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HUMAN RESOURCE PROVISION IN THE REHABILITATION SYSTEM OF UKRAINE'S HEALTHCARE SECTOR

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Abstract. Human resource provision in the rehabilitation system of Ukraine's healthcare sector. Tymruk-Skoropad K.A., Martynova N.O., Boichuk A.Yu., Kolesnikov B.Yu., Yezhova O.O., Pampukha A.V., Prytherch H. *The aim of this study was to analyze the human resource needs, and engagement of rehabilitation professionals within the healthcare system of Ukraine. Data on the professional education, training, and employment of rehabilitation professionals in Ukraine were obtained through requests to the Unified State Electronic Database on Education for the period 2015-2025 (as of September 2025) and the Electronic Healthcare System of the National Health Service of Ukraine (as of March 2025). Additional information on human resource in healthcare facilities at different levels was collected through direct information requests and an online survey. The assessment was conducted using indicators of admission and graduation in the specialty "Therapy and Rehabilitation," the licensed capacity of the specialty, the titles of educational programs and their academic and teaching support; as well as healthcare facilities contracted with the National Health Service of Ukraine and the employment of rehabilitation professionals, including their number and occupied positions (physical therapists, occupational therapists, physical therapy assistants, occupational therapy assistants, and physicians of physical and rehabilitation medicine), their education, and continuing professional development. As of November 2025, education in the specialty "Therapy and Rehabilitation" was provided by 72 higher education institutions. Based on admission-graduation indicators, only approximately a half of bachelor graduates proceeded to master's level education. A significant increase in the number of enrolments to educational programmes*

related to physical therapy and occupational therapy was observed during 2023-2025. As of March 2025, the specialization cycle "Physical Therapy and Occupational Therapy" was implemented in 18 colleges/universities, which accounted for 42% (1,767 persons) of employed physical therapy assistants and 39% (1,052 persons) of occupational therapy assistants. The specialization cycles "Speech and Language Therapy" and "Prosthetics and Orthotics" were introduced in 2024-2025. The specialization "Physical and Rehabilitation Medicine" was completed by 5,754 individuals during 2019-2025 through specialization cycles and by 146 individuals through the internship program. Analysis demonstrates a pronounced imbalance between the different regions of Ukraine regarding both their contribution to education of the rehabilitation workforce and the subsequent employment of such professionals within the healthcare system. Analysis of the number of physical therapists and occupational therapists per 10,000 of population indicates a low level in almost all regions. The volume of staff turnover remains consistently high across all analysed rehabilitation professions, with the greatest numbers observed among occupational therapists. It was established that 71% to 80% of rehabilitation professionals in each group are employed in only one position. On average, 20-34% of such professionals combine two or more positions within the same institution, while for physicians of physical and rehabilitation medicine this proportion reaches 52%. Thus, the key challenges in ensuring adequate human resources in the rehabilitation system of healthcare and their employment include uneven quality of professional education, barriers to entry into the profession and retention within the healthcare system, and unjustified multiple job holding. The obtained results demonstrate the need for a revised, integrated state policy on rehabilitation workforce planning, which should take into account not only quantitative indicators of admission, graduation, and employment, but also forecast data, the quality of educational programs, actual labour market demand, demographic and regional factors, and motivational mechanisms for attracting and retaining personnel in professional education and the rehabilitation system.

Реферат. Забезпечення кадровими ресурсами системи реабілітації у сфері охорони здоров'я України. Тимрук-Скоропад К.А., Мартинова Н.О., Бойчук А.Ю., Колесніков Б.Ю., Єжова О.О., Пампуха А.В., Прайтерч Х. *Мета цього дослідження полягала в аналізі кадрового потенціалу, потреб та залучення фахівців з реабілітації у сфері охорони здоров'я України. Дані про підготовку та працевлаштування фахівців з реабілітації в Україні отримано на основі запитів до офіційних електронних інформаційних ресурсів: Єдиної державної електронної бази з питань освіти за період 2015-2025 рр. станом на вересень 2025 року, Електронної системи охорони здоров'я Національної служби здоров'я України станом на березень 2025 року. Додаткові відомості про кадрове забезпечення закладів охорони здоров'я різних рівнів були отримані шляхом прямих інформаційних запитів та онлайн-опитування. Оцінювання відбувалася за показниками вступу та випуску за спеціальністю «Терапія та реабілітація», ліцензійного обсягу спеціальності, назв освітніх програм та їх науково-педагогічного забезпечення; закладів охорони здоров'я, що мають угоду з Національною службою здоров'я України та працевлаштування фахівців з реабілітації, їх кількості та посад, які вони обіймають (фізичні терапевти, ерготерапевти, асистенти фізичних терапевтів, асистенти ерготерапевтів, лікарі фізичної та реабілітаційної медицини), їх освіти та підвищення кваліфікації. Станом на листопад 2025 р. підготовку фахівців за спеціальністю «Терапія та реабілітація» здійснюють 72 заклади вищої освіти. За показниками вступу-випуску орієнтовно лише половина випускників-бакалаврів вступають на навчання в магістратуру. Спостерігається суттєве зростання кількості вступників на освітні програми, пов'язані з фізичною терапією та ерготерапією, протягом 2023-2025 рр. Станом на березень 2025 р. цикл спеціалізації «Фізична терапія та ерготерапія» реалізувався у 18 коледжах/університетах, що забезпечило 42% (1767 осіб) працевлаштованих асистентів фізичної терапії та 39% (1052 особи) асистентів ерготерапевта. Цикли спеціалізації «Терапія мови і мовлення» та «Протезування-ортезування» з'явилися у 2024-2025 рр. Спеціалізацію «Фізична та реабілітаційна медицина» за період 2019-2025 рр. отримали 5754 особи за рахунок циклів спеціалізації та 146 осіб за програмою інтернатури. Регіональний аналіз демонструє виражену диспропорцію у внеску областей у підготовку кадрів і їхнім працевлаштуванням у сфері охорони здоров'я. Аналіз показника кількості фахівців фізичних терапевтів та ерготерапевтів на 10 тис. населення свідчить про його низький рівень практично у всіх областях. Обсяг звільнень є стабільно високим для всіх проаналізованих реабілітаційних професій з найбільшою кількістю серед ерготерапевтів. З'ясовано, що від 71% до 80% фахівців з реабілітації кожної групи працюють лише на одній посаді. У середньому 20-34% фахівців поєднують дві й більше посад у межах одного закладу; а для лікаря фізичної та реабілітаційної медицини цей показник становить 52%. Отже, викликами в забезпеченні кадрових ресурсів у системі реабілітації сфери охорони здоров'я та їх працевлаштуванні є: нерівномірний рівень якості освіти, входження у професію та утримання в системі охорони здоров'я, невиправдане сумісництво. Отримані результати демонструють необхідність перегляду цілісної державної політики щодо кадрового забезпечення реабілітації, яка повинна враховувати не лише кількісні фактичні показники вступу, випуску та працевлаштування, але й прогностичні дані, якість освітніх програм, реальний попит на ринку праці, демографічні та регіональні чинники, важелі мотивації для залучення й утримання кадрів у освіті та системі реабілітації.*

Access to rehabilitation services plays a fundamental role in ensuring a healthy lifestyle and well-being for people who have or may have impairments in their functional capacities. The World Health Organization (WHO) makes significant efforts to study global accessibility, needs, and gaps

in the provision of rehabilitation services [1], noting that currently, 2,4 billion people worldwide live with conditions for which rehabilitation could be beneficial. At the same time, it is reported that in low- and middle-income countries, over 50% of people do not receive the rehabilitation services they require. The dissatisfaction with access to rehabilitation services can vary widely depending on the region, disease, level of functioning, stage of rehabilitation, healthcare service delivery level, and the need for specific rehabilitation services or rehabilitation professionals [2].

Wars, conflicts, natural disasters, and catastrophes exert additional pressure on the health care sector, significantly increasing the need for rehabilitation. At the same time, in such contexts, barriers to accessibility also grow. The full-scale invasion of Ukraine by the RF since 2022 has also significantly intensified pressure on the country's rehabilitation system. According to data from the National Health Service of Ukraine (NHSU), from 2021 to 2024, of 1,773,901 cases requiring urgent rehabilitation assistance, only 149399 (8.42%) received it.

The main reasons for unmet rehabilitation needs relate to either the lack of access to services or a shortage of personnel [3]. The WHO Rehabilitation 2030 initiative directly calls out the global workforce shortage, uneven workforce training, and lack of systemic manpower planning, especially in low- and middle-income countries, emphasizing that these present a key barrier to accessibility [4]. The implementation of the universal health coverage principle and the strengthening of rehabilitation on community level even greater depends workforce capacity.

Assessing the availability of rehabilitation professionals is a critical starting point for understanding the health care system's capacity to achieve health-related rehabilitation service goals in a given country. However, the complexity of evaluating and monitoring personnel in rehabilitation, particularly in low- and middle-income countries, can lead to data inconsistency and only a fragmented picture [3]. Despite the existence of state registers in Ukraine, such as the Unified State Electronic Database of Education (for the educational sector) and the Electronic Health System (for the health care sector), as well as attempts to assess the availability and quality of workforce resources [5], it is still difficult to create a comprehensive, integrated, and full picture of the situation.

The challenges regarding methodological approaches and the incomplete findings complicate the formulation of a well-founded policy on formal rehabilitation education, as well as other steps to improve workforce qualifications, plan government orders, attract and retain employees in healthcare facilities and communities, and ultimately to makes decisions regarding the quality requirements and access to rehabilitation.

In this context, it is important to focus on identifying the key aspects of rehabilitation education in Ukraine, the structure of employment and the use of workforce to form the basis for informed decisions and improve the rehabilitation system.

Objective – to analyze the human resource capacity, needs, and engagement of rehabilitation professionals in the health care sector of Ukraine.

MATERIALS AND METHODS OF RESEARCH

A descriptive cross-sectional study was conducted based on secondary data analysis, using national administrative registers and an online survey of educational institutions and health care professionals.

The study was based on an analysis of official state electronic information systems and administrative data. Data on the training and employment of rehabilitation professionals in Ukraine were obtained through requests to official electronic information resources: the Unified State Electronic Database of Education (USEDE) [6], the Electronic Health System (EHS) of the National Health Service of Ukraine (NHSU) [7].

Unified State Electronic Database of Education data. The data extract from the USEDE contained criteria regarding admission and graduation in the specialty I7 "Therapy and Rehabilitation" (including related previous specialties) for the period 2015-2025 as of September 2025; data on the provision of scientific and pedagogical staff (SPS). Data on the licensing volume of the I7 specialty as of November 2025 were obtained from open sources in the USEDE [8].

The data were harmonized across years, duplicates were removed, and discrepancies between higher education institutions, specialty names, specializations, and educational programs were standardized into a uniform format.

Electronic Health System data from National Health Service of Ukraine. The data extract from the NHSU covered information from the Electronic Health System (EHS) as of March 2025 regarding:

- health-care facilities (HCFs) contracted by the NHSU and the employment of rehabilitation professionals;
- the number of rehabilitation professionals listed in HCFs and the positions held (physical therapists, occupational therapists, physical therapy assistants, occupational therapy assistants, and physicians of physical and rehabilitation medicine);
- education and advanced training of rehabilitation professionals registered in the EHS.

An aggregated dataset was formed for the analysis, allowing for the evaluation of the relationship

between workforce training and their actual employment in the specialty.

The NHSU data, like the USEDE data, were standardized by specialty (specialization) and higher education institution (HEI) names, with duplicates removed.

Online survey of rehabilitation professionals. Additional information on workforce provision for HCFs at various levels was obtained through direct information requests (online surveys) regarding:

- number of employed rehabilitation professionals and their education;
- level of education (bachelor's, master's degree, primary (internship) or secondary specialization);
- part-time employment and workload distribution.

The sampling frame for the survey was formed on the basis of health care facilities holding active contracts with the National Health Service of Ukraine (NHSU). Survey invitations were disseminated through multiple channels, including administrations of contracted health care facilities. The key variables included in the analysis comprised profession, educational level and pathway, current position(s), multiple jobholding, and workload (full-time or part-time employment).

The survey conducted in February-March 2025 involved 7,271 rehabilitation professionals. This accounts for 59% of all professionals in the surveyed professions, according to the EHS, working in HCFs as of March 2025, indicating the representativeness of the sample and the ability to generalize about the workforce composition in rehabilitation professions, such as physical and rehabilitation medicine physicians (PRMP), physical therapists (PT), occupational therapists (OT), physical therapy assistants (PTA), and occupational therapy assistants (OTA). All data were collected in a manner that precluded personal identification of respondents and were used exclusively for aggregated analytical purposes.

Informed consent was obtained from each participant online prior to data collection. The study "Human resource provision in the rehabilitation system of Ukraine's healthcare sector" was approved by the "Health Science Research Foundation" Ethics Committee (Protocol No. KE-009-2025, December 15, 2025).

Data processing and statistical analysis. Python scripts were employed for data processing using Python version 3.12.2 and the pandas (version 2.3.0) [9] and NumPy (version 1.26.4) [10] libraries; all software used is open-source and distributed under BSD-style licenses. A multi-stage cleaning procedure was implemented, including clustering of textual categories to standardize nomenclature, manual mapping where clustering was not feasible, removal of duplicates, and construction of subgroup tables by professional categories and regions. Statistical analyses were conducted in Excel and were descriptive in nature, involving the calculation of absolute and relative indicators, coefficients, proportions, as well as the dynamics and structural patterns of employment.

At the level of formal pre-university education of rehabilitation professionals, the analysis of their educational programs in the specialties 8.01020302 Physical Rehabilitation, 7.01020302 Physical Rehabilitation, 227 Physical Rehabilitation, 227 Physical Therapy, Occupational Therapy, 227 Therapy and Rehabilitation, and I7 Therapy and Rehabilitation in the period of 2015-2025 enabled the assessment of trends in the enrolment and graduation of physical therapy and occupational therapy professionals during 2015-2025, demand for the corresponding specialty, provision of scientific and pedagogical staff (SPS) for educational programs (EPs), and the employment of graduates in the health care system in positions such as PTA, OTA, PT, and OT.

The formal education in the specialties of "Speech and Language Therapy" (specialty I7) and "Prosthetics and Orthotics" (I6 "Medical Diagnosis and Treatment Technologies") only began in 2025 and 2024, respectively, with the enrolment of 28 and 88 students. Educational pathways for PRMP and rehabilitation nurses include specialization (primary or secondary). The training of other rehabilitation professionals was not the focus of this study.

RESULTS AND DISCUSSION

Formal Pre-University Education of Rehabilitation Professionals.

As of November 2025, 72 HEIs in Ukraine provide education for professionals in Therapy and Rehabilitation under EPs at various levels of higher education. Of these, 12 institutions are under the Ministry of Health (MOH), 33 under the Ministry of Education and Science (MES), and 27 are under other authorities. Among them, 8 (11%) HEIs train professionals at all three educational levels of higher education, 23 (32%) HEIs train only at the first (bachelor's) level, 2 (3%) HEIs have EPs only at the second (master's) level, and 39 (54%) HEIs train at both the first and second educational levels.

The total number of enrolled students for the selected period was 40,226 persons, of whom 26,101 enrolled at the first (bachelor's) level and 14,125 at the second (master's) level of higher education (Table 1). Therefore, approximately half of the bachelor's degree graduates continue their studies in the master's program.

The USEDE data revealed a significant increase in the number of student enrolment to educational programs related to physical therapy and occupational therapy from 2023 to 2025. The highest enrolment

levels were observed in 2024-2025, with the total number of newly enrolled students at the bachelor's and master's levels exceeding 4,500 people per year.

The total number of graduates for the period from 2015 to 2025 was 25,015 persons (bachelor's, master's, and specialist's degrees). Of these, professionals with access to the PT and OT professions – specialist's and master's degree graduates without specialization account for 34.7% (8,676 persons), master's degree graduates in PT – 15.6% (3,911 persons), and master's degree graduates in OT – 0.3% (79 persons).

Table 1

Enrolment and graduation dynamics for specialties that grant the right to employment in the positions of PT, OT, and PTA/OTA

Count by PT/OT specialty without specialization*

Levels of education	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total
Bachelor's degree enrolment by PT/OT specialty, persons	-	1,745	2,720	2,882	2,617	2,167	1,655	1,808	10	-	-	15,604
Master's degree enrolment by PT/OT specialty, persons	627	707	1,201	1,369	570	285	365	567	-	-	-	5,691
Specialist's degree enrolment by PT/OT specialty, persons	919	1,030	-	-	-	-	-	-	-	-	-	1,949
Total	1,546	3,482	3,921	4,251	3,187	2,452	2,020	2,375	10	0	0	23,244
Bachelor's degree graduation by PT/OT specialty, persons	-	-	-	252	570	2,384	2,460	2,133	1,850	1,396	1,190	12,235
Master's degree graduation by PT/OT specialty, persons	544	258	424	1,145	1,155	738	421	321	287	496	-	5,789
Specialist's degree graduation by PT/OT specialty, persons	811	855	900	231	14	-	14	14	13	35	-	2,887
Total	1,355	1,113	1,324	1,628	1,739	3,122	2,895	2,468	2,150	1,927	1,190	20,911

Count by PT/OT specialization*

Levels of education	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total
Bachelor's degree enrolment for PT, persons	-	-	-	1	3	37	68	60	3,082	3,434	3,554	10,239
Master's degree enrolment for PT, persons	-	-	-	39	858	622	617	1,217	1,069	1,107	804	6,333
Total	0	0	0	40	861	659	685	1,277	4,151	4,541	4,358	16,572
Bachelor's degree graduation for PT, persons	-	-	-	-	-	-	-	-	-	35	79	114
Master's degree graduation for PT, persons	-	-	-	-	-	510	579	557	709	697	859	3,911
Total	0	0	0	0	0	510	579	557	709	732	938	4,025
Bachelor's degree enrolment for OT, persons	-	-	-	-	-	-	-	-	-	76	159	258
Master's degree enrolment for OT, persons	-	-	-	-	24	9	12	30	25	33	19	152
Total	0	0	0	0	24	9	12	30	25	109	178	410
Bachelor's degree graduation for OT, persons	-	-	-	-	-	-	-	-	-	-	-	-
Master's degree graduation for OT, persons	-	-	-	-	-	-	21	9	11	21	17	79
Total	0	0	0	0	0	0	21	9	11	21	17	79

Notes: * – excluding data for the third educational level; Doctor of Philosophy (PhD).

The total licensed enrolment capacity in 2025 for all EPs and specialties at all three levels of education under specialty I7 amounted to 24,096 places. The share of licensing implementation at the first level was 23%, at the second level – 11%; 16 HEIs provided education for 50% of the enrolled students in 2025. During this period, the USEDE recorded 1,559 entries about scientific and pedagogical staff (SPS) providing educational programs for specialty I7 "Therapy and Rehabilitation". There were 1,131 duplicate entries (re-registrations), related to teaching at different levels of EPs. A total of 428 unique SPS persons were registered to support this specialty. Education data were provided for 260 (60.7%) unique staff members, of which 131 (50%) have a specialized education in physical rehabilitation/PT/OT (for 41 persons, this is a second acquired profession), and 52 (20%) are teachers with only medical specialties. In 27.7% of HEIs in the USEDE, no SPS with specialized education were recorded, and in 11 HEIs, 50% of all registered specialized SPS were employed. Compared to 2024, these figures represent much lower numbers of SPS with specialized education registered in the system. Specifically, in 2024, the USEDE recorded 5,546 entries for persons who provided educational programs across all levels, of which 2,513 were unique persons, and 283 had specialized education. This may indicate improper and untimely data updating.

Formal Postgraduate Education for Rehabilitation Professionals.

The formation of rehabilitation workforce capacity occurs not only through pre-university education but also through postgraduate training – specialization cycles and internships (as primary specialization for PRMP), the necessity of which is a condition for access to the profession as defined by current legislation and relevant professional standards.

Specialization cycles serve a dual function: on the one hand, they are an instrument of continuous professional development (CPD), and on the other, they are a mechanism for a transitional period that allows for obtaining professional qualifications in the corresponding profession within a short period. The professional qualification of PTA and OTA can be obtained through a specialization cycle of 150 hours for nurses; Prosthetics and Orthotics (PO) – 3 months of study; PRMP and Speech and Language Therapy (SLT) with 4 and 9 months of study, respectively.

At the same time, for OT, a requirement for mandatory specialization was established: from 2022 to July 2025, access to the profession for individuals who had a master's/specialist's degree diploma in "Physical Rehabilitation" in the field of knowledge "Physical Education, Sports, and Human Health" required completion of a six-month specialization cycle in "Occupational Therapy" [11, 12]. As of 2025, 6 and 8 HEIs conducted specialization in PT and OT, respectively, both through budget and contract forms of education (Table 2).

Table 2

Dynamics of rehabilitation workforce training (2019-2025) and planned indicators for specialization cycles* (based on responses from 46 HEIs)

Cycle	Completed the cycle and received a certificate (2019-2025), persons		Number of persons who started the cycle in 2025 but have not yet received the certificate	Planned volume for 2026 (budget+contract), persons	Number of HEIs (as of 2025)
	budget	contract			
Physical Therapy	96	176	114	293	6
Occupational Therapy	84	231	121	237	8
Speech and Language Therapy	–	23	22	40	3
Prosthetics and Orthotics	1	33	3	0	1
Physical and Rehabilitation	1,641	3,431	682	825	18
Medicine nurses (PTA, OTA)	2,310		-	562	18

Note. * – the indicators reflect the data from those HEIs that provided information. Due to varying levels of questionnaire completion, partial underrepresentation of certain specialties or indicators may occur.

Specialization cycles in "Speech and Language Therapy" and "Prosthetics and Orthotics" appeared relatively recently: in 2025 and 2024, respectively, and remain the smallest both in terms of the number of graduates and the number of educational institutions implementing them (Table 2). This may be explained by their novelty and temporary status, as well as increased framework requirements defined by the MOH order [13] and professional standards for the relevant professions [14, 15], particularly regarding the composition of the certification commission and the organization of the qualification examination, the results of which determine the decision regarding the assignment of professional qualifications in the specialty of SLT or PO.

As of March 2025, the specialization cycle "Physical Therapy and Occupational Therapy" was implemented in 18 colleges/universities (according to the data provided by the educational institutions). This specialization accounted for 42% (1,767 persons) of employed PTA and 39% (1,052 persons) of OTA as recorded in the EHS in 2025.

Among all the specialization cycles for rehabilitation professionals, the "Physical and Rehabilitation Medicine" specialization is the most in demand. As a result, the professional qualification of "PRMP" was obtained by 5,754 individuals between 2019 and 2025. Only 146 individuals acquired this specialty through the internship, the curriculums of which are implemented in 15 HEIs. The model curriculum for the internship in the specialty "Physical and Rehabilitation Medicine," approved by the MOH [16], defines the prerequisites for entry, the content and forms of education, forms of assessment, the list of competencies, learning outcomes, practical skills, and the required level of proficiency, as well as the list and scope of educational components. Based on the HEI survey, 88% of institutions estimated that 75-100% of their program content was aligned with the competencies specified in the Model Curriculum.

The next most common specialization program based on the number of HEIs that have implemented or plan to introduce it, is Occupational Therapy. According to the survey, eleven HEIs plan to launch this program in 2026.

Employment Structure of Rehabilitation Professionals within the Health Care System.

To assess the transition of physical therapists and occupational therapists from education to employment within the health care system, graduate output was compared with actual employment. From 2015 to 2024, 48 higher education institutions provided education at the master's and specialist levels under specialty I7. During this period, a total of 11,755 professionals graduated, including 2,039 individuals whose education was funded through the state budget.

Regional analysis reveals a distinct disproportion in the contribution of higher education institutions located in different regions to workforce preparation and their integration into the profession within the health care system (Table 3). Share of those who entered employment in PT and OT positions within the country's health care system ranges from critically low rates of 15-17% from HEIs in Zakarpattia, Khmelnytskyi, Mykolaiv, and Volyn oblasts to relatively high rates from Ternopil (76%), Chernivtsi (55%), and Poltava (52%) oblasts HEIs. The overall employment rate of graduates in the health care system during this period was 26% (3,056 persons), while the exit rate from the health care system among those employed reached 40% (1,241 persons). As of 2025, there are 5,472 people employed in PT/OT positions in the health care system (Table 4), of whom 33% are graduates of educational programs completed between 2015 and 2025.

The analysis of the indicator for the number of PT and OT in the health care system per 10,000 of population shows a critically low level, with an average of 1.36 PT/OT per 10,000 of population (the highest being in Sumy Oblast – 2.3 PT/OT per 10,000 of population). In contrast, according to Eurostat statistics [17], the average for 30 European countries for PT alone is 11.3, with the highest in Germany (24 PT per 10,000 population) and the lowest in Türkiye (1.7 PT per 10,000 population). The average number of graduates with a master's and specialist's degree in specialty I7 during 2015-2024 also falls short of the average levels in European countries, averaging 2.2 professionals per 10,000 of population in the regions (the highest rates were found in Zaporizhzhia Oblast – 10.5 graduates per 10,000 of population).

The workforce dynamics further reveal significant differences between rehabilitation professions, particularly with regard to the retention of professionals within the profession. The exit rate from the health care system remains consistently high across all analyzed rehabilitation professions, with the highest level observed among occupational therapists, only 50.2% of them remain employed in health care positions. In contrast, the lowest exit rate was recorded among physicians in physical and rehabilitation medicine (PRM) at 35.7% (Table 4).

The employment structure, based on EHS data analysis, shows that between 71% and 80% of rehabilitation professionals in each professional group are employed in a single position. On average, 20-34% of professionals combine two or more positions within the same institution, while this proportion reaches

52% among physicians in physical and rehabilitation medicine (PRMP). As of March 2025, 9% of PT also held an OT position, 4% held a PTA position, 2% held an OTA position, and 6.3% held a PRMP position. Occupational therapists were additionally employed as PT in 13% of cases, PTA in 3.6%, OTA in 1.8%, and PRM in 4.6% of cases. Physical therapists assistants combined their roles with PT, OT, OTA, and PRMP positions in 8%, 5%, 11%, and 11% of cases, respectively. Occupational therapists assistants also worked as PT in 7% of cases, OT in 4%, PTA in 16.8%, and PRMP in 9.8% of cases. Seven percent of PRMP in the health care system held combined positions as PT, 3.5% as OT, 6% as PTA, and 3.3% as OTA.

Table 3

Regional Employment Structure of Master's and Specialist Degree Graduates (2015-2024) in PT/OT and PTA/OTA Positions within the Health Care System

Oblast in which the HEI is located (number of HEIs that graduated master's and specialist's degree students*)	Number of graduates from all HEIs in the oblast (USEDE), persons	Graduates from the oblast (A) recorded in the EHS (nationwide), persons	Share of graduates (A) recorded in the EHS (nationwide), %	Number of graduates from the oblast (A) employed in the health care system as of March 2025, persons	Share of graduates employed in the health care system as of March 2025 (C) from the total number recorded in the EHS (B), %	Number of PT/OT employed in the health care system in the oblast as of March 2025, total (graduates from any oblast)	Share of discharges from the health care system in the oblast, %
	A	B		C			
Ivano-Frankivsk Oblast (2)	485	128	26%	66	52%	36	43%
Volyn (3)	659	113	17%	51	45%	84	32%
Vinnytsia (2)	511	165	32%	102	62%	69	42%
Dnipropetrovsk (1)	136	67	49%	41	61%	235	42%
Zakarpattia (1)	582	89	15%	55	62%	49	38%
Zaporizhzhia (6)	1,719	472	27%	293	62%	77	37%
Luhansk (1)	116	34	29%	21	62%	8	20%
Lviv (4)	1,117	324	29%	190	59%	167	37%
Mykolaiv (4)	590	93	16%	52	56%	33	38%
Poltava (1)	54	28	52%	16	57%	113	38%
Rivne (2)	1,159	213	18%	119	56%	22	48%
Sumy (2)	465	174	37%	113	65%	121	41%
Ternopil (2)	184	140	76%	87	62%	102	44%
Kharkiv (2)	334	148	44%	89	60%	69	38%
Kherson (1)	125	48	38%	29	60%	24	41%
Khmelnytskyi (3)	459	68	15%	40	59%	29	37%
Chernivtsi (1)	276	152	55%	96	63%	82	47%
Kyiv city (10)	2,784	600	22%	355	59%	220	40%

Note. * – according to the USEDE data.

Table 4

Number of rehabilitation professionals and key employment indicators (EHS data and survey results)

Indicator	PT n=1,837 persons (%)	OT n= 1,176 persons (%)	PTA n=1,580 persons (%)	OTA n=1,023 persons (%)	PRMP n=1,655 persons (%)
Number of professionals in the EHS	6,048	4,479	4,202	2,673	4,698
Number of professionals as of March 2025 (EHS)	3,223	2,249	2,297	1,542	3,022
Percentage of those who remained in the profession	53.30%	50.2%	54.70%	57.70%	64.30%
Number and share of those working in only one position in the EHS	2,376 (74%)	1,588 (71%)	1,844 (80%)	1,159 (75%)	2,282 (76%)
Working in ≥ 2 positions in one HCF*	575 (31%)	405 (34,4)	311 (20%)	235 (23%)	862 (52%)
Employed in ≥ 1 full-time position	1,469 (80%)	936 (80%)	1,349 (85%)	901 (88%)	1,217 (74%)
Employed in 0.5–0.75 full-time position*	247 (13.4%)	175 (15%)	217 (14%)	101 (10%)	286 (17%)
Employed in 0.25 full-time position*	106 (6%)	58 (5%)	14 (1%)	21 (2%)	116 (7%)

Note.* – less than 1% of PT and 2% of PRMP did not indicate the rate of the position they work in.

The survey of healthcare professionals revealed that, on average, 10% of PTA and OTA combine their roles with nursing positions. Combining rehabilitation professions with other clinical professions is also observed.

Flexible staffing models are widely used by HCFs: the majority of professionals work full-time (from 74% to 88%, depending on the specialty), while the share of those employed in 0.5-0.75 full-time equivalent (FTE) positions is 10-17%. Working in 0.25 FTE positions is the least common and is characteristic for PRMP (7%) and PT (6%).

The results obtained demonstrate a significant increase in the educational potential in the field of rehabilitation in Ukraine over the past decade, while also revealing a number of structural imbalances between undergraduate education, postgraduate education, CPD possibilities, and actual employment of professionals in the health care system. Previous Ukrainian studies have already pointed out the critical shortage of physical therapy and occupational therapy professionals in the health care system [5, 18], despite the significant number of graduates from relevant educational programs. Our study not only confirms the persistent imbalance between workforce training and actual health care workforce capacity, but also for the first time provides an up-to-date assessment of workforce capabilities, needs by region, and characteristics of the training and staffing across the professions of PRMP, PTA, and OTA.

Until 2018, education in the specialty "Physical Therapy, Occupational Therapy" was conducted without formal specialization tracks. Starting in 2019, specializations were actively introduced, and since 2021-2022, there has been a sharp increase in enrolment for PT programs with specialization. The total number of students enrolled at the first (bachelor's) level in PT programs during 2019-2025 is 10,239 persons, with 6,333 students enrolled in PT master's degree programs. Meanwhile, enrolment in occupational therapy programs remains minimal – 258 students entered the first year and 152 entered the master's program; OT make up only 2.4% of all entrants to the specialty.

Considering the completion rates of the four-year bachelor's programs (74.4% of entrants on average) and the 2-year master's degree program (85.4% of entrants on average), it is expected that in the period from 2026 to 2029, the profession will be entered by 9,100 PTA/OTA and 1,630 PT and 44 OT in 2026-2027. Starting from 2027, a significant influx of PTA/OTA to the labor market is expected, with over two thousand professionals per year. Given the current trends in master's degree program enrolment (50% of bachelor's degree graduates), it is expected that nearly 1,600 more masters will graduate in 2028-2029. In fact, only one-third of entrants to the first level of higher education later complete the second level, which grants the right to work as a physical therapist or occupational therapist.

Thus, from 2026 to 2029, the number of graduates in physical therapy and occupational therapy EPs will significantly increase. The primary growth will be provided by bachelor's degree graduates (PTA/OTA),

whose numbers will nearly double. At the same time, the training of physical therapy master's degree students will increase only moderately, while the graduation of occupational therapists will remain critically low. This could create a significant imbalance in multidisciplinary teams and limit the potential for the development of occupational therapy services in the next decade, even despite the secondary specialization programs for OT given the projected ratio of PTA/OTA to PT and OT graduates described above.

It should be noted that as of 2025, a pathway remains in place allowing nurses to obtain specialization in physical therapy assistant (PTA) and occupational therapy assistant (OTA) roles [19]. This will add to the number of professionals applying for relevant positions in HCFs. However, 11 out of 18 educational institutions (medical colleges) offering 150-hour specialization cycles for professionals with basic nursing education do not have specialized departments or EPs in physical therapy and/or occupational therapy. Such short-term specialization programs are not comparable to the four-year educational preparation of PT/OT bachelor's degree programs, which include foundational theoretical disciplines, extensive clinical practice, and structured development of professional identity. Achieving a level of competence comparable to that defined in national educational standards is not feasible within such a limited training duration, given the 150-hour duration of these specialization cycles. Moreover, in colleges that lack accredited PT or OT bachelor's degree programs, the minimum alignment of academic staff, clinical training bases, and the educational environment with quality assurance standards is not ensured. Without such structural elements, their ability to ensure proper content and quality for specialization cycles is substantially constrained. Taken together, these factors pose significant risks to training quality and contribute to the formation of a subgroup of professionals with markedly lower levels of professional readiness, as inferred from training duration, staffing limitations, and lack of accredited educational infrastructure.

As of 2025, Ukraine has broad educational offer under specialty I7 "Therapy and Rehabilitation" with a total licensed enrolment capacity of 24,096 places. This formally creates substantial capacity for workforce education, which, however, is only utilized to about a quarter of its potential. This underscores the need for workforce planning based on projected health care system needs, rather than relying solely on the capacity of higher education institutions to expand licensed intake. Staffing for educational programs is one of the most critical aspects. The presence of 1,559 entries for SPS in the USEDE, with only 428 unique lecturers, suggests a significant number of duplicate registrations due to lecturers working simultaneously across multiple educational levels. This structure of workload may indicate a limited workforce reserve in the rehabilitation sector and overburdening of some professionals, potentially affecting the quality of the educational process. The fact that only 60.7% of unique SPS have education data (as of 2025), and only half of those with education details have specialized education in PT/OT, highlights a significant staffing gap between regulatory requirements and actual staffing of EPs. This situation is inconsistent with the position statements of World Physiotherapy and ENPHE, which emphasize the availability of appropriately qualified, profession-specific academic staff as a key prerequisite for the development of professional competencies in physical therapy education [20, 21].

According to available data, 11 HEIs concentrate half of all specialized SPS. This also points to the uneven distribution of rehabilitation academic staff, limiting the potential for scaling up quality training. For Ukraine, this situation poses the risk of preserving significant differences in the quality of graduate education across institutions. Marked fluctuations in the number of registered SPS in the USEDE during 2024-2025 may indicate methodological limitations and delayed or incomplete updates to the USEDE, emphasizing the need for a systematic review of the mechanisms for maintaining and updating SPS information, given its role in evidence-informed educational planning and workforce policy, as high-quality data may be crucial for effective decision-making in educational program planning and staffing policy.

Alongside undergraduate education, a key element in shaping a capable rehabilitation system in healthcare is postgraduate education.

As of March 2025, 3,022 PRMP were employed in Ukraine, over 95% of whom are graduates of specialization cycles. However, the total number of graduates from these cycles exceeds the actual number of PRMP working in the healthcare system by approximately 40%. Over the past seven years, postgraduate specialization cycles in "Physical and Rehabilitation Medicine" have been implemented in 18 HEIs, of which 13 have licenses to educate PRM physicians through internships, ensuring state oversight of competency-based education requirements.

Survey results show that the main participants in the cycle are representatives from specialties such as general practitioner, neurologist, pediatrician, orthopedic traumatologist, and sports medicine physician. Given this professional heterogeneity, standardizing education without considering prior clinical competencies may be ineffective. Nevertheless, 88% of providers do not apply participant selection criteria,

do not define academic differences, and do not adapt the programs to the prior experiences of the participants. Along with the limited time for the specialization cycle, this increases the risk of incomplete competency development as outlined in the Model Curriculum for Internship Training in "Physical and Rehabilitation Medicine."

A significant proportion of the physicians completing the PRMP cycle do not fully retrain but rather add the PRMP specialty to their primary specialty, resulting in the highest level of dual employment among rehabilitation professionals. As of March 2025, 52% of PRM recorded in the EHS held multiple positions. Among the 1,655 PRMP surveyed, 9.37% (155 persons) simultaneously held a neurologist position, 3.02% (50 persons) – an orthopaedic-traumatologist position, 3.02% (50 persons) – a paediatric neonatologist position, and 2.11% (35 persons) – a therapist position; there are also combinations with obstetrician-gynecologists, cardiologists, infectious disease professionals, and others. These patterns are directly derived from the observed prevalence of multiple jobholding and position combinations reported in the EHS and survey data.

Despite the predominance of short-term specialization cycles in PRMP training, internships may be the main factor in forming a stable workforce. A three-year training cycle provides much deeper immersion into clinical practice, as approximately 70% of the training takes place in a clinical settings, supporting the development of professional competencies and professional identity. The projected output of internship graduates (approximately 120 physicians annually in 2026-2028) creates the conditions for gradually increasing a stable group of professionals who have undergone full training, which is critically important given the high proportion of dual employment among graduates of specialization cycles.

Returning to the issue of holding multiple positions in the same HCF, it should be noted that PRMP are not the only professionals working under such arrangements. Similar employment patterns are observed among 20-34% of other rehabilitation professionals. These combined roles create unstable professional trajectories, blur the boundaries between clinical and rehabilitation functions, and contradict international standards of professional autonomy, as interpreted in relation to the reported shares of dual employment and part-time positions.

It is important to note that the counting of available staff in the EHS, without considering the "full-time position" parameter, creates a situation where one person employed in several positions is counted as multiple staffing units. As a result, the nominal headcount in HCFs is significantly overestimated, while the actual available workforce is underestimated, leading to distorted assessments of health system capacity, particularly in the context of service purchasing under NHSU packages. Given that 71-80% of professionals work in a single position, 10-17% work at 0.5-0.75 FTE, and 6-7% at 0.25 FTE, the integration of workload-adjusted workforce accounting is critical for accurately estimating real workforce capacity and supporting informed managerial and policy decisions.

Limitations of the Study.

The study has several limitations, primarily related to the quality and completeness of available data, which complicates the acquisition of up-to-date information and its analysis. Specifically, the electronic data collection systems may not have been updated in a timely manner; in some cases, there was negligence in entering data by the subjects (errors, omissions, or incomplete entries, lack of standardization). An additional issue is the change in data collection approaches in electronic systems over the years, which made it difficult to compare results and interpret their dynamics.

The study focuses on the staffing situation in the health care system. It does not account for rehabilitation professionals working in the social sector, education, the private sector, or military medical institutions.

The study focuses on the staffing of rehabilitation professionals in health care system. It does not analyze if the highlighted problems apply to all healthcare professionals showing structural problems in health workforce or are limited to rehabilitation professionals only.

The survey of HEIs and HCF professionals, which was voluntary, had partial coverage and may have contained errors in self-reporting on programs, education, dual employment, full-time positions, etc., which potentially affected the accuracy of the results.

Despite the data cleaning and standardization conducted before analysis, there remains a risk of errors, which could have affected the accuracy of the results.

CONCLUSIONS

1. In the period from 2015 to 2025, there was a significant expansion of formal training in physical therapy and occupational therapy. Despite the positive dynamics reflected in the growing enrolment in physical therapy and occupational therapy educational program, number of graduates in occupational therapy remains critically low, and the educational programs, in general, are not accompanied by a proportional strengthening of the staffing of scientific and pedagogical personnel, which is a critical factor for forming the professional competence of future professionals.

2. Specialization cycles played an important role in rapidly forming the staffing potential of the rehabilitation system (physical therapy assistants and occupational therapy assistants; physical and rehabilitation medicine physicians). Their short duration and the absence of standardized quality assurance mechanisms for the educational process have resulted in the formation of a segment of professionals with a lower level of professional preparation. It should also be noted that these professionals do not integrate into full professional rehabilitation practice and often combine their qualifications with other medical or nursing specialties, which increases inter-professional overlap and contributes to the fragmentation of the rehabilitation workforce structure.

3. The rehabilitation workforce structure reflects a complex and heterogeneous configuration at both regional and national levels. Despite the increase in the number of new graduates, their engagement and retention in the health care system remain low. Dual employment and combining several positions within healthcare facilities are common, especially among physical and rehabilitation medicine physicians, which blurs the boundaries between professions, complicates the objective accounting of the actual workforce (due to the lack of full consideration of the position in the Electronic Health System), and indicates an imbalance between demand and supply.

4. The results obtained highlight the need to revise the overall state policy regarding the staffing of rehabilitation services to consider not only the quantitative actual indicators of admission, graduation, and employment but also forecast data, the quality of educational programs, actual labor market demand over a medium to long term perspective, demographic and regional factors (including community rehabilitation needs), and mechanisms for motivating the recruitment and retention of staff in education and the rehabilitation system.

Future Research Prospects. The conducted study lays the foundation for understanding the current situation in the system of training and employment of rehabilitation professionals. However, in order to shape an effective state policy and ensure the quality of rehabilitation services, further in-depth study of several key issues is necessary, namely: qualitative and quantitative analysis of educational and employment outcomes, in-depth analysis of the employment of graduates by specialty, as well as identifying cause-and-effect relationships leading to professionals leaving the profession or health care system, evaluating the quality of educational programs in terms of their alignment with real labor market needs; forming a strategic vision of rehabilitation education in the context of developing the state rehabilitation services system, which includes determining the current and forecast rehabilitation needs of the population, substantiating the state order policy for professionals based on these needs, as well as developing economic and social mechanisms for attracting and retaining trained professionals in the health care system.

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