ВЖИВАННЯ ПРИЙМЕННИКІВ ТА ПРИЙМЕННИКОВИХ ФРАЗ В АНГЛІЙСЬКИХ ФАХОВИХ СТАТТЯХ З КАРДІОЛОГІЇ

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THE USE OF PREPOSITIONS AND PREPOSITIONAL PHRASES IN ENGLISH PROFESSIONAL ARTICLES OF CARDIOLOGY

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Запоточная Л., Рак О., Томка И. Употребление предлогов и предложных фраз в английских профессиональных статьях по кардиологии. В статье исследуются предлоги и предложные фразы английского языка в профессиональных текстах по кардиологии. Предметом исследования выступают предлоги, используемые в статьях по кардиологии. Проанализированы и классифицированы формальные и семантические аспекты наиболее часто употребляемых предлогов.

Ключевые слова: *предлог, предложная фраза, семантическая классификация, кардиологическая терминология.*

English language is widely used in the professional language of doctors all over the world. Today, all the most influential medical journals are written in English, and English has become the language of choice at international conferences. We have entered the era of medical English, which resembles the era of medical Latin in that, once again, medical doctors have chosen a single language for international communication[1].

Since English language has become the dominant language in medical communication, medical professionals should use their knowledge of English to keep up to date with medical advances[2]. The correct use of medical terminology, the ability of applying various grammar constructions, prepositions and prepositional phrases makes it possible for doctors to enrich and share their knowledge and experience.While writing medical articles many scientists may face some difficulties choosing an appropriate preposition or prepositional phrase in English medical terminology. On the basis of cardiologic articles the semantic and structural analyses have been done.

The **aim** of the article is to determine the number, presence, prepositional meanings and realizations in cardiologic medical texts, to make quantitative analysis of the most frequently used units.

The issues concerning origin and morphological structures of prepositions have been discussed by I. Vyk-hovanets, O. Potebnia, V. Vynogradov, A.S. Hornby, D. Litt, K. Markert, M. Romacker, J. Robertson, J. Rijkhoff, J. Simpson, S. Krulj, B. Prodanovic. The **topicality** of the research is caused by insufficient study of functioning and peculiarities of prepositions in the professional language of cardiology.

The history of English grammar writing with regard to prepositions can be seen as one of relative stagnation, exceptionally interrupted by authors like Bullokar, Miege, Maittaire, Brightland, Greenwood or Lowth. The relative negligence of prepositions culminated in the first half of the twentieth century, when most of the grammarians completely omitted sections on prepositions in their works. It was only in the second half of the twentieth century, that the situation radically changed and since then, grammarians like Schibsbye, Quirk, Greenbaum, Leech, Svartvik, Huddleston, Pullum or Aarts introduced scientifically precise definitions and developed detailed and elaborate frameworks for their description, which, in most cases, reflect contemporary developments in theoretical linguistics[3].

Preposition is a word or group of words used before a noun or pronoun to show e.g. place, position, time or method[4].

It should also be noted that preposition is "an unchangeable word that shows the relationship between nouns or pronouns and other words or groups of words in a sentence[5].

1 Henrik R. Wulff. The language of medicine. : [E-source], URL: https://www.ncbi.nlm.nih.gov
2 Ribes R, Ros PR. Medical English.: [E-source], URL: dlia.ir/Scientific/e_book/Language_Literature/English/PE...English_/005712.pdf
3 David Weber. English Prepositions: A historical survey : [E-source], P. 13, URL : https://is.muni.cz/
4 Oxford Advanced Learner's Dictionary of current English, Oxford, Oxford University Press, 1998, P. 911.
5 Krulj S. "Realization of prepositions and prepositional phrases in professional medical texts in English language", *Scientific journal of the faculty of medicine*: [E-source], URL: publisher.medfak.ni.ac.rs/AFMN/2011/3-2011/5.pdf

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It is a word used to link nouns, pronouns, or phrases to other words within a sentence. Prepositions are usually short words, and they are normally placed directly in front of nouns[6]. Prepositions are high frequency items belonging to one of the nine word classes into which English lexicon can be divided. They can be defined as a relatively closed class that is not prone to quick changes. Most of the formal changes in their system are a result of internal word-formative processes and grammaticalization and not borrowings from external sources[7]. In general, there are three main types of prepositions, including time prepositions, place prepositions, and direction prepositions.

Time prepositions are those such as *before, after, during,* and *until;* place prepositions are those indicating position, such as *around, between,* and *against;* and direction prepositions are those indicative of direction, such as *across, up,* and *down*[8].

There are more than 100 prepositions in the English language; most of them are constantly used by medical professionals while writing articles in medical journals or during conferences and congresses. In addition, there are endless possibilities for creating prepositional phrases. Classification of prepositions in English may be divided into: formal, semantic and syntactic. Formal prepositions may be divided into simple, such as at, by, in, on, to; complex – in general, by means of, due to; marginal prepositions, that are prepositions with conjunctions as a special type of grammatical words – until, as, before, since, or prepositions with adverbs that belong to the lexical words – within, opposite, near, across, beyond, around. According to the meaning of preposition or semantic criterion prepositions can be divided into place prepositions, time prepositions, prepositions of origin, source, case, aim, means, instrument, manner, accompaniment, exception, reference, subject matter etc[9].

The **basis** for research served a corpus of medical articles in cardiology published in journals and on the internet, which helped to analyze the prepositions and prepositional phrases often used in the professional language of cardiologists.The chosen medical texts were taken from the "British journal of cardiology"and "British medical journal": "Risk factors for femoral arterial complications and management" (Shabnam Rashid, Stephanie Hughes) ; "Postural tachycardia syndrome: a UK occupational therapy perspective"(Jenny Welford and Christopher McKenna); "Heartbeat: Prediction of coronary disease risk with cardiac troponin in the general population" (Catherine M Otto), "Smartphone-based cardiac rehabilitation" (Karam Turk-Adawi, Sherry L. Grace).

All prepositions and prepositional phrases in our research were divided and classified according to formal and semantic criteria. The percentage of representation for prepositions was calculated. The total amount of prepositions and prepositional phrases in the articles comprises 847 units: "*Risk factors for femoral arterial complications and management*" – 319, "*Postural tachycardia syndrome: a UK occupational therapy perspective*" – 221, "*Heartbeat: Prediction of coronary disease risk with cardiac troponin in the general population*" – 118, "*Smartphone-based cardiac rehabilitation*" 189.

According to their structure the prepositions were divided into simple (basic) and complex. Simple prepositions used in the articles were: ***to, of, in, with, at, for, by, as, from, over, between, on, via, without, after, beyond, towards, behind, up, upon, among, into, above, versus, along***. Complex prepositions in the cardiologic articles were: ***as well as, as a result of, along with, along with, carry out, in order to, in addition to, according to, such as, due to, in comparison to, compared with, prone to, associated with, for the purpose of, superior to, for instance, care for, prior to, similar to, result in, in conclusion, depend on focus on, engage in***.

The total number of simple prepositions in the examined articles is 776, complex prepositional phrases constitute 71, so it is clearly seen that complex prepositions form only 10% of the total amount of prepositions.

Most prepositions have multiple usage and meaning. Generally they are divided into 8 categories: time, place, direction (movement), agency, instrument (device), reason, purpose, connection and origin[10]. In order to analyze the semantic structure and relationship between prepositions and other parts of speech, their realization in the professional medical texts we have examined the meaning of prepositions and prepositional phrases and classified them according to such semantic aspects as:

1. Prepositions of time: *by, on, before, during, after, for, in, at, between, within, since, until, to.*

2. Prepositions of place: *in, into, between, on, to, at, among, through, of, from, by near, close to, next to, beside, behind, in front of, above, below.*

3. Prepositions of direction and movement: *from, to over, above, along, around, across, through, into, out of, towards, away from, off, up down.*

4. Comparison prepositions: *such as, as…as, than.*

5. Prepositions of instruments, technologies and device: *by, with, on.*

6. Prepositions of purpose: *for, through, from, in order to.*

7. Prepositions of connection or possession prepositions: *of, with, in, to.*

8. Cause, reason prepositions: *due to, because of, from, as, for, on account of.*

Preposition **of** was frequently used in such semantic categories as: 1) **place** - *Postural tachycardia syndrome is a form of dysautonomia, a term used to describe dysfunction* ***of*** *the autonomic nervous system*[11]; *Our first article is an interview with Professor Peter Weissberg, Medical Director* ***of*** *the British Heart Foundation*[12]; *Duration* ***of*** *hospital stay was shorter among patients who had coronary angiography*

[6] Prepositions: Definition, Examples, And Exercises - Ginger Software [E-source], URL: www.gingersoftware.com/content/grammar.../ preposition/

[7] David Weber. English Prepositions: A historical survey: [E-source], P.13, URL: https://is.muni.cz/

[8] Prepositions: Definition, Examples, And Exercises - Ginger Software [E-source], URL: www.gingersoftware.com/content/grammar.../ preposition/

[9] Krulj S. "Realization of prepositions and prepositional phrases in professional medical texts in English language", *Scientific journal of the faculty of medicine*: [E-source], URL: publisher.medfak.ni.ac.rs/AFMN/2011/3-2011/5.pdf

[10] Prepositions [E-source], URL: http://www.thefreedictionary.com/dictionary.htm

[11] Jenny Welford, Christopher McKenna. "Postural tachycardia syndrome: a UK occupational therapy perspective", *British journal of cardiology*: [E-source], P. 1-6, URL : https://bjcardio.co.uk/

[12] Catherine M Otto. Heartbeat: Prediction of coronary disease risk with cardiac troponin in the general population: [E-source], P. 2-5, URL: heart.bmj.com

performed under fluoroscopic guidance[13]. *Thrombi can develop at the site* **of** *the sheath and embolisation may occur after sheath removal*[14]. 2) **possession or connection** – *Bleeding is one* **of** *the complications associated with percutaneous coronary intervention from the femoral route due to the use* **of** *potent antiplatelet therapies including adenosine diphosphate receptor blockers and glycoprotein IIb/ IIIa inhibitors*[15]; *Treatment largely depends on type* **of** *complications*[16] 3) **instrument, technologies, methods of investigation** – *Techniques to reduce the risk of femoral arterial complications include the use* **of** *ultrasound scan or fluoroscopy guided femoral punctures*[17]. *Treatment involves bed resting, transfusing blood, as required, and early involvement* **of** *the surgical team*[18]. *Measuring* **of** *cardiac output; measuring* **of** *circulating blood volume; measuring* **of** *blood flow speed* 3) **cause, reason** – *If hand/finger fatigue develops, the amount of pressure applied decreases and, hence, increases the risk* **of** *bleeding*[19]

Preposition **in** stands second in use and possesses multiple meanings: 1) **place, location** – *Femoral arterial complications are predominantly seen* **in** *patients who have femoral punctures performed blindly*[20]. *This burden of cardiovascular diseases has been great* **in** *high-income countries for decades, and is now reaching epidemic proportions* **in** *low and middle-income countries*[21]. *... a cross sectional study* **in** *Tanzania calculated cardiovascular risk scores in HIV-infected patients ...*[22] 2) **direction, movement** – *Training healthcare professionals* **in** *the management of femoral punctures post-procedures is one of the first steps* **in** *identifying problems and managing them promptly*[23]. 3) **connection** – *Arterial injury was prevalent* **in** *1,9% of patients who had punctures performed blindly and 0,7%* **in** *those who had punctures performed under fluoroscopy*[24]. *For instance, patients may engage* **in** *sufficient physical activity from active transport and occupational activity, and therefore the focus on exercise may require tailoring.* 3) **time** – *heart pain occurs* **in** *the morning ...*

We have noticed 105 examples of the preposition **to**, which is used in such categories: 1) **purpose** - *... use of tele-*

health-based CR models will help **to** *augment current centre-based and home-based CR interventions* **to** *reach a much larger population with coronary heart disease*[25]. 2) **location** – *Overall, CHD risk category was re-classified in 18% of patients when hs-c TnI was added* **to** *the Framingham risk score*[26].

Preposition **with** is used in such cases: 1) **instruments, technologies** – *examined* **with** *ultrasonic waves; to pack the wound by gauze* **with** *haemostatic sponge powder; bleeding has been controlled* **with** *clamps.* 2) **connection** – *The survey used demographic questions in order to learn more about the target population in conjunction* **with** *Likert scales*[27]. *This reflects a significant period of time that individuals are living* **with** *debilitating, often life-changing symptoms* **with** *no formal explanation of their use*[28].

For: 1) **time** – *Taking nitroglycerin gives relief* **for** *a short time; The time* **for** *blood filling is 20 seconds; This was hosted on Bristol Online Surveys* **for** *a period of 10 weeks...*[29] 2) **purpose** – *needle* **for** *blood taking; blood fit* **for** *transfusion; indication/contraindication* **for** *blood transfusion; This study aimed to determine how postural tachycardia syndrome impacts upon activity, in order* **for** *occupational therapists to understand the implications of this condition and develop appropriate interventions*[30]. *Technology has been used* **for** *chronic management more broadly, and studies generally have demonstrated positive effects on patient's outcomes*[31].

We have also observed 2 prepositions **versus** and **via** which are of Latin origin and sometimes they are used in English cardiologic articles instead of the prepositions **against to, contrary to, because of, by means of, through**: *Most recently, cardiac rehabilitation has been delivered* **via** *mobile phones*[32]. *We recruited 201 adults* **via** *two patient support charities to participate in an online quantitative survey. The Wilcoxon signed-rank test located change within the sample by comparing PS* **versus** *PD. Participants were far less physically able to manage in employment in the PD* **versus** *PS*[33].

Prepositional phrases **due to, prior to, similar to, de-**

[13] Shabnam Rashid, Stephanie Hughes. Risk factors for femoral arterial complications and management: [E-source], P. 1-6, URL : https://bjcardio.co.uk/

[14] Ibid., P. 2.

[15] Ibid., P. 4.

[16] Ibid., P. 3.

[17] Ibid., P 4.

[18] Ibid., P. 5.

[19] Ibid., P. 6.

[20] Ibid., P. 3.

[21] Ibid., P. 2.

[22] Catherine M. Otto. Heartbeat: Prediction of coronary disease risk with cardiac troponin in the general population: [E-source], URL: heart.bmj.com

[23] Shabnam Rashid, Stephanie Hughes. Risk factors for femoral arterial complications and management: [E-source], URL : https://bjcardio.co.uk/

[24] Ibid., P. 5.

[25] Catherine M Otto. Heartbeat: Prediction of coronary disease risk with cardiac troponin in the general population: [E-source], URL: heart.bmj.com.

[26] Ibid., P. 4.

[27] Jenny Welford, Christopher McKenna. "Postural tachycardia syndrome: a UK occupational therapy perspective", *British journal of cardiology*: [E-source], URL : https://bjcardio.co.uk/

[28] Ibid., P. 3.

[29] Ibid., P. 4.

[30] Jenny Welford, Christopher McKenna. "Postural tachycardia syndrome: a UK occupational therapy perspective", *British journal of cardiology*: [E-source], URL: https://bjcardio.co.uk/

[31] Karam Turk-Adawi, Sherry L Grace. Smartphone-based cardiac rehabilitation: [E-source], URL: heart.bmj.com

[32] Ibid., P. 1.

[33] Jenny Welford, Christopher McKenna. "Postural tachycardia syndrome: a UK occupational therapy perspective", *British journal of cardiology*: [E-source], URL: https://bjcardio.co.uk/

pend on, in order to, such as, in addition to, in comparison with, prone to, result from, out of, up to, as a result of, carry out, according to, associated with have been used in the cardiologic texts in the semantic categories of comparison, purpose, technologies, methods, reason: *... instead they may reflect the severity of the underlying atherosclerosis or subclinical myocardial ischemia, or may be proxies for conditions* **associated with** *increased cardiovascular risk* **such as** *renal impairment[34].* **In order to** *better understand the effect of HIV-infection on cardiovascular disease...[35] Complications for diagnostic procedures are lower* **due to** *the lack of antiplatelet therapies on board. Blood collects in the soft tissues and,* **depending on** *the size of the haematoma, there can be a drop in haemoglobin levels and blood pressure. Diagnosis is* **confirmed by** *computerized tomography scan. Pseudoaneurism, also known as a false aneurism, can* **result from** *punctures made below the femoral bifurcation[36]; These patients are particularly* **prone to** *bleeding if there are multiple attempts at obtaining femoral access or the incorrect puncture has been made.[37]; If major bleeding occurs while a patient is taking a non-vitamin K antagonist oral anticoagulant,* **such as** *dabigatran, rivaroxaban, endoxaban or apixaban, ...[38] This study* **aimed to** *determine how postural tachycardia syndrome impacts upon activity,...[39] Participants rated their experiences pre-symptoms versus present day* **in relation to** *their occupations,...[40]* **In conclusion**, *postural tachycardia syndrome has a significant negative impact upon occupation and* **is associated with** *considerable morbidity[41].* **As well as** *a significant increase in heart rate upon standing,* **as a result of** *orthostatic intolerance, syncope and presyncope can occur,* **along with** *headaches, fatigue, palpitations, nausea and dizziness, which are usually relieved by lying down[42]. Consequently, there was a need to* **carry out** *a UK-based, national quantitative investigation* **in order to** *gain a scoping view[43].*

The frequency of use of prepositions in the cardiologic articles (the percentage was calculated from the total number of prepositions and prepositional phrases).

Table 1

Prepositions	Frequency of use	Percentage	Prepositions	Frequency of use	Percentage
On	17	2,2%	Within	9	1,1%
To	105	13,5%	Due to	3	0,38%
Of	240	31%	Prior to	1	0,1%
Upon	3	0,38%	Similar to	2	0,25%
In	125	16,1%	Depend on	4	0,5%
With	77	9,9%	In order to	3	0,38%
At	16	2,06%	Such as	6	0,7%
For	62	7,98%	In addition to	1	0,1%
By	27	3,47%	In comparison with	2	0,25%
As	15	1,93%	Prone to	1	0,1%
Versus	2	0,25%	Result from	3	0,38%
From	18	2,31%	Out of	1	0,1%
Over	5	0,64%	Up to	1	0,1%
Via	3	0,38%	As a result of	2	0,25%
Without	3	0,38%	Carry out	2	0,25%
While	2	0,25%	According to	1	0,1%

The most commonly used prepositions in the cardiologic texts were: **of** (240 examples), **in** (125 examples), **to** (105 examples), **with** (77 examples), **for** (62 examples), **by** (27 examples), **from** (18 examples), **on** (17 examples), **at** (16 examples), **as** (15 examples); prepositions and prepositional phrases **upon, versus, over, between, via, without, while, within, due to, prior to, similar to, depend on, in order to, such as, in addition to, in comparison with, prone to, result from, out of, up to, as a result of, carry out, according to** were used from 1 to 9 times.

On the basis of the research we can make the conclusion that prepositions **of**, **in**, **to**, **with**, **for**, **by**, **from**, **on**, **at**, **as** are the most frequently used in the cardiologic texts and they have occurred in several categories and expressed different meaning: **of** –*place, possession or connection, instrument, technologies, methods of investigation, cause, reason*;

[34]Catherine M Otto. Heartbeat: Prediction of coronary disease risk with cardiac troponin in the general population: [E-source], URL: heart.bmj.com

[35] Ibid., P. 5.

[36]Shabnam Rashid, Stephanie Hughes. Risk factors for femoral arterial complications and management: [E-source], URL: https://bjcardio.co.uk/

[37] Ibid., P. 6.

[38] Ibid., P. 2.

[39] Jenny Welford, Christopher McKenna. "Postural tachycardia syndrome: a UK occupational therapy perspective", *British journal of cardiology*: [E-source], URL: https://bjcardio.co.uk/

[40] Ibid., P. 4.

[41] Ibid., P. 5.

[42] Jenny Welford, Christopher McKenna. "Postural tachycardia syndrome: a UK occupational therapy perspective", *British journal of cardiology*: [E-source], URL: https://bjcardio.co.uk/

in- *place, location, direction, movement, connection, time*; **to** – *purpose, location, place, time*; **with** – *instruments, technologies, connection*; **on** – *time, place, instruments, technologies*; **at** – *time, place, direction*; **from** – *direction, movement, purpose, cause, reason, origin*.

Запоточна Л., Рак О., Томка І. Вживання прийменників та прийменникових фраз в англійських фахових статтях з кардіології. У статті досліджуються прийменники і прийменникові фрази англійської мови в професійних текстах фахової мови кардіології. Предметом дослідження виступають прийменники та прийменникові фрази, які вживаються у медичних статтях з кардіології. Проаналізовано та класифіковано формальні і семантичні аспекти найбільш часто вживаних прийменників. Визначено наявність, кількість, значення та проаналізовано типові приклади використання прийменників у англійській фаховій мові кардіології. Були виокремлені 847 одиниць прийменників та прийменникових фраз з медичних журналів "British medical journal" та "British journal of cardiology", з яких 776 виявилися простими (базовими) прийменниками та 71 складними, тобто прості прийменники набагато частіше використовуються у фаховій мові кардіології.

Проаналізувавши корпус текстових прийменників були виділені наступні семантичні групи: *прийменники часу, місця, напрямку, руху, мети, зв'язку, причини, походження, порівняння, методів дослідження, інструментів, технологій*. Найпоширенішими виявилися наступні прийменники: *of, in, to, with, for, by*. Слід зазначити семантичні категорії їхнього застосування: прийменник *of* використовується при позначенні *місця, зв'язку, методів дослідження, причини*; *in* у значенні *місця, розташування, напрямку, руху, часу*; *to* – для позначення *мети, місця, часу*; *with* – *інструментів, технологій та зв'язку*; *on* – *часу, місця, інструментів*; *at* – *часу, місця, напрямку*; *from* – *мети, причини, напрямку, руху*.

Ключові слова: *прийменник, прийменникова фраза, семантична класифікація, кардіологічна термінологія.*

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