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Health locus of control and optimal communication channels selection in Ukraine

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Локус контролю щодо здоров'я та визначення оптимальних каналів комунікації в Україні

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Introduction

Eastern Europe, especially Ukraine, needs effective health promotion measures [1]. The progression of non-communicable diseases (NCDs) are considered one of the biggest deals for public health worldwide, however, the behavioral change proved as an effective way to influence it [2–5].

The one of the factors influencing public health behavior is a locus of control (LoC) [6, 7]: a psychological concept that describes how strongly people believe they have control over events that affect their lives.

Most often, three dimensions (factors) of LoC there used: an internal factor, an external factor of "influential others" and an external factor of "chance or supernatural forces" [8, 9]. In the data obtained in previous Ukrainian studies, these factors were called proactive, directive, and collective, respectively. The collective factor reflects assigning responsibility to society and public organizations, the proactive (internal) factor – to yourself, and the directive ("influential others") factor – to institutions (ministries, Center of Diseases Control, etc) [10].

The dependencies between the LoC and health behavior are established in previous research. The patients with a higher internal LoC demonstrated higher readiness for surgical intervention [11]. People who had diabetes mellitus with a lower directive LoC were smokers more often, and also had less trust in physicians and worse control of blood glucose levels [12]. Patients with higher values of external LoC have a higher level of trust in physicians, and patients with higher internal LoC showed better treatment results [13, 14]. LoC has been identified as a clinically valuable factor to consider in behavior change campaigns, particularly in cardiac rehabilitation [15].

However, the relationship between the LoC, behavior, and trust in the sources of health information remains underresearched. Discovering and verifying such relationships could have a positive impact on the development of communication activities in public health.

The article aims to study the variations in attitudes towards authority and trust of various health information sources (media profile) of citizens of Ukraine, depending on changes in LoC.

Methods

The answers of 402 respondents from all regions of Ukraine, obtained in the cross-sectional study, were analyzed. Persons over 18 years of age were interviewed. People were involved in the survey using the respondent-driven sampling method (first wave of respondents recruiting the 2nd wave, respondents from the 2nd wave recruiting the 3rd, etc). The basic level respondent were physicians, mainly family doctors. They were recruited directly by researchers and have fulfilled other type of questionnaire. The respondents could choose to fill in the questionnaire online or in the printed version. The research was performed after approval by an ethics committee in accordance with the ethical standards of the Helsinki Declaration.

Respondents answered

− questions about the level of trust in health information from different sources (17 positions, 10 points Likert scale) and assessment of their authority (14 positions, 10 points Likert scale);

− responsibility for the health of institutions or persons (12 positions, 10 points Likert scale);

− attitude about the social determinants impacting public health (one question with open-ended response, "What of the social environment most influences the health of the population?");

− their typical physical activity (five questions with open-ended responses, about the amount of time, spent using the stairs, walking, gym, active games, or other relevant activities). Each question is assessed on a four-point scale, and then those points are summed into one variable;

− self-assessment of the practical actions (measures) that they do to protect their health and assessment of the importance of children's compliance with recommendations regarding a healthy lifestyle (two positions, 10 points Likert scale);

− their readiness to change a lifestyle (mean of two questions with 10 points Likert scale: "Do you ready to change your lifestyle right now?" and "Do you ready to change your lifestyle according to to ask of your child?");

− need to change a lifestyle (one position, 10 points Likert scale: "How much need do you have to change your lifestyle to protect your health?");

− as well as age, gender, level of education, etc.

Statistical analysis was performed in the software package jamovi v. 2.2. To the answers about the responsibility of various institutions and individuals for one's health, factor analysis was applied. Using principal component analysis (based on eigenvalue, with Varimax rotation, Kaiser-Meyer-Olkin measure is 0.874, Barlet's test $p<0.00001$, which indicates appropriate adequacy of the factor model) three factors were identified.

Using the factors of LoC as input variables a cluster analysis was carried out. The optimal number of clusters was estimated using the kGap measure: the estimate of the optimal number of clusters will be the value that maximizes kGap. The model containing seven clusters was chosen. Since Cluster I includes six people, who are characterized by extremely low proactive LoC scores (-5.76±0.86), it was excluded from further analysis (Fig. 1). To test the adequacy of clustering, two cluster models were elaborated, created by Ward's and k-means methods. The share of coincidence of clusters in both models is 74%, which indicates the satisfactory quality of the obtained solution. The ratio between the largest cluster (108 persons in Ward's method, 98 persons in k-means) and the smallest of analyzed (26 persons in Ward's, 24 persons in k-means) clusters was assessed. A model formed by the k-means method had less ratio between the biggest and smallest cluster and therefore was selected for further analysis. The distribution of LoC factors by clusters is shown in Fig. 1.

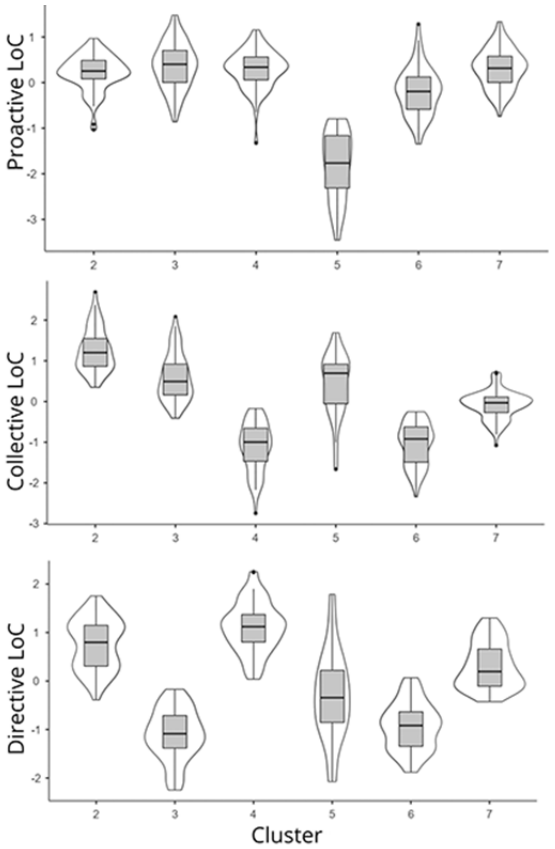

Fig. 1. Characteristics of the clusters by the factors of the LoC

Comparing the directive, collective, and proactive LoC scores in each cluster, short names of clusters were given. Due to the data-oriented approach of cluster analysis (contrary to the hypothesis-oriented approach) no tests for statistical significance were used to assess the differences between clusters.

Results

Demographic differences between the clusters are mostly small: the average age varies from 39.1 to 43.9 years, and from 65.2 to 85.5% of each cluster is female. From 54.2% (V cluster) to 72.3–75.7% (VI and III clusters) persons graduated university, from 51.6% (IV cluster) to 70.9% (V cluster) are residents of regional centers. About 2/3 of the IV cluster have chronic NCDs, in the III cluster – 44.3%, and in the remaining clusters – about half.

At the same time, the clusters differ more in terms of attitude to health (Fig. 2):

− readiness to change a lifestyle is highest among the representatives of the II cluster (8.0 points out of 10), and the lowest among the V and VI clusters (6.5 points);

− the need for a lifestyle change was rated the highest by the respondents of the II cluster (8.0 points), and the lowest by the respondents of the IV and VI clusters (7.0 points);

− practical actions for one's health are also most positively scored in the II cluster (7.0 points), and with

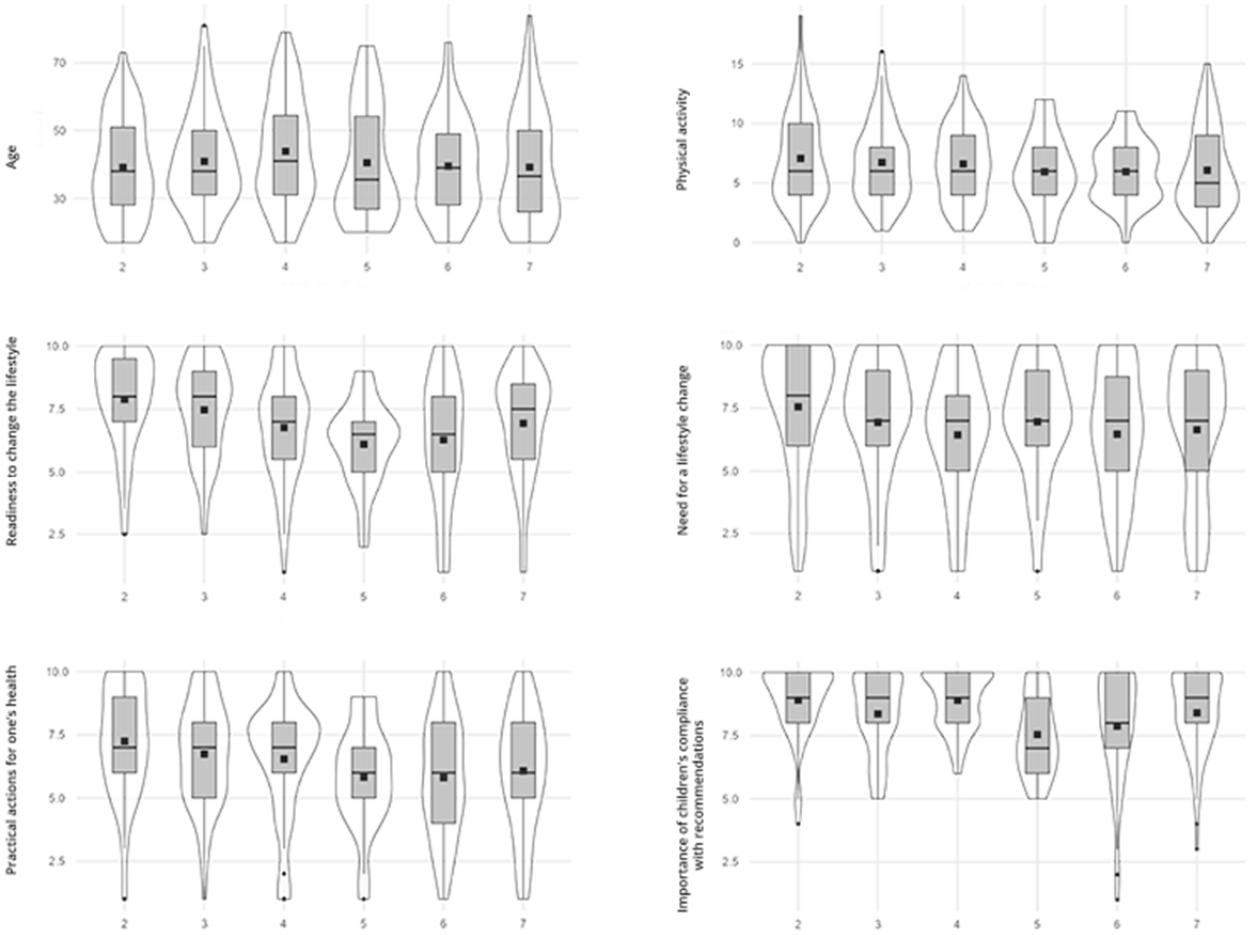

Fig. 2. Demographic and psychographic characteristics of the clusters

the minimum points – in the V and VI clusters (6.0 points);

− representatives of the II and VI clusters have a slightly higher level of physical activity, and representatives of the VII cluster have a slightly lower level of physical activity.

Also, there are differences in the assessment of social factors affecting health. Fig. 3 shows that the representatives of the V and II clusters consider legislation to be the most important of the given determinants, III and V – lifestyle, IV – traditions, VI – friends, and mass media.

Also, the representatives of the clusters differently evaluated the importance of children's compliance with recommendations regarding a healthy lifestyle: the representatives of the V and VI clusters consider these measures less necessary and evaluate them with a median score of 7.0 points (interquartile range of 6.0 – 9.0 points) and 8.0 points (7.0 – 10.0 points) compared to 9.0 points (8.0–10.0 points) in the remaining clusters.

Assessing the authority of health information sources (Fig. 4a), representatives of all clusters consider most authoritative the physicians (8.0 – 10.0 points) and services associated with them (websites: 7.0 – 9, 0 points, pages in social networks: 6.0 – 8.0 points), and less authoritative – radio broadcasting (2.0 – 5.0 points), newspapers (2.0 – 5.0 points) and magazines (3.0 – 5.0 points). Nevertheless, representatives of the cluster II rated the authority of physicians (10.0 points) two points higher than cluster V (8.0 points). This difference also is for medical sites (9.0 points vs 7.0 points), and for pages on social networks (8.0 points vs 6.0 points). At the same time, answers to questions about the authority of friends differ between clusters by 1 point. The absence of authoritative sources was most supported in the V cluster (4.0 points), and the least in the IV cluster (2.0 points). Representatives of the II cluster rated most of the sources with the highest points, and the lowest ratings among the clusters were given by the representatives of the IV (friends, newspapers, magazines, social networks, mobile applications), the V (friends, medical social networks, medical sites, doctors) and the VI (TV, radio, magazines, teachers) clusters.

The assessment of the levels of trust in the sources of medical information demonstrates similar trends to those shown above (Fig. 4b): representatives of cluster II tend to rate most sources with higher scores, and V and VI with lower scores. The exception is

− high trust in news sites (V cluster, up to +2.0 points),

− low trust in physicians in social media (III cluster, -1.0 points); in newspapers, magazines, and unknown people in social media (IV cluster, up to -2.0 points); in friends (VII cluster, up to -2.0 points).

The most trusted source in most clusters is physicians (7.0 – 9.0 points) and medical websites (8.0 – 9.0 points).

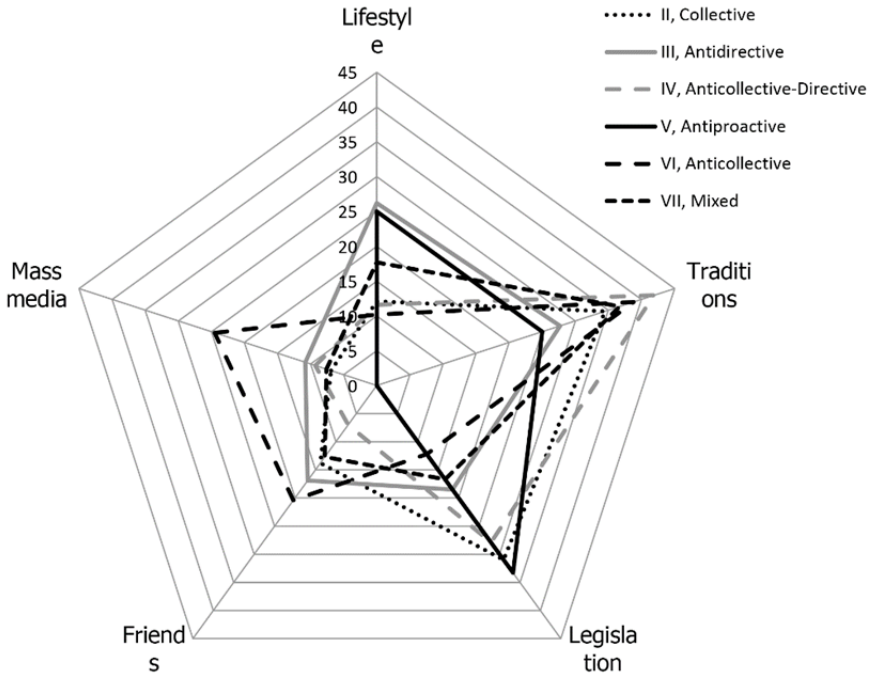

Fig. 3. Social determinants shaping the population health (by clusters), %

In the II cluster, medical TV programs (9.0 points) and pages of medical institutions on social media are also highly trusted (9.0 points), and in the V cluster – pages of physicians on social networks (8.0 points) and medical websites (8.0 points) even prevail trust in physicians (7.0 points).

Discussion

The results of the presented study confirm the main three health LoC dimensions [8, 9]. Based on those factors in previous research clustering models containing 6 to 8 clusters were elaborated [9, 16]. In our study, a lack of the proactive-oriented cluster was found. Previous studies by Ukrainian authors [10, 17] indicated that despite declarative recognition of a person's responsibility for health, Ukrainians often distribute it among multiple individuals and institutions.

The absence of a proactive-oriented cluster may be related to the features of the questionnaire used or to other reasons. E.g., a study [18] demonstrated a decrease in proactive and an increase in external factors of LoC resulting from the COVID-19 pandemic.

Lower interest in medical decision-making was associated with higher external (directive) LoC scores and older age [19]. The fatalistic LoC, younger age, pessimism, and lack of trust in the physician are the determinants of worse adherence to treatment in patients with type II diabetes [20] and less need for receiving health information [19]. Previous studies indicated that fatalistic LoC is more likely to harm practical measures protecting health. A study [21] demonstrated that adolescents with a higher directive and collective LoC scores were less likely to consume fruits and vegetables daily. Individuals with higher fatalistic LoC were less physically active, paid

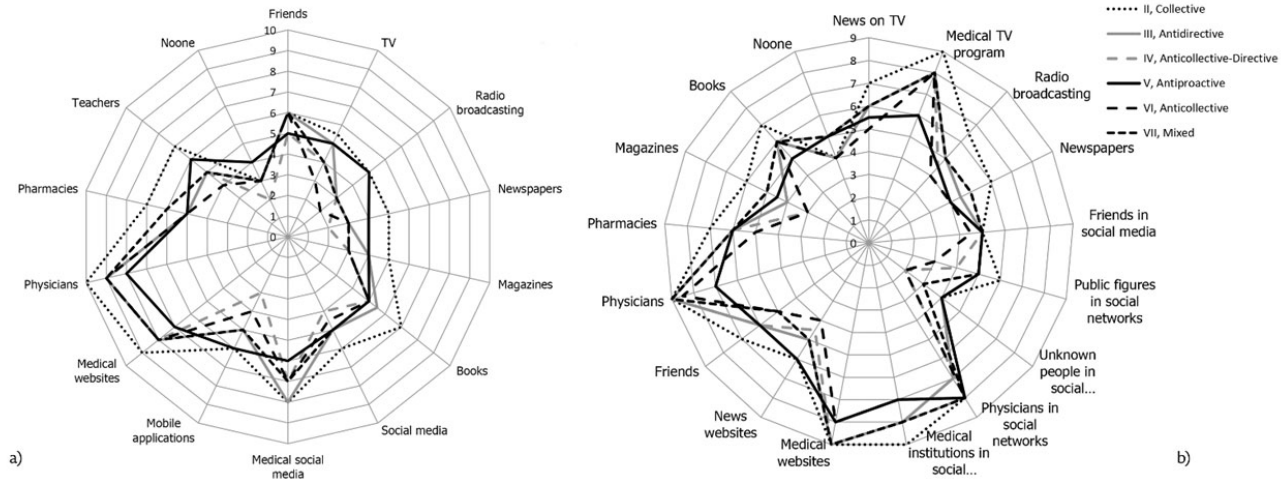

Fig. 4. Authority (a) and trust (b) in health information obtained from different sources (by clusters)

less attention to oral hygiene, and were less consistent in information seeking [22]. Research [23,24] found that individuals with external LoC are more prone to risky behavior. Most of the studies analyzed in the systematic review [7] show a negative relationship between fatalistic LoC and treatment adherence.

A study of cancer patients' information needs [25] demonstrated that patients with higher external LoC were more likely to use common sources of information and more often needed additional information. A similar effect has been demonstrated repeatedly in specific populations [16].

According to article [26], the sources of information about health in Ukraine are divided into three groups:

1) less popular and less trusted (traditional mass media);

2) the most popular, but less trusted (the Internet);

3) the most trusted, but less popular (health workers).

In our study, collectively oriented clusters (II, III) demonstrate a more active, but less selective behavior regarding information consumption. Along with higher scores of authority and trust in virtually all sources of information, trust in general sources (traditional mass media, social media, etc.) is more pronounced. In contrast to this, the only cluster whose representatives consider mass media to be an important social determinant of public health is the anti-collective-oriented VI cluster (Fig. 3). Collective orientation is associated with a higher assessment of readiness, need, and practical actions aimed at a healthy lifestyle (as seen from the comparison of II and IV clusters). However, the absence of substantive differences in the prevalence of NCDs, physical activity, and the proportion of smokers may indicate a less active implementation of healthy routines in everyday life.

The "physicians" factor of LoC mostly shows a positive relationship with treatment adherence [7]. The study [27] found that women with higher values of external LoC tended to visit the physician more often (men showed no statistically significant relationship between these factors). The II and IV clusters, which have a pronounced directive component, tend to prefer physicians and the services associated with them as a source of medical information, more often mention legislation as a determinant of health, and less often – friends and the mass media in such a role. Comparing the obtained results with the data of other studies [28, 29], it could be assumed that directive-oriented individuals are more inclined to faithfully implement recommendations received from authoritative structures, in particular, physicians.

In the article [30] the interaction of LoC with education level and income level in influencing healthy eating were investigated. The proactive LoC is significantly more positively associated with healthier behavior. The level of education strengthens the positive influence in combination with proactive LoC. Higher values of directive LoC allow to compensate for the negative impact of lack of education. At the same time, people with a low level of income and low internal LoC demonstrate healthier behavior than people with a high level of income for similar values of internal LoC. As the scores of internal LoC increase, the difference decreases, and for the highest values of internal LoC, individuals with a higher level of income demonstrate healthier behavior. The authors conclude that messages that focus on proactive LoC (e.g., providing specific skills and knowledge about healthy behaviors) may be more useful to the wealthier and more educated, whereas messages that focus on directive LoC (e.g., advice on healthy lifestyles provided by well-known health professionals) may be more effective for less educated people [30].

Comparing the antiproactive (V) cluster with others suggests that the pronounced proactive component of LoC is a determinant of greater orientation towards physicians and physician-associated services. It is also likely that a proactive position regarding health affects both the readiness to change lifestyle, and corresponding practical activity, as well as the readiness to communicate about health (representatives of the V cluster most often did not answer questions about social determinants of health). Such results were previously found in a number of studies. In particular, a study involving 820 Israeli citizens aged 21 to 65 years found that internal LoC is a determinant of a higher level of trust in physicians [31]. Cardiac patients with higher levels of proactive LoC had higher levels of physical activity in their free time [15]. And an analysis of data from more than 3,000 respondents over 65 years with pain syndrome found that internal LoC is associated with higher resilience, less stress, higher physical activity, and less opioid use across income groups [32].

Another group of studies demonstrated that proactive LoC indicates the degree of stability of the individual. A study [33] found a relationship between higher internal LoC and greater psychological resilience. A study of a group of Norwegians (1.2 thousand) and Germans (1.5 thousand) found that the internal LoC reduces, while the external – increases the level of stress caused by the COVID-19 pandemic [34]. A systematic review on the relationship between self-efficacy, health LoC, and treatment adherence [7] revealed that internal LoC is mostly positively associated with adherence to treatment. At the same time, one study hypothesized that high internal LoC is responsible for commitment to the decision made: to accept or not to accept the proposed treatment. In Ukraine, a higher degree of responsibility for one's health is positively related to greater trust in health professionals as sources of health information [10, 17].

Practical recommendations

Thus, health communications measures may be built depending on the combination of LoC factors:

a) for collective-oriented clusters (II, III, V, VII): to direct communication towards highlighting the importance of lifestyle and proactive behavior to health outcomes; to increase commitment to physicians, using general sources of information (mass media, friends, social networks);

b) for directive-oriented clusters (II, IV, VII): to provide clear advice on measures of a healthy lifestyle, in particular with emphasis on the risks of unhealthy behavior (a negative frame). The optimal channels are physicians and governmental organizations (incl., their websites and pages on social media);

c) for proactive-oriented clusters (VI): to support and strengthen the commitment to healthcare; to provide information on methods of reducing costs \ and simplifying healthy lifestyle measures; a call to disseminate practices in the social environment. Physicians are the most appropriate channel to communicate with this group.

The development of online medical communities is a universal response to healthcare issues in Ukraine [26], which is particularly useful for more proactive and collective-oriented people (II, III cluster). The development of such communities must involve the following measures:

− using and sharing present-day evidence-based information about the main directions of medicine;

− response to current trends in the sphere of health (providing comments and opinions);

− giving medical advice to people within the allowable boundaries (depending on the communication channel);

− professional development of the physicians as health communicators and strengthening the compliance and trust between a physician and a patient.

For proactively-oriented people who have already reached a certain basic level of health, more profound measures can be implemented, that will contribute to the sustainable development of healthcare practices in society:

a) encouraging critical thinking and proactivity;

b) learning the basics of management (ability to implement changes) and information security (filtering information, maintaining mental health);

c) provide a toolkit for proactive and voluntary involvement in the practices of social marketing, resulting in the reduced typical resistance to innovations.

Regarding the fact that antiproactivity is connected with lower readiness to change a lifestyle, it is advised to accent in communication:

− easy ways to have a healthy lifestyle, including methods of minimizing obstacles, demonstrating accessible measures (using stairs, walking, etc.);

− benefits for individuals (in different spheres of life) and their relatives in case of the adoption healthy lifestyle;

− influence of small, but stationary changes in the lifestyle.

Whereas the representatives of the antiproactive (V) cluster more often are male without higher education, shorter and simpler messages using traditional mass media, social networks, and mobile applications are required. In respect of the highest among all clusters levels of general mistrust, it is important to reveal the real needs of this group of people and to attempt to include them in the communication.

Conclusions

The clusters formed based on LoC factors differed slightly in terms of demographics but demonstrated the meaning difference in terms of the attitudes about healthy lifestyle, the trust in different health information sources, as well as their authority. It has been found that proactive and directive orientation is usually associated with a healthier lifestyle, while collective (fatalistic) with a less healthy one. Collectively oriented clusters have tended to prefer more common sources of information: traditional mass media, social media, etc.; and proactively oriented prefer physicians and services associated with them (medical sites, pages of physicians, and medical institutions in social networks).

The communication measures for the individuals with negative proactive LoC scores need to include methods of minimizing obstacles and demonstrating accessible healthy activities, presenting benefits for individuals in case of the adoption healthy lifestyle, and accenting the influence of small, but stationary changes in the lifestyle.

Limitations and further research perspective

Currently, most LoC studies have a cross-sectional design, which does not allow for establishing cause and effect [35]. So, revealing the causation is highly important for the improvement of communications in public health.

Ethical approval. The research was performed after approval by an ethics committee of Uzhhorod National University.

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Introduction. The extent people believe they have control over their health (locus of control) has been identified as a clinically valuable factor to consider in behavior change campaigns. The article aims to study the variations in attitudes towards authority and trust of various sources of information about the health of citizens of Ukraine, depending on changes in locus of control.

Methods. The answers of 402 respondents from all regions of Ukraine, obtained in the cross-sectional study, were analyzed. Three factors of locus of control (proactive, collective, and directive) and six clusters (collective, antidirective, anticollective-directive, antiproactive, anticollective, mixed) were identified.

Results. The clusters differ more in attitude to health, the assessment of social factors affecting health, the importance of children's compliance with recommendations regarding a healthy lifestyle, and the levels of trust in the sources of medical information. The proactive and directive orientation is usually associated with a healthier lifestyle, better treatment adherence, and higher trust in physicians, and collective (fatalistic) with a less healthy lifestyle and higher trust in common sources of information (mass media, social media).

Conclusions. The development of online medical communities is a universal response to healthcare issues in Ukraine, which is particularly useful for more proactive and collective-oriented people.

Key words: health communication, locus of control, noncommunicable diseases, cluster analysis, social determinants of health.

Уявлення населення про міру, якою вони контролюють своє здоров'я (локус контролю), було визначено як клінічно цінний чинник, який слід ураховувати в кампаніях зі зміни поведінки.

Мета – дослідження відмінностей у ставленні до інституцій та довірі до джерел інформації про здоров'я громадян України залежно від зміни локусу контролю.

Методи. Проаналізовано відповіді 402 респондентів з усіх регіонів України, отримані в ході крос-секційного дослідження. Виявлено три фактори локусу контролю (проактивний, колективний і директивний) і шість кластерів (колективний, антидиректівний, антиколективно-директивний, антипроактивний, антиколективний, змішаний).

Результати. Представники кластерів більшою мірою відрізняються за ставленням до здоров'я, оцінкою соціальних чинників, що впливають на здоров'я, важливістю дотримання дітьми рекомендацій щодо здорового способу життя, рівнем довіри до джерел медичної інформації. Проактивно-директивна орієнтація зазвичай асоціюється зі здоровішим способом життя, кращою прихильністю до лікування та вищою довірою до лікарів, а колективна (фаталістична) – із менш здоровим способом життя та вищою довірою до загальних джерел інформації (ЗМІ, соцмережі).

Висновки. Розвиток медичних онлайн-спільнот – це універсальна відповідь на проблеми охорони здоров'я в Україні, яка особливо корисна для більш ініціативних та орієнтованих на колектив людей.

Ключові слова: комунікація щодо здоров'я, локус контролю, неінфекційні захворювання, кластерний аналіз, соціальні детермінанти здоров'я.

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