

## Effect of health behaviors on presentation and condition of the skin – a preliminary report

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### ABSTRACT

**Introduction:** Skin condition is determined by multiple factors, among them some which are beyond human control. However, it can be also indirectly modulated by positive health behaviors and cosmetic procedures.

**Objective:** To analyze health behaviors and knowledge of factors determining skin condition among Polish university students.

**Materials and methods:** The diagnostic survey, based on a questionnaire developed by the authors, included a total of 75 respondents.

**Results:** The largest proportion of the study participants evaluated condition of their skin as moderate (41.3%). According to most respondents, skin condition is positively affected by balanced diet (78.7%), physical activity (68%), collagen (68%), calcium (41.3%) and diet rich in vegetables, fruits, fish, rice and grits. Up to 60% of the study subjects

declared present or past intake of dietary supplements, 44% used dedicated cosmetics for facial skincare, and 58.7% consumed 1-2 liters of fluids per day. Sweetened beverages, alcohol, excess of coffee, tea and herbal infusions were considered unfavorable for skin health, similar to stimulants, such as cigarettes, alcohol, drugs and coffee. Up to 38.7% of the respondents declared a sedentary lifestyle. In the participants' opinion, stimulants (85.3%), lack of hygiene (76%), inappropriate fluid repletion (68%) and too low physical activity (62.7%) are the most harmful factors for skin health.

**Conclusions:** The study participants had basic knowledge of health behaviors and their beneficial or detrimental effects on the condition of human skin. The majority of the respondents used skincare cosmetics dedicated to a given body area.

**Keywords:** Skin, health behaviors, knowledge

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## **INTRODUCTION**

Well-maintained skin was considered a canon of beauty already in the ancient times. Nowadays, medical sciences, especially esthetic medicine and cosmetology, offer a support for contemporary humans who are constantly exposed to the canons of a young and perfect body, and seek assistance and help in skin care, treatment of dermatological defects and signs of aging. However, many people seem to forget that condition of their skin is determined not only by extrinsic but also by intrinsic factors, such as systemic disorders, other comorbidities, addictions, dietary habits and genetic predisposition. Many etiopathogenic factors are beyond human control, and others can be controlled only to some degree [1]. Activities that exert either a positive or negative effect on human health are referred to as health behaviors (undertaken to improve or strengthen one's health) or health-related behaviors (usually driven by one's habits and responses to life situations, rather than being undertaken on purpose) [1]. Depending on their health consequences, human activities can be classified as pro- and anti-health behaviors. The first group includes health promoting activities, such as rational diet and physical activity, that protect one against potential threats and are aimed at restoration of health [2,3]. In contrast, the second group comprises all behaviors that constitute a direct or indirect health threat, e.g. alcohol or substance abuse and tobacco smoking. Health behaviors are modulated by three groups of factors. Predisposing factors (one's knowledge, beliefs and system of values), facilitating factors (availability of healthcare services and health policy in a given country) and strengthening factors (associated with one's environment, e.g. social conventions determining acceptance of a given behavior) [4].

Primary health behavior that exerts a positive effect on overall body condition, including status of the skin, is physical activity, which stimulates the lymphatics and increases blood pressure, thus markedly improving oxygen and nutrient supply. However, physical activity is inevitably associated with sweating, which increases during a strenuous physical exercise. Sweating is a physiological response of human body, and plays an important role in thermoregulation; however, it may exacerbate skin ailments in persons whose skin is sensitive or prone to acne. Although the sweat is primarily composed of water, it also contains salt, fats, urea and minerals, which together with the sebum may block skin pores and promote growth of bacteria, predisposing to eczema and development of blackheads [4]. Physical activity is a main factor influencing skin condition, and sedentary lifestyle has a number of negative consequences [4], among

them partial loss of bactericidal properties of the skin (which becomes more sensitive to extrinsic factors), dryness and loss of elasticity resulting from limited supply of oxygen and nutrients. The lack of physical activity may also indirectly contribute to a decrease in the rate of collagen synthesis, which promotes development of wrinkles and aging [4]. Another important determinant of dermal condition is balanced diet, providing appropriate tonus and adequate hydration of the skin [5]. The latter is particularly important, since water is a carrier of nutrients, and plays a role in the elimination of metabolites and toxins accumulated in the tissues. Deficiency of water disrupts water-electrolyte and acid-base balance, and interferes with thermoregulatory processes. Therefore, recommended daily intake of water approximates 2.5 liters. The most beneficial for skin condition are foods rich in vitamins A, E and C, i.e. strong antioxidants that slow down the process of aging, protect tissues against damage and promote their regeneration [6]. Healthy diet should contain vegetables, fruits, dairy and fish. Further, it should be remembered that some foods may exert a negative effect on skin condition; for example, excessive consumption of sweets and highly-processed foods may either promote or exacerbate dermatological lesions, e.g. acne [6]. Condition of the skin is also modulated by water-soluble vitamin B complex, i.e. thiamin (B1), riboflavin (B2), pyridoxine (B6), cobalamin (B12), niacin (PP), folic acid, pantothenic acid, para-aminobenzoic acid, inositol, biotin and choline. These nutrients are natural components of some foods, such as lean beef, chicken meat, almonds, sunflower seeds, soy products, legumes and green vegetables. Vitamin B complex exerts an anti-stress effect, supports circulation and metabolism, and as such may slow down the process of preterm aging and prevent acne. Moreover, vitamins from this group are actively involved in cell proliferation, which makes them vital for wound healing. Their deficiency may result in skin pallor, pigmentation disorders and dandruff. Furthermore, long-term deficiency of vitamin B complex may predispose to oral ulcers and skin eczema [7].

Another vitamin with an established beneficial effect on skin condition is fat-soluble vitamin D, present in fish, such as herring, salmon and mackerel, as well as in soy milk, alfalfa and egg yolk [8]. Similar to vitamin A, also vitamin D plays a supportive role in the treatment of acne and herpes. Moreover, vitamin D increases the bioavailability of calcium. Deficiency of vitamin D manifests as the loss of skin vitality, poor mineralization of the bones, constitutional growth delay in adolescent years and osteoporosis at an older age [8]. Another physiological component of the skin are minerals, such as zinc, iodine, silicon and sulfur [6].

Primary dietary sources of zinc include sprouted grains, pumpkin and sunflower seeds, fish, eggs and nuts. Zinc boosts immunity, supports wound healing and treatment of acne. Its deficiency may predispose to or exacerbate dandruff, and result in a greater susceptibility to dermal infections. Iodine present in fish, seafoods and sea salt, may influence the skin condition, supporting wound healing and metabolic processes. Iodine prevents formation of wrinkles and skin roughness, but may also exacerbate acne. Silicon, contained in linseed, barley, apples and berries, promotes collagen synthesis, and thus plays a role in the maintenance of appropriate skin tonus, preventing formation of wrinkles. Also sulfur, abundant in root vegetables, is beneficial for the skin, providing its smoothness; however, when provided in excess, sulfur may also predispose to skin dryness, rash and eczema [6].

Also dietary fats are vital for skin health, playing a role in the maintenance of its adequate hydration [8]. Skin condition is a primarily influenced by two groups of fatty acids, omega-3 and omega-6. Omega-3 fatty acids are present in cold water fishes, such as salmon, tuna and mackerel, as well as in linseed, sunflower oil and Brazil nuts. Omega-3 fatty acids support production of sebum and promote wound healing. Their appropriate dietary intake contributes to healthy appearance and appropriate hydration of the skin, and their deficiency may predispose to scaling and inflammation. Omega-6 fatty acids, abundant in primrose oil and blackcurrants, make the skin smooth and well-nourished [8].

## Purpose

The aim of this study was to analyze health behaviors and knowledge of factors determining skin condition among Polish university students.

## MATERIALS AND METHODS

The study, designed as a diagnostic survey, was conducted between February 20, 2017 and March 5, 2017. The survey, based on a questionnaire developed by the authors, included a total of 75 respondents aged 20-25 years, university students from Lomza (Poland). The results were pooled and presented as descriptive statistics and graphs.

## RESULTS

The respondents were asked to self-evaluate their skin condition. The largest proportion of the study participants evaluated condition of their skin as moderate (41.3%). Others found their skin condition as very good (18.7%), good (6.67%) or poor (9.3%), or were unable to give an exact answer to this question (24%). Although skin condition is determined by a plethora of factors, a key role is played by health behaviors. Our respondents identified both positive behaviors, such as maintaining balanced diet (78.7%) and undertaking physical activity (68%), and negative behaviors, e.g., excessive use of tanning beds or stimulants, as significant determinants of skin condition (Table 1).

**Table 1.** Health behaviors exerting a positive effect on skin condition

Health behavior	Number*	Percent*
Physical activity	51	68%
Fat-rich diet, irregular meals	4	5.3%
Lack of physical activity	5	6.7%
Central heating	12	16%
Balanced diet	59	78.7%
Everyday bath	41	54.7%
Use of natural cosmetics	40	53.3%
Everyday use of multiple cosmetics	32	42.7%
Use of tanning bed a few times per week over a whole year	4	5.3%
Simultaneous use of medications and dietary supplements influencing skin condition	14	18.7%
Repletion of fluids with sweetened beverages	12	16%
Adequate amount of sleep (8 hours per day)	47	62.7%
Repletion of fluids (2-3 liters of neutral fluids, e.g. water, per day)	31	41.3%
Restrictive diet	7	9.3%
Use of dietary supplements	22	29.3%
Use of stimulants (alcohol, cigarettes, psychoactive substances)	3	4%
Hard to tell	2	2.7%

\* The results do not sum up to 100% since the respondents were allowed to choose more than one answer.

Another question regarded the effect of vitamins and the minerals on skin condition. The largest percentage of the study subjects considered collagen (68%) and vitamin B complex i.e. vitamin B12 (48%), B1 (40%) and B2 (34.7%) as beneficial for the skin. According to some respondents, also vitamin A (20%) and its precursor,  $\beta$ -carotene (29.3%), exerted a positive effect on skin health. In turn, vitamin C (14.7%) and vitamin E (10.7%) were chosen less often as the determinants of good skin condition. The list of minerals that have been most often considered beneficial for the skin included calcium (41.3%), iodine (40%) and magnesium (20%). Other, less frequently selected minerals were potassium (12%) and fluoride (10.7%). Only 9.3% of the respondents recognized beneficial effects of iron for skin health. According to the respondents, diet and indirectly also the way of preparing meals, exerted a significant effect on skin condition. The vast majority of the respondents declared their preference to meals prepared at home (54.7%) or at a restaurant (17.3%). Ready-to-eat dishes were preferred by 6.7% of the participants. Other study subjects were either unable to declare

their preference in this matter (8%), or they stated that the mode of meal preparation depended on the amount of available time (13.3%). Although steamed products were generally considered as the healthiest, this technique of food processing was used by only 12% of the respondents. While the largest proportion of the study subjects declared their preference to boiled (22.7%), roasted (18.7%) and fried foods (16%), microwave cooking (12%) and braising (8%) were used less often for food processing. Some of the study subjects (4%) were unable to identify their favorite method of food processing. Good condition of the skin is also determined by the type of consumed foods. Skin condition is markedly better in persons whose diet is rich in fruits, vegetables, fish, rice and grits, and may deteriorate due to excessive consumption of fat- and sugar-rich foods (Table 2). With no doubt, skin condition is also negatively affected by stimulants, not only cigarettes, psychoactive substances and alcohol, but also by coffee the excessive consumption of which contributes to skin dehydration and dryness (Table 3).

**Table 2.** Intake of various food products among the study subjects

Food product	Every day		A few times a week		Once a week		Not at all	
	%	n	%	n	%	n	%	n
Whole-wheat pasta	18.7%	14	29.3%	22	45.3%	34	6.7%	5
Fast foods	13.3%	10	22.7%	17	32%	24	32%	24
Grits	5.3%	4	21.3%	16	33.3%	25	30.7%	23
Regular pasta	40%	30	32%	24	17.3%	13	10.7%	8
Milk	29.3%	22	41.3%	31	10.7%	8	18.7%	14
Fruits	53.3%	40	26.7%	20	10.7%	8	9.3%	7
Fish	29.3%	22	26.7%	20	14.7%	11	29.3%	22
White rice	41.3%	31	28%	21	18.7%	14	12%	9
Sweets	54.7%	41	18.7%	14	12%	9	14.7%	11
Vegetables	48%	36	26.7%	20	16%	12	9.3%	7
Pork	37.3%	28	28%	21	24%	18	10.7%	8
Beef	9.3%	7	24%	18	29.3%	22	40%	30
Poultry	53.3%	40	21.3%	16	18.7%	14	6.7%	5
Brown rice	10.7%	8	14.7%	11	20%	15	56%	42
Dairy	42.7%	32	28%	21	17.3%	13	12%	9
Ripened cheese	37%	28	38.7%	29	12%	9	12%	9
Whole-wheat bread	36%	27	22.7%	17	17.3%	13	24%	18
White bread	44%	33	33%	25	16%	12	6.7%	5
Processed meats	18.7%	14	20%	15	40%	30	21.3%	16

**Table 3.** Use of stimulants among the study subjects

Stimulant	Every day		A few times a week		Once a week		Not at all	
	%	n	%	n	%	n	%	n
Alcohol	14.7%	11	21.3%	16	48%	36	16%	12
Coffee	29.3%	22	42.7%	32	8%	6	20%	15
Psychoactive substances	1.3%	1	4%	3	16%	12	78.7%	59
Designer drugs	4%	3	2.7%	2	5.3%	4	88%	66
Energy drinks	12%	9	9.3%	7	4%	3	74.7%	56
Cigarettes	29.3%	22	20%	15	21.3%	16	29.3%	22

Aside from diet and stimulants, condition of human body, including skin, is also modulated by a lifestyle. Active lifestyle exerts a positive effect on all body functions, improving

cell oxygenation, metabolism and general condition due to endorphin release. Unfortunately, up to 38.7% of the respondents preferred a sedentary lifestyle (Figure 1).

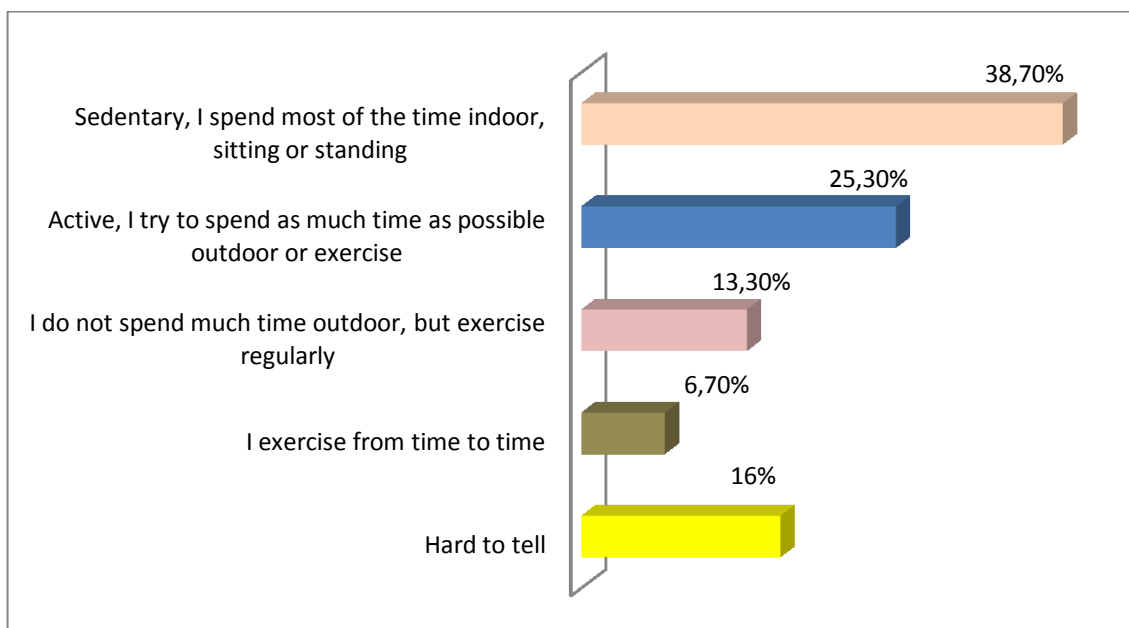


Figure 1. Lifestyle preferred by the study subjects

To improve condition of their skin, many persons use dietary supplements; according to their manufacturers, these products promote regeneration of the epidermis, blood perfusion, metabolism and many other processes that may influence skin condition. However, it should be remembered that concentrated supplements (e.g., tablets, solutions) do not constitute a primary source of vitamins and minerals, and the latter should be provided in their natural form, with foods. Our study confirmed high popularity of dietary supplements for skin, hair and nail health, since their use was declared by up to 60% of the respondents. According to 22.7% of the respondents, their skin condition has improved after the supplement intake; others reported no improvement (29.3%) or even noticed a deterioration of their skin condition (8%). The

effect of cosmetics on skin condition depends on their type. Facial skin should not be washed with soap since it may dry out a sensitive epidermis; however, soap is recommended for washing other body parts.

Cleansing lotions and gels are better for facial care, and recently also various cosmetic masks and scrubs gain their momentum as they better purify the skin surface and dermal pores (Table 4).

Face should be treated only with cosmetics dedicated exclusively for facial skin. While most respondents (44%) declared their preference to such products, a large proportion of the study subjects used the same cosmetics for facial care and general skin care (29.3%). Others washed both facial skin and other body parts with tap water (14.7%) or a delicate soap (12%).

Table 4. Skincare cosmetics used by the study subjects

Cosmetic	Often		A few times a week		Once a week		Not at all	
	%	n	%	n	%	n	%	n
Masks	18.7%	14	29.3%	22	22.7%	17	29.3%	22
Soaps	37.3%	28	18.7%	14	32.0%	24	12%	9
Scrubs	20%	15	30.7%	23	20%	15	29.3%	22
Lotions	34.7%	26	32%	24	6.7%	5	26.7%	20
Gels	36%	27	18.7%	14	13.3%	10	32%	24

Although the recommended daily intake of fluids approximates 2.5 liters, it should be remembered that this is only an estimate which should be adjusted for body weight and lifestyle. Most study participants (58.7%) declared that they drank 1-2 liters of fluids per day, and declared daily consumption of fluids in another 20% of the respondents varied between 2 and 3 liters. However, the study group included also the persons who drank more than 3 liters of fluids per day (9.33%), as well as those drinking less than 1 liter (12%). Condition of the skin is influenced not only by the volume of

consumed fluids, but also by their type and intake frequency. Sweetened beverages, alcohol, as well as the excess of coffee, tea and herbal infusions exert unfavorable effects on the skin. However, it should be emphasized that none of these beverages are harmful if consumed rationally. (Table 5). The last question was designed as an open-ended question to enable the participants to identify the factors which in their opinion were the most harmful for skin health. The list of the most harmful factors included stimulants (85.3%), lack of hygiene (76%), and low level of physical activity (62.7%) (Table 5).

**Table 5.** Types of beverages consumed by the study subjects

Beverage		Often		Quite often		Sporadically		Not at all	
Alcohol		16%	12	22.7%	17	46.7%	35	14.7%	11
Tea		38.7%	28	18.7%	14	32%	24	12%	9
Coffee		14.7%	11	20%	15	46.7%	35	18.7%	14
Herbal infusions		1.3%	1	4%	3	16%	12	78.7%	59
Fruit juice concentrates, syrups		29.3%	22	20%	15	21.3%	16	29.3%	22
Juices	fruit. unsweetened	16%	12	20%	15	36%	27	28%	21
	fruit. prepared at home	6.7%	5	16%	12	20%	15	57.3%	43
	fruit. sweetened	36%	31	16%	12	22.7%	17	20.0%	15
	vegetable	24%	18	28%	21	32%	24	16%	12
Fruit and vegetable pulps		36%	27	16%	12	22.67%	17	25.3%	19
Carbonated beverages		36%	36	16%	12	13.3%	10	22.7%	17
Water		45.3%	34	29.3%	22	18.7%	14	6.7%	5

## DISCUSSION

Healthy skin forms an integral barrier protecting underlying organs and tissues against harmful biological, chemical and mechanical factors [9]. According to Tourles, health behaviors, especially diet, addictions and physical activity, exert a significant effect on skin condition [7]. Woynarowska [4] defined health behaviors as intentional activities undertaken to improve and strengthen one's health [4]. Bojarczuk et al. [10] examined knowledge of skin care and its application in a group of 210 students aged between 19 and 34 years, among them 71% of women and 29% of men. Up to 96% of the study participants believed that diet has no effect on skin condition [10]. In contrast, individuals participating in our present study were well aware of health behaviors that are beneficial for skin health: they most frequently pointed to balanced diet (78.7%), physical activity (68%) and adequate amount of sleep (62.7%), and least often chose fat-rich diet (5.3%), excessive use of tanning beds (5.3%) and stimulants (4%).

According to Borzucka-Sitkiewicz [5], vitamins control key functions of human body. Thus, either their deficiency (hypovitaminosis) or excess (hypervitaminosis) manifest with vitamin-specific disorders [5]. Our respondents had a

relatively good knowledge of vitamins and other compounds exerting a beneficial effect on the skin; the largest proportion of the study subjects pointed to collagen (68%) and water-soluble vitamin B complex (B<sub>12</sub> - 48%, B<sub>1</sub> - 40% and B<sub>2</sub> - 34.7%). While also vitamins A, C and E are beneficial for the skin, they were identified as such by markedly less respondents, 20%, 14.67% and 10.67%, respectively. Probably, those vitamins were less often mentioned in the advertisements of cosmetic products and dietary supplements generally considered as food for skin health, or were primarily recognized for their role in the treatment or prevention of other conditions, e.g. common cold in the case of vitamin C. Among minerals, the least frequently chosen one was iron (9.3%), despite its beneficial effect on skin pigmentation and a role in the prevention of fingernail and hair splitting. In contrast, the study subjects recognized the beneficial effects of calcium (41.3%), iodine (40%) and magnesium (20%) on skin condition.

Our respondents showed relatively high level of nutritional awareness. Only a small proportion of the study subjects (6.7%) declared their preference of ready-to-eat dishes, and the majority of the participants prepared their meals at home (54.6%); typically, those persons preferred boiling (22.7%), roasting (18.7%) and frying (16%) as the methods of thermal processing.

A relatively small proportion of the study participants (12%) declared their preference to steaming, a method of food processing which according to Borzucka-Sitkiewicz [5] is good for human health. Probably this resulted from the fact that traditional Polish cuisine includes primarily roasted, boiled or fried dishes rich in animal fats.

According to Placek [6], condition of the skin and the rate of skin aging depend on the diet. Usually skin condition is better in persons whose diet is rich in vegetables, fruits and fish, whereas excessive intake of sweets and highly-processed foods typically exerts a detrimental effect on skin health [6]. The largest proportion of our respondents pointed to sweets (54.7%), fruits (53.3%), poultry (53.3%) and vegetables (48%) as the common components of their diet. Thus, except from sweets, the diet of most study subjects can be considered as relatively healthy. The list of the least often consumed products included brown rice (10.7%), beef (9.3%) and grits (5.3%). Low popularity of highly-processed foods might correspond to higher dietary awareness, but a relatively lesser interest of the respondents in grits and rice should be considered an alarming finding.

Syrek and Borzucka-Sitkiewicz [5] classified the use of stimulants, namely alcohol and substance abuse, and cigarette smoking, among negative health behaviors; if used in excess, all these stimulants may contribute to vitamin and mineral depletion, and accelerate the process of aging [5]. The most popular stimulants among the study subjects were cigarettes (29.3%), coffee (29.3%) and alcohol (14.7%).

According to Woynarowska [4], staying indoor, in air-conditioned rooms, especially in a sitting position, may contribute to a decrease in metabolic rate, and the lack of sunlight results in depigmentation of the epidermis [4]. Thus, sedentary lifestyle, declared by a considerable proportion of our respondents (38.7%) is unfavorable for presentation and condition of the skin.

In Tourles' [7] opinion, basic hygienic procedures play a key role in skin care, as they keep the epidermis clean, and thus facilitate functioning of deeper skin layers. However, it should be emphasized that excessive cleansing may be unfavorable, as it deprives skin of its natural protective barrier [7]. Each type of the skin requires special individualized treatment, and cosmetic products should be adjusted to both type and condition of the skin [11]. The vast majority (87%) of respondents participating in the study conducted by Bojarczuk et al. [10] took care for their skin every day, and most of them (71%) used facial cosmetics, namely a cleansing gel (68%), toner (39%) and micellar fluid (33%), on a daily basis. Equally large proportion of the respondents used a moisturizing cream (69%) or facial day and night

cream (54%). Matysek-Nawrocka et al. [12] surveyed a group of 100 persons; their respondents typically used water (n=50), cosmetic milk (n=48), gel (n=36), toner (n=26), toilet soap (n=22) and thermal water (n=14) for facial cleansing and make-up removal. One per two respondents used two or more cosmetics for facial cleansing [12]. Also in the study conducted by Zegarska et al. [13], the majority of the respondents used water (67.2%) and cleansing milk (44.0%) for facial care. Our respondents most often used soap (37.3%), gels (36%) and cleansing lotions (34.7%) for their skin hygiene. The majority of the study subjects (44%) used different cosmetics for facial and body care. According to Ciborowska and Rudnicka [8], daily requirement for water in a healthy person living in a moderate climate is 2.5 liters [8]. Students participating in the study conducted by Bojarczuk et al. [10] usually (48%) drank 1-2 liters of fluids per day. Based on those findings, the daily intake of fluids in our study participants should be considered sufficient, since 20% of them consumed 2-3 liters, and another 58.7% drank between 1 and 2 liters per day. The most commonly consumed beverages were water (45.3%) and tea (38.7%). However, a relatively high intake of carbonated beverages (36%) and sweetened fruit juices (36%) with high content of sugar should be considered alarming. Importantly, 68% of the respondents realized that inadequate hydration exerts a harmful effect on skin condition.

Appropriate care is important for skin protection. However, it should be remembered that skin requirements change with age, season of the year and physiological function of the tissue.

## CONCLUSIONS

1. The study participants had basic knowledge of health behaviors and their beneficial or detrimental effects on the condition of human skin.
2. The majority of the respondents used skincare cosmetics dedicated to a given body area.

## Conflicts of interest

The authors declare no conflicts of interest.

## REFERENCES

1. Kowalski M, Gaweł A. Zdrowie - wartość – edukacja [Health – value – education]. Oficyna Wydawnicza Impuls, Kraków 2006. (Polish)
2. Kulik TB, Latalski M. Zdrowie publiczne [Public health]. Wydawnictwo Czelej, Lublin 2002. (Polish)
3. Heszen I, Sęk H. Psychologia zdrowia [Health psychology]. Wydawnictwo PWN, Warszawa 2007. (Polish)

4. Woynarowska B. Edukacja zdrowotna. Podręcznik akademicki [Health education. An academic textbook]. Wydawnictwo PWN, Warszawa 2008. (Polish)
5. Syrek E., Borzucka-Sitkiewicz K.: Edukacja zdrowotna [Health education]. Wydawnictwa Akademickie i Profesjonalne, Warszawa 2002. (Polish)
6. Placek W. Dieta w chorobach skóry [Diet in skin diseases]. Wydawnictwo Czelej, Lublin 2015. (Polish)
7. Tourles S. Piękna i zdrowa skóra [Beautiful and healthy skin]. Świat Książki, Warszawa 2006. (Polish)
8. Ciborowska H, Rudnicka A. Dietetyka. Żywnienie zdrowego i chorego człowieka [Dietetics. Diet in healthy and diseased humans]. Wydawnictwo PZWL, Warszawa 2014. (Polish)
9. Petsitis X, Kipper K. Kosmetyka ozdobna i pielęgnacyjna twarzy: informacje o produktach kosmetycznych i ich prawidłowym stosowaniu. wyd. II pol. [Decorative cosmetics and facial care: information about cosmetic products and their appropriate use. 2<sup>nd</sup> Polish edition] Wydawnictwo MedPharm Polska, Wrocław 2011. (Polish)
10. Bojarczuk K.A., Lewicki M., Michalczak M., Smoleń A.: Ocena wiedzy studentów na temat zasad pielęgnacji cery [Evaluation of students' knowledge about skin care], J Edu Health Sport 2016;6(6):661-76. (Polish)
11. Noszczyk M. Noszczyk B. Medycyna Piękności [Medicine of beauty]. Wydawnictwo Lekarskie PZWL, Warszawa 2015.
12. Matysek-Nawrocka M, Bernat M, Dyczewski B, Kamińska M. Assessment of patients' knowledge regarding the use of emollients and humectants in skin care and prevention of skin dryness. Zeszyty Naukowe Wyższej Szkoły Nauk Społecznych, 2016;1(5):129-37. (Polish)
13. Zegarska B, Woźniak M, Grupka M, Zegarski T, Fatz-Grupka A. Ocena stanu wiedzy i świadomości społeczeństwa na temat przyczyn suchości skóry, jej profilaktyki i możliwości pielęgnacyjnych [Assessment of level of knowledge and society awareness concerning reasons for dry skin, prophylaxis and care possibilities], Post Dermatol Alergol 2008;3: 100–6.