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Psychophysiological Adaptation of International Students to Learning Abroad

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Abstract

The article describes the problems international students encounter during psychophysiological adaptation. As the modern higher education system is characterized by academic mobility, and international students from countries with quite different geoclimatic and cultural traditions have to undergo an adaptation period, the problem under study is topical. The study was conducted at Kharkiv National Medical University (Ukraine) in 2020/2021. The research involved 1st, 2nd and 3rd-year international students (from 50 countries). The peculiarities of international students' psychophysiological states were assessed during the stages of initial adaptation, stable adaptation and final adaptation. This study aims to provide a comprehensive analysis of the factors of the natural and socio-pedagogical environment that affect the psychological adaptation process of international students. The present study provides new information on the acclimatization patterns of international students who study in Ukraine, as well as its functional significance on selected performance measures. General theoretical methods, research methods and methods of statistical data processing have been employed. The results reveal that the destabilizing factors that negatively affect international students' adaptation process include frequent hypothermia, dietary changes, inadequate and irregular food intake, insufficient physical activity and excessive mental stress. Practical recommendations to decrease these negative factors are proposed.

Keywords: International students, Psychophysiological adaptation, Social adjustment, Acclimatization, Higher education, Academic mobility.

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1. Introduction

The modern higher education system is characterized by academic mobility. It is becoming an increasingly common phenomenon for both academic staff and international students to travel abroad to pursue higher education. There are many countries across the world that welcome international students for tertiary-level education. The most popular host destinations include the United States of America with nearly 1.1 million international students, the United Kingdom with more than 550,000, Canada with 503,270, Australia with 463,643 international students [1], as well as several European and Asian countries, see Figure 1. According to UNESCO, over 6 million students were studying abroad at the tertiary level in 2020 [2].

International students often come from backgrounds that differ drastically from their host countries: different geoclimatic conditions, cultural traditions, dietary patterns etc. Therefore, upon arriving in their host country, these students must undergo a period of adaptation, which is a complex biosocial process determined by factors associated with changes in living conditions, nutrition, climate, as well as differences in the socio-cultural environment.

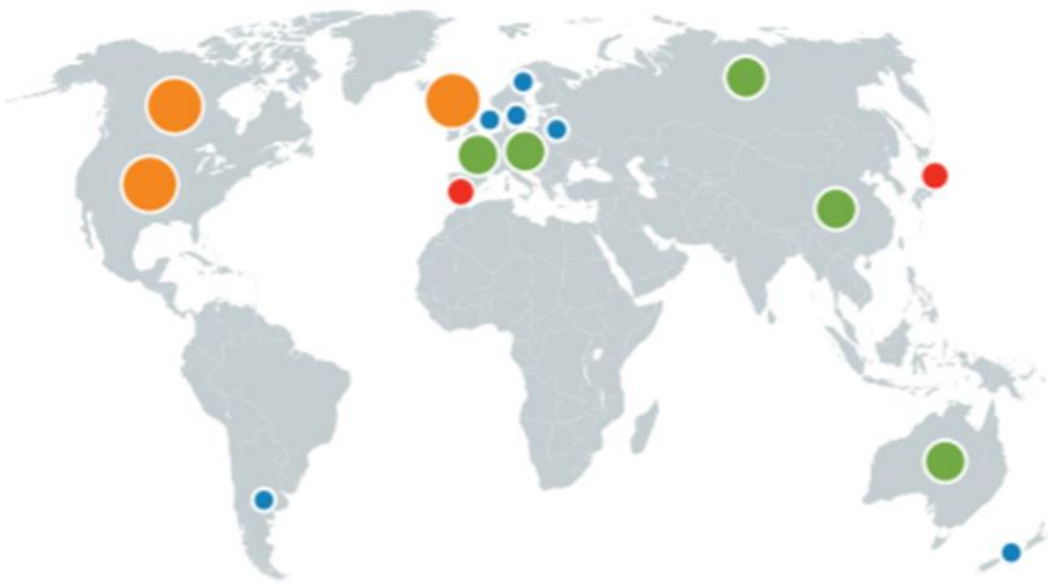

Figure 1.
Leading host countries for international students. (The size and color of the dots reflect the total number of international students in host country: yellow – more 500,000; green – from 300,000 to 499,999; red from100,00 to 299,999; blue – from 20,000 to 99,999).
Source: Project Atlas [1].

Although reasons for studying abroad as well as teaching approaches in different countries may differ, the challenges that international students and academic staff face in host universities are similar. The adaptation process is associated with a number of social, psychological and economic issues. This study will add to the discussion surrounding the determination of the key factors that affect international students' adaptation to a new educational environment. The range of services universities provide international students should go beyond educational services and paperwork; they should also include assistance and support for international students adapting to the new educational and socio-cultural environment.

There is, however, a gap between the significant public interest in this problem and the lack of specific practical recommendations to address it. Most previous research [3-18] has focused on theoretical studies of the various types of adaptation displayed by international students. The application of these aspects of psychophysiological adaptation has not been the subject of scientific discussion. There is a lack of practical recommendations aimed to reduce the adaptation period and improve the psychophysiological state of international students, thereby making the educational process more efficient.

With the increase in international academic mobility, Ukraine is becoming an attractive destination for international students. Kharkiv National Medical University is a leading host university in Ukraine with more than 5,000 international students from 54 countries. Despite great interest in the adaptation of international students in general, there are no prior comprehensive studies related to the country-specific problems of international student adaptation in Ukraine. This study is also novel in that the research emphasizes the importance of studying the peculiarities of the adaptation process specific to a locality, determines the key factors affecting international students' adjustment to the climatic conditions and educational environment of eastern Ukraine, and offers practical recommendations for universities and other educational service providers to assist with international students' adaptation.

2. Review of Literature

2.1. First Theoretical Studies

In the scientific literature, adaptation is considered a complex and multilevel problem, the modern study of which began with the theories of Bernard [19] and Cannon [20] on homeostasis and the constancy of the internal environment.

The physiological mechanisms of adaptation were explored in the work of Selye [21]; Pavlov [22]; Sechenov [23]; Anokhin [24].

A more integrated approach to the study of the problems of human adaptation has led to the emergence of a number of original concepts. Thus, Oberg [3] put forward the concept of "culture shock", describing the features of a recipient's mastery of a new culture [3]. Although the concept of culture shock later became widespread, Berry [4] suggested that the concept of "acculturative stress" was more accurate [4]. According to him, the word "shock" carries a negative connotation, indicating that an individual receives only negative experiences during the adaptation process, which does not correspond to reality [5]. The word "culture" does not fully reflect the essence of the concept either, because the reason for the described phenomenon is in the intercultural plane [25-27].

2.2. The Study of "International Student Syndrome"

As young people who move to other countries to pursue higher education are, due to their age and lack of experience in solving problems, especially vulnerable and susceptible to negative influences, researchers have assigned international students a special social group with its own specific adaptation processes that manifest at all levels. Ward [6] even introduced the special term "international student syndrome" into scientific circulation [6]. This notion is characterized by international students' significant difficulties with the socio-cultural adaptation associated with integration into a new cultural space and the development of new traditions, norms of behaviour and social roles. Ward's ideas have been further developed in works devoted to the issue of socio-cultural adaptation [7-9].

According to research by Newsome and Cooper, international students go through a three-stage process of adapting to the living conditions of a host country [10]. In the initial stage, they experience emotional uplift and have high expectations, then they go through a stage of confusion, depression and cultural shock, and finally, they develop their own adaptation strategies.

2.3. The Study of Types of Adaptation

In the broad interpretation of the term, adaptation is understood as the dynamic process of an organism's adaptation to constantly changing environmental conditions. At the same time, adaptation is considered not only a process but also the ultimate goal towards which each organism strives, as a system-forming factor that ensures its integrity [11].

In considering the problems of human adaptation, priority is given to an integrated approach that analyses the relationship between mental and physiological states. Depending on the assumed perspective, there are two main types of adaptation – psychophysiological and socio-psychological – which in turn are further subdivided. Psychophysiological adaptation is associated with the establishment of an adequate relationship between the mental and physiological characteristics of an individual when interacting with the conditions of a constantly changing environment. Socio-psychological adaptation covers the organization of micro-social interactions, the formation of adequate interpersonal relationships and the achievement of socially significant goals for the individual [12]. In the scientific literature, the term social adjustment is often used as a synonym of socio-psychological adaptation. Social adjustment is understood as a psychological process that includes coping with new social standards and values for individual acceptance [28, 29].

In recent years, the term "intercultural adaptation" has appeared in social psychology and pedagogy; this is a complex process on the part of an individual of mastering the norms and values and behavioural models adopted in a new socio-cultural environment [25]. At the same time, the adaptation process can be considered successful if an individual achieves social and psychological integration with another culture without losing their own spiritual guidelines.

The peculiarities of the adaptation of educational migrants to the social and pedagogical environment in the country of study have been less studied since they depend directly on the specific type of professional education. The problems of academic adaptation have, however, been considered by Chambel and Curral [13]; Murff [14]; Rienties, et al. [15]; Ushakova, et al. [16]; Kyrychenko [30].

Thus, modern studies on the problems of international students' adaptation are to a greater extent focused on issues of socio-cultural adaptation and, to a lesser extent, concern issues of psychophysiological adaptation. However, despite scientists' increased interest in the topic of the adaptation of international students, there is a lack of applied research explaining the specifics of the psychophysiological adaptive reactions of international students from countries with different geoclimatic conditions, diets and socio-cultural and academic environments.

2.4. The Aim

This study aims to provide a comprehensive analysis of the factors within the natural and socio-pedagogical environments that affect the psychophysiological adaptation process of international students.

The tasks are 1) to compare the climatic characteristics, nutrition and lifestyle peculiarities of international students' countries and regions of permanent residence and their place of study; 2) to analyse the peculiarities of international students' socio-cultural and academic adaptation; 3) to develop recommendations for use in university practice in order to facilitate and reduce the adaptation period for international students.

3. Materials and Methods

To achieve the study's purpose and complete the outlined tasks the following methods were used: 1) general theoretical methods, namely analysis, synthesis, comparison and systematization of scientific literature on geography and nutritional science to discover the differences in climatic characteristics and nutritional peculiarities between the host country and international students' places of origin; literature on socio-cultural and pedagogical psychology to analyse the

peculiarities of international students' socio-cultural and academic adaptation and develop recommendations to reduce their adaptation period; and 2) research methods such as a psychophysiological questionnaire and automated statistical data processing. The main statistical data processing methods used were descriptive and cross-tabulation statistics. They served to clarify the subjective perceptions of the surrounding natural and social educational environment.

The questionnaire method was applied in all stages of the study. In addition to general demographic questions, it included questions on the following topics: 1) problems of acclimatization; 2) food and lifestyle; 3) socio-pedagogical adaptation to the university's educational environment. The student survey was carried out anonymously using the Google Forms online service. The results were processed using Microsoft Excel.

The required sample size was calculated according to the formula

$$N = \frac{z2*p*(1-p)*Ng}{\triangle 2*Ng+z2*p*(1-p)},$$

where z is the Z-factor (1.96 is the students' distribution for the 95% confidence interval); p is the proportion of respondents or answers of interest (0.5 by default); Ng is the size of the general population (the total number of students in years 1-3 is 2827); $\triangle$ is the sample fraction of variance (0.05 with the selected accuracy ± 5%).

Based on these calculations, the required sample size (N) is 338 respondents. In this study on the peculiarities of international students' adaptation, 342 students aged 18-26 took part, including 222 male (65%) and 120 female students (36%).

3.1. Participants

The study was conducted at Kharkiv National Medical University (Kharkiv, Ukraine) in 2020/2021 by the Department of Language Training. The research involved international students in years 1-3 from 20 different countries, mainly from India, the Middle East and Africa. The peculiarities of international students' psychophysiological state were assessed during the stage of initial adaptation (1st year of study), during the stage of stable adaptation (2nd year of study) and during the stage of final adaptation (3rd year of study).

4. Theoretical Background

International students who come to study in Ukraine find themselves under the simultaneous influence of several stress factors, which complicate the adaptation process and negatively affect academic performance and students' general emotional and psychological state. Researchers have identified everyday problems, manifestations of discrimination by local residents, difficulties in managing financial resources, as well as psychological problems − culture shock and the language barrier − as the main stress factors experienced by international students in the process of integrating into the social environment [17, 18].

Changes in climatic conditions play an important role among the stress factors. The results of the questionnaire show that many students find it difficult to get used to the cold weather. Although the issue of international students' acclimatization is rarely considered in the scientific literature, effective adaptation to colder climatic conditions plays an important role in ensuring students' psycho-emotional and physiological comfort when arriving from hot countries. The body's response to temperature discomfort should not be underestimated. Some studies have noted that a cold climate and the associated hypothermia of the body can negatively affect a person's physical and mental activity [31, 32]. Thermal discomfort can reduce the speed and quality of the performance of tasks that require concentration and mental stress, which is especially important in the educational process [33].

The overwhelming majority of international students come to Ukraine from countries with significantly different climatic characteristics. Understanding what the features of acclimatization to colder climates are, as well as what factors contribute to a more rapid acclimatization and adaptation to living and studying in a new country, is extremely important for the effective organization of the educational process and the improvement of the quality of education.

Among the factors involved in students' habituation to a new environment, scientists have also identified changes in nutrition [34, 35]. Adaptive problems in the organization of meals for international students are primarily due to changes in the determinants of nutrition due to the lack of habitual food [36]. Under the influence of emotional factors (stress, mental strain, emotional discomfort, feelings of anxiety, etc.), eating behaviour also changes, which can be expressed in a lack of appetite or, conversely, in an increased desire to eat or night meal syndrome, which is accompanied by hyperphagia, insomnia and morning anorexia [37, 38].

5. Results and Discussion

5.1. Acclimatization Problems

Acclimatization problems are usually the first and one of the most severe challenges for people from countries with a warm climate. The process of acclimatization can be defined as the physiological or behavioral changes occurring within the lifetime of an organism that reduce the strain caused by stressful changes in the natural climate (whether seasonal or geographical) [31]. Low temperatures and lack of sunlight during rather long periods not only bring physical discomfort but affect many processes in the human body and can often determine a person's ability to act. International students who come to study in Ukraine face these problems to the fullest. The geographic distribution of the international students who took part in the survey is shown in green in Figure 2.

As we can see, most of the students were from subequatorial and equatorial zones with tropical or subtropical climates. The most important factors that determine the impact of climatic conditions on humans from these countries include high

air temperatures (in humid subtropics, the high relative humidity of atmospheric air as well) with average annual temperatures ranging from 20 ° C to 31 ° C, as well as the large number of sunny days per year.

The climate in the northeast of Ukraine (Kharkiv) is moderately continental, characterized by low average annual temperatures with cold and snowy winters and changeable weather in the autumn-spring period. The sun's rays contain less ultraviolet content due to the sun's lower altitude above the horizon and cloud cover. The comparative characteristics of climatic factors in north-eastern Ukraine and the main regions and countries where most of the surveyed international students originated are presented in Table 1.

Figure 2.
Distribution of international students by country of origin. (Green areas are the places of origin of the international students who took part in the survey).

Table 1.
Comparative climatic characteristics of north-eastern Ukraine and international students' countries of origin. (*Data from: www.worldweatheronline.com*).

Region	Climatic zone (according to Alisov [39])	Average temperature of the warmest month	Average temperature of the coldest month	Average annual temperature	Change in average annual temperature	Number of sunny days per year
North-East Ukraine						
(Kharkiv)	Moderate continental	+26°C	-4°C	+11.6 °C	30°C	150
Asia						
India (New Delhi)	Tropical and subequatorial	+42°C	+17°C	+30.6°C	25°C	244
Iran (Tehran)	Tropical and subequatorial	+35°C	+7°C	+19.7°C	28°C	246
Pakistan (Islamabad)	Tropical and subequatorial	+38°C	+14°C	+26.3°C	24°C	198
Iraq (Baghdad)	Tropical and subequatorial	+41°C	+15°C	+28.6°C	26°C	270
Yemen (Sanaa)	Tropical	+25°C	+19°C	+21.1°C	6°C	180
Near East						
Israel (Tel Aviv)	Subequatorial	+29°C	+17°C	+20.6°C	12°C	242
Jordan (Amman)	Subequatorial	+30°C	+10°C	+20.4°C	20°C	284
Lebanon (Beirut))	Subequatorial	+29°C	+14°C	+21.5°C	15°C	250
Syria (Damascus)	Subequatorial	+33°C	+11°C	+22.1°C	22°C	313
North Africa						
Morocco (Rabat)	Tropical and subequatorial	+25°C	+15°C	+20.1°C	10°C	266
Egypt (Cairo)	Tropical	+36°C	+17°C	+26.5°C	19°C	331
East Africa						
Sudan (Khartoum)	Tropical	+38°C	+26°C	+32.6°C	12°C	295
West and Southwest Africa						
Nigeria (Abuja)	Equatorial and subequatorial	+35°C	+25°C	+30.6°C	10°C	179
Ghana (Accra)	Subequatorial	+30°C	+25°C	+28.2°C	5°C	88
Namibia (Windhoek)	Tropical	+28°C	+17°C	+23.3°C	11°C	273

As can be seen from the presented data, the climatic characteristics of the students' countries of origin differ significantly from the climatic conditions in the northeast of Ukraine. For the most part, students do not experience sub-zero temperatures in their homelands. The average temperature of the coldest month in these regions ranges from + 7 ° C to + 25 ° C, which is significantly higher than in the region where the students are currently studying (the average temperature of the coldest month in Kharkiv is -4 ° C). The same applies to average annual temperatures, with a difference with Ukraine of between 10 and 20 ° C.

Local climatic conditions are characterized by the large amplitude of seasonal temperature fluctuations. The difference between summer and winter average temperatures is 30 ° C. In comparison, in Ghana this figure is 5 ° C, in Yemen it is 6 ° C, in Israel, Morocco, Sudan, Nigeria, Namibia and other countries this is 10-12 ° C. Only in some countries of southern, western and south-western Asia do seasonal temperature fluctuations reach 24-28 ° C; however, in these countries, the average temperature of the coldest month does not drop below 14 ° C.

A comparative analysis of the geoclimatic living conditions of students in Ukraine versus their country of origin showed that the move caused almost all students to be exposed to significantly lower temperatures, which, along with a change in the time zone, a decrease in the spectrum of sunlight, changes in air humidity and atmospheric pressure, a decrease in the number of sunny days and other climatic and weather factors, requires a long period of acclimatization for international students, while their bodies get used to new geoclimatic conditions.

It is obvious that the change of climate causes problems of physiological adaptation for international students. According to our research, many students, when exposed to the adverse effects of low temperatures, complain of a constant feeling of cold. Thus, 153 surveyed students (73%) indicated that they often go beyond the zone of thermal comfort, that is, their thermoregulatory system is in a state of long-term physiological destabilization. In this state, the adaptive reactions of organisms are characterized by the predominance of inhibitory neuroreflex reactions: students sit motionless in the classroom and during breaks, physical activity is significantly reduced. The authors' experience of working with international students testifies to the fact that in the cold season, international students from hot countries experience a sluggish, depressed, drowsy state. This is especially true for African students.

It is known that a violation of thermal equilibrium leads to a decrease in the body's immune resistance. In this regard, 67% of respondents (140 students) noted that they suffered from acute respiratory diseases and frequent rhinitis. Absenteeism caused by seasonal colds and infectious diseases leads to serious problems catching up with the curriculum.

Although international students have information about the climate of the country where they plan to study before their arrival, most appear psychologically unprepared for the effects of lower temperatures. In everyday life, they unknowingly often neglect to adequately protect themselves from hypothermia or do not have sensible winter clothing and shoes. Teachers have noticed that international students often wear inappropriate clothing and footwear. Such behavioural factors confirm the observations of modern researchers that show that people in countries with colder climates are more effective at protecting themselves from the cold than people in warmer regions faced with a sharp drop in temperature. The results from the questionnaire showed that 12% of the surveyed students did not have winter outerwear and used demi-season clothing in winter as well; 8% of the surveyed students did not have winter shoes and used a single set of shoes for different seasons.

The change in the usual thermoregulatory reactions determined by a hot climate to others characteristic of a cold climate is characterized by leaving the zone of thermal comfort, which, in turn, leads to psychological discomfort: the appearance of apathy, isolation, and a decrease of interest in social life. Similar conditions were noted in 54 cases (26% of the respondents). Moreover, female students noted this fact more often than male students.

The psychological state of international students is also significantly influenced by the reduction in daylight hours and a significant decrease in the number of sunny days in winter.

Thus, the research not only establishes Ukraine's geoclimatic conditions as a host country for international students but also demonstrates that these conditions affect the psychophysiological state of such students to a certain extent. Consequently, it is necessary to offer them assistance in adapting to the climatic conditions of the host country. In this context, practical recommendations may include improving the websites of host universities with the mandatory posting of information about the temperature conditions in the winter season and recommendations for suitable clothing.

5.2. Nutrition and Lifestyle

Nutrition is a habit that is formed in childhood through the influence of a person's family, religious traditions, social ideas about dietary rules, and climatic conditions, which, on the one hand, allow certain fruits and vegetables to grow, and on the other, require the consumption of a certain amount of calories to maintain a person's well-being in these same climatic conditions. So, for international students who have moved thousands of kilometers, food can be an equally serious stress factor that affects their adaptation to the new social and educational environment. When international students move to Ukraine, their diet necessarily undergoes significant changes. The results show that most students believe that their diet has deteriorated due to the move; 86% of students noted that they had difficulty adapting to the local cuisine, and only 14% of respondents stated that they had no problems restructuring their meals.

Our investigation reveals that many Indian students experience additional difficulties as they are vegetarians from birth. However, the features of the psychophysiological adaptation of vegetarian students from this country remain poorly understood, despite the fact that vegetarian Indian students represent a significant proportion of international students. It is worth considering that in India vegetarianism is a national tradition with a highly developed culinary culture. According to official statistics, the number of vegetarians among young people in this country reaches 40% [40].

Most of the interviewed Indian students noted that they could not buy their usual products and spices in Ukraine; at the same time, they found it difficult to change their eating habits for religious and ethical reasons. Some vegetarian students in the second and third years of study had been forced to adjust their eating behaviour: due to the lack of plant-based products, they had to include chicken meat in their diet.

Moreover, in 142 cases (68%) the international students indicated that they had difficulties in buying food; 114 students (55% of the respondents) stated that this was due to the unavailability of the products they used in their homeland in local grocery stores and the city's markets. In some cases, when buying products, there were problems of a socio-communicative nature associated with a language barrier. Twenty-eight students (13% of the respondents) faced such difficulties, mainly students in their first year of English-language education.

The survey revealed that the overwhelming majority of students have serious problems relating to their diet: 87% of the respondents noted that they ate irregularly, on the go or in a hurry, trying to fit it in between double periods. Many students use the services of fast-food restaurants: 62% daily, 27% several times a week, 11% several times a month.

A different combination of macro- and microelements present in local products and a radical change in diet due to the students' heavy workload can lead to various disorders of the body's vital functions, negatively affecting the students' ability to successfully complete the curriculum. The results show that 53% of students believe that a change in nutrition has a negative effect on their well-being: 87 students (41%) had problems with their digestive system, 26 students (12%) noted the appearance of dental problems.

Taken together, the results outlined above demonstrate significant nutrition problems among international students. Meanwhile, nutrition is closely connected with a person's health and lifestyle. A lack of nutrition causes a certain decrease in physical activity, which in turn affects the process of acclimatization and adaptation to new life conditions. The analysis of the personal data revealed that only 61% of the respondents participate in sports within the walls of the university, the remaining 39% of international students do not take part in regular physical activity. In the context of an intensive educational process at a medical university (67% of students note that they are experiencing a very heavy educational workload), a decrease in physical activity and a poor diet lead to various forms of psychological discomfort.

The results show that first-year students are in a state of increased psycho-emotional tension and stress compared to second- and third-year students. The international students' initial period of adaptation is characterized by the destabilization of physiological functions, which manifests in a deterioration in health, an increase in the number of acute respiratory diseases, exacerbation of problems of the gastrointestinal tract, increased irritability, and a tendency to depressive states. The sharp increase in morbidity in the first and second year, provoked by cooler weather, dietary changes and overwork due to heavy educational workloads, decreases markedly over time, particularly by the third year of study, as demonstrated in Figure 3.

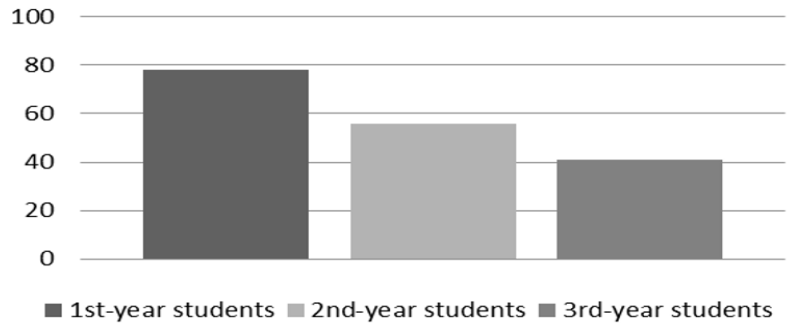

Figure 3.
Dynamics of colds among first-, second- and third-year international students.

The authors' recommendations on improving meals (namely, consuming hot, high-calorie food and warm drinks, increasing the calorie intake to keep warm in cold weather) may help students adapt their diet to the geoclimatic conditions of the country.

5.3. Socio-Pedagogical Adaptation

The main goal of international students is to obtain a good-quality higher education. To achieve this purpose, they must fully comply with the curriculum provided by the program. However, they face a double challenge of academic adaptation. On the one hand, each student experienced a different educational tradition and educational load in their native country; on the other hand, higher education differs significantly from secondary education for all students.

Meanwhile, an important factor that creates stress for students is the nervous tension associated with studies. Students have to adapt to an academic environment that is very different from what they are used to. At a medical university, in particular, the educational process is one of intense, stressful training, requiring students to regularly prepare for classes, utilize independent study skills and display self-organization and the ability to understand and memorize a large amount of new information to master significant volumes of educational literature.

In the survey, the majority of students (67%) noted that studying at a medical university is difficult and that they are experiencing significant mental and psychological overload. The remaining 23% of students report that meeting the requirements of their academic load does not cause them any difficulty. However, many students face the problem of self-organization. To the question "Do you have enough time to prepare for classes?" 72% of respondents answered negatively.

In response to the academic difficulties, 76% of the respondents noted the presence of various physiological disorders (sleep disturbances, headaches and back pain) and psychophysiological conditions (constant feelings of fatigue, deterioration in working capacity, decreased concentration). Among the psycho-emotional symptoms, irritability, dissatisfaction with educational results, and feelings of anger are noted. The most frequent complaints are behavioural symptoms associated with a feeling of a chronic lack of time for rest and privacy. Only 24% of students have no such problems.

The results of the survey of international students on the issues surrounding adaptation to the educational environment reveal that many students have difficulties planning their work independently. The inability to regulate the load creates additional problems for them and can lead to psycho-emotional overload. In these conditions, students need psychological and pedagogical assistance.

Finally, the language barrier is a serious stress factor, especially for first-year students. One year of pre-university training is clearly not enough to enable students to assimilate educational information in the language of the host country. Uncertainty of their communicative competence and fear of making a mistake cause constant nervous tension and impede educational and pedagogical communication. This is even more true of students in the English-speaking form of education. Slavic languages are quite difficult to learn (inflectional structure, the presence of case and verb forms); therefore, students often experience stress during real communication, and the language barrier becomes a serious cause of misunderstandings and even conflict situations.

Overcoming the language barrier is an important factor in the effective psychophysiological adaptation of international students. In this regard, it is advisable to organize an intensive course of communicative language training for students at the initial level of education, aimed at removing both linguistic and psychological barriers to communication. In addition, language training teachers should choose lexical and syntactic material based on its relevance and demand.

6. Conclusion and Policy Recommendations

The research data collected from international students at Kharkiv National Medical University has demonstrated that the successful adaptation of international students depends on several factors. Most researchers tend to focus on the social and cultural challenges international students face; however, the findings of this research have also revealed the importance of adjustment to new climatic conditions. The climatic conditions of north-eastern Ukraine differ considerably from those of students' countries of origin, and adaptation is required to climatic factors such as a lower average temperature, large fluctuations in the average temperature, lack of sunlight, and short daylight hours in winter.

The results of the study showed that the destabilizing factors that negatively affect international students' adaptation process to new living and learning conditions include frequent hypothermia, dietary changes, inadequate and irregular food intake, insufficient physical activity and excessive mental stress.

Typical subjectively determined psychophysiological reactions in international students' adaptation process include temperature discomfort, nervous tension, drowsiness and gastrointestinal problems. A general tendency of the indicated reactions to decrease by the third year of study was revealed.

Given that the Kharkiv region of Ukraine welcomes a large number of international students, the results of this research can be used to develop practical recommendations for universities and other educational service providers, since we show which psychophysiological problems international students face and how to help them quickly work through the complex biosocial process of adaptation to new geoclimatic, social and educational conditions.

The following recommendations are proffered based on the study findings.

In order to speed up the acclimatization period of international students from hot countries and to prevent the negative consequences of changing geoclimatic conditions, it is advisable to promptly inform newly arrived students how their bodies might react to the change in climatic conditions and what measures should be taken to minimize negative psychophysiological reactions. Practical recommendations for international students can be posted in the information booklet or in the appropriate section for international students on the university website and may include the following points:

- Information about the temperature conditions in the winter season (typical average monthly temperatures of atmospheric air; precipitation in the form of snow, duration of snow cover, etc.).
- Recommendations for clothing in the cold season (purchase of warm clothing with low thermal conductivity, moisture- and windproof properties, as well as appropriate winter shoes one size larger; use of multiple layers of clothing to create a warm air cushion around the body).
- Tips for organizing meals (consuming hot, high-calorie food and warm tea before going out in the cold season; increasing the caloric content of the diet because the body needs more energy to keep warm in the cold season, etc.).
- Recommendations for overcoming peak educational loads (planning activities for each day and the coming week as a whole; a balanced distribution of time for study and rest, etc.).

In order to create more comfortable dining conditions for international students, it is advisable to consider expanding the range of university canteens, taking into account the traditional national preferences of students.

In short, the results and recommendations of the present study can contribute to a reduction of the period of psychophysiological adaptation and an improvement in the learning conditions not only of the more than 5,000 international students who study at Kharkiv National Medical University but of international students around the country and further afield.

Universities are advised to be actively involved in the adaptation process of international students. Adaptive measures for international students should be a part of a university's internalisation strategy. Further studies are needed to combine the information on international students' adaptation with risk prevention and management measures.

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