforme 3 Urticaria 3 Dermatitis alergica medicamentosum 2 Dermatitis contacta 2 Purpura 2 Erythema fixum 2 Ukupno: 14	7. Druge bolesti Sclerodermia 2 Pyoderma gangrenosum 2 Dermatomyositis Mb. Behcet Ukupno: 6

Table 4. Broj Number of correct diagnoses set by teledermatologists by diagnostic groups

K	Category dermatosis	TD1	TD2	TD3	TD4	Ukupno
33	Infectious	29	26	27	28	110
19	Papulosquamous	15	15	15	16	61
14	Allergic	13	13	11	10	47
11	Acne	9	9	8	8	34
9	Autoimmune	9	7	8	9	32
8	Tumors	7	6	5	6	24
6	Other	3	3	3	4	13
100	Total	85	79	77	81	321

Table 5. Degree and evaluation of teledermatology compliance K-TD1-TD2-TD3-TD4

Type of lesions	K-TD1-TD2-TD3-TD4					
	kappa	95% IP kappa	SE	SP	EF	Rating
Infectious	*0.81**	*(0.68-0.95)*	*1.00*	*0.81*	*0.90*	almost complete
Papulosquamous	*0.78*	*(0. 59-0.98)*	*1.00*	*0.78*	*0.89*	significant
Allergic	*0.85*	*(0.66-1.04)*	*1.00*	*0.85*	*0.92*	almost complete
Acne	*0.81**	*(0.58-1.05)*	*1.00*	*0.81*	*0.90*	almost complete
Autoimmune	*0.88*	*(0.67-1.09)*	*1.00*	*0.88*	*0.94*	almost complete
Tumors	*0.75*	*(0.43-1.06)*	*1.00*	*0.75*	*0.87*	significant
Other	*0.50*	*(0.07-0.92)*	*1.00*	*0.50*	*0.75*	moderate
The mean value	*0.80***	*(0.71-0.88)*	*1.00*	*0.80*	*0.90*	significant

† p<0.05 * Lower limit value
** Upper limit value

Table 6. Kappa coefficient and final assessment of diagnostic agreement of all examined groups

Correlation group	kappa	SE	SP	EF	95% IP k	Rating
K-TD1	*0.85*	*1.00*	*0.85*	*0.92*	*(0.77-0.92)*	almost complete
K-TD2	*0.79*	*1.00*	*0.79*	*0.89*	*(0.70-0.87)*	significant
K-TD3	*0.77*	*1.00*	*0.77*	*0.88*	*(0.68-0.85)*	significant
K-TD4	*0.81**	*1.00*	*0.81*	*0.90*	*(0.73-0.88)*	almost complete
TD1-TD2	*0.64*	*0.85*	*0.79*	*0.82*	*(0.53-0.74)*	significant
TD1-TD3	*0.64*	*0.87*	*0.77*	*0.82*	*(0.53-0.74)*	significant
TD1-TD4	*0.66*	*0.85*	*0.81*	*0.83*	*(0.51-0.59)*	significant
TD2-TD3	*0.56*	*0.79*	*0.77*	*0.78*	*(0.44-0.64)*	moderate
TD2-TD4	*0.66*	*0.85*	*0.81*	*0.83*	*(0.55-0.76)*	significant
TD3-TD4	*0.70*	*1.00*	*0.70*	*0.85*	*(0.56-0.83)*	significant
K-TD1-TD2-TD3-TD4	*0.80***	*1.00*	*0.80*	*0.90*	*(0.71-0.88)*	almost complete

* Lower limit value

Diagnostic agreement in the group K-TD1 (TD1 teledermatologists diagnostic agreement in relation to the primary clinical diagnosis) is nearly complete (k=0.85, SE 100%, SP 85% and EF 92%).

Diagnostic agreement in the group K-TD2 (TD2 teledermatologists diagnostic agreement in relation to the primary clinical diagnosis) was significant-(upper limit value, k=0.79, SE 100% SP79% and EF 89%).

Diagnostic agreement in the group K-TD3 (TD3 teledermatologists diagnostic agreement in relation to the primary clinical diagnosis) was significant-(upper limit value, k=0.79, SE 100%, SP 79% and EF 88%). A complete diagnostic agreement was achieved for a group of other diseases (k=1, 100%, SP 79%, EF 89%).

Diagnostic agreement in the group K-TD4 (diagnostic agreement of teledermatologists TD4 in relation to the primary clinical diagnosis) is almost complete-(lower limit value, k=0.81, SE 100%, SP 81% and EF 90%). A complete diagnostic agreement was achieved for a group of auto-immune diseases (k=1, SE, SP and EF 100%).

Diagnostic agreement in the group TD1-TD2 (diagnostic agreement of teledermatologists TD1 and TD2 in relation to the primary clinical diagnosis) was significant (r=0.64, 85%, SP 79% and EF 82%).

Diagnostic agreement in the group TD1-TD3 (diagnostic agreement of teledermatologists TD1 and TD3 in relation to the primary clinical diagnosis) was significant (r=0.64, SE 87%, SP 77% and EF 82%).

Diagnostic agreement in the group TD1-TD4 (diagnostic agreement of teledermatologists TD1 and TD4 in relation to the primary clinical diagnosis) was significant (r=0.66, 85%, SP 81% and EF 83%). A complete diagnostic agreement was achieved for a group of autoimmune diseases (k=1, SE, SP, EF 100%). Without the consent of the evaluated diagnostic group differences for other diseases (k=0, 77%, SP 66%, EF 50%, a statistically significant difference p<0.05).

Diagnostic agreement in the group TD2-TD3 (diagnostic agreement of teledermatologists TD2 and TD3 in relation to the primary clinical diagnosis) was moderate (r=0.56, SE 79%, SP 77% and EF 78%). Without the consent of the evaluated diagnostic group differences for other diseases (k=0, SE 79%, SP 77%, EF 78%, a statistically significant difference p<0.05).

Diagnostic agreement in the group TD2-TD4 (diagnostic agreement of teledermatologists TD2 and TD4 in relation to the primary clinical diagnosis) was significant (r=0.66, 85%, SP 81%

and EF 83%). Without the consent of the evaluated diagnostic group differences for other diseases (k=0, 42%, SP 57%, EF 50%, a statistically significant difference p <0.05).

Diagnostic agreement of all examiners K-TD1-TD2-TD3-TD4 (diagnostic agreement of teledermatologists TD1, TD2, TD3 and TD4 in relation to the primary clinical diagnosis) is significant (the upper limit value, k=0.80, SE 100%, SP 80% and EF 90%). Almost complete diagnostic agreement was achieved for a group of infectious (lower limit value, k=0.81, SE 100%, SP 81% EF 90%), allergic (r=0.78, SE 100%, SP 85%, EF 92%), acne (lower limit value, k=0.81, SE 1005, SP 81%, EF 90%) and autoimmune diseases (k=0.88, SE 100%, SP 88%, EF 94%). Significant diagnostic agreement was achieved for the group papulosquamous (k=0.78, SE 100%, SP 78%, EF 89%) and tumor group (r=0.75, SE 100%, SP 75%, EF 87%). Moderate agreement was achieved for a group of other skin diseases (k=0.50, SE 100%, SP 50%, EF 75%, a statistically significant difference p<0.05). Teledermatology evaluation results are shown in Table 5.

Table 6 presents the summarized results of diagnostic agreement of all the groups. The evaluation of diagnostic agreement ranging from moderate for the group TD2-TD3 (k=0.56), significant for the group K-TD1 (k=0.85), K-TD2 (k=0.79), TD1-TD2 (k=0.64), TD1-TD3 (k=0.64), TD1-TD4 (k=0.66), TD2-TD4 (k=0.66), TD3-TD4 (k=0.70) is almost complete for the group K-TD1 (k=0.85), K-TD4 (lower limit value, k=0.81) and almost complete diagnostic evaluation of compliance by comparing all the test groups (the upper limit value, k=0.80).

Discussion

The obtained data which refer to the degree of diagnostic consent could be compared with data from the literature, as numerous researches in the field of teledermatology have been conducted. Teledermatology diagnostic efficacy in comparison to the primary clinical diagnosis in our study was determined for each individual and all teledermatologists. Looking at individual results of diagnostic agreement, teledermatologist TD1 and TD4 achieved almost complete diagnostic agreement in relation to primary diagnosis. The values of the kappa coefficient for the TD4 is the lower limit value (k=0.81). Teledermatologists TD2 and TD3 achieved slightly weaker result, which was considered as a significant teledermatology consent. The values of the kappa coefficient for TD2 is also the limiting value (k=0.79). The highest level of diagnostic agreement and kappa coefficient value k=1 according to the diagnostic categories generated TD1 and TD4 for a group of autoimmune diseases and TD2 for a group of other diseases. The weakest level, moderate diagnostic agreement for the kappa coefficient value k=0.50 were realized by TD1 and TD3 a group of other diseases. The degree of diagnostic difference is statistically significant at p<0.05. For other diagnostic categories diagnostic agreement was reached which ranges from significant to complete diagnostic agreement. The obtained values of diagnostic consents of all teledermatologists individually in relation to the primary clinical diagnosis are statistically significant and may be accepted as a measure of validity of the used method. The level of diagnostic agreement of all teledermatologists is statistically significant and can be considered as a measure of the validity of methods for setting the diagnosis using teledermatology. Variations of the results obtained according to the literature can be explained by differences in the size, type and variability of the sample, the definition of consent, teledermatology questioning variability and the exclusion of certain dermatological diagnoses and diagnostic categories (25). A certain number of diagnoses that were ranked as accurate present the differential diagnoses. In literature, there are researches which deal with increasing level of diagnostic agreement with the differential diagnosis and suggests that dermatologists prefer to set the differential diagnosis rather than primary dermatological diagnosis (26).

Conclusion

Clinical assessment of clinical diagnosis using "store and forward" method of teledermatology is equal to the diagnostic evaluation of clinical diagnosis in real time. Diagnostic differences were not statistically significant.

With the method of teledermatology, clinical diagnosis can be set.

Teledermatology (store and forward) can be carried out using technical equipment, which includes the following minimum technical characteristics: computer, configuration, which supports the operating system: Windows 2000 | XP, with at least 64 MB of virtual memory.Connect to the Internet via cable modem, the lowest speed of 3.3 MB/s.Internet browser: Explorer 6.0 or older (with 128-bit ecripsy), Mozilla Firefox, Netscape, Opera. Monitor 17cm diagonal least 1024x768 pixels resolution. Digital camera, 3.1 megapixel resolution and faithful color vision-display recommendations: Nikon, Canon, Hewllet Pacard. Teledermatology method (store and forward) can be performed by dermatologists who are familiar with the basics: computer technology, internet data transmission, digital projection, digital photography.

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PROCENA VALIDNOSTI KLINIČKE DIJAGNOZE "STORE AND FORWARD" METODOM TELEDERMATOLOGIJE

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Teledermatologija se definiše kao praktična dermatologija koja koristi adekvatna sredstva elektronske komunikacije i informacione tehnologije. U teledermatologiji je najzastupljenija i najekonomičnija tzv. "store and forward" (SF) metoda. SF metoda uobičajeno koristi digitalne fotografije i anamnezu, koje se dostavljaju preko Interneta i namenjene su za konsultaciju sa dermatologom koji je prostorno udaljen.

Cilj istraživanja bio je utvrđivanje stepena dijagnostičke preciznosti i dijagnostičke saglasnosti, dijagnoza koje su određivane na pregledu u realnom vremenu i dijagnoza koje su postavljane metodom teledermatologije u različitim konsultativnim centrima. Materijal za procenu kliničke dijagnoze predstavlja 300 digitalnih fotografija 100 dermatoloških oboljenja. Od ukupno 100 dijagnoza koje su poslate na teledermatološku evaluaciju, 4 konsultativna teledermatološka centra je postavilo ukupno 321 tačnu dijagnozu. Dobijene vrednosti dijagnostičkih saglasnosti svih teledermatologa ponaosob u odnosu na primarnu kliničku dijagnozu imaju statistički značaj i mogu se prihvatiti kao merilo validnosti korišćene metode. *Acta Medica Medianae 2010;49(4):23-30.*

***Ključne reči**: teledermatologija, "store and forward" (SF) metoda*