

A Corpus-Based Analysis of Translation Equivalence in English-Uzbek Cardiological Terminology: Semantic Relations, Variation, And Terminological Standardization

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Abstract: The rapid advancement of medical science, particularly in the domain of cardiology, has triggered a significant structural shift in specialized discourse from monolexical units to complex multi-word terms (MWTs) and dense noun phrases. This study provides a comprehensive corpus-based evaluation of translation equivalence between English cardiological terminology and its Uzbek target language counterparts. Drawing upon the theoretical frameworks of Eugen Wüster, Maria Teresa Cabré, and Kyo Kageura, the research utilizes a specialized subcorpus elicited from high-impact academic journals and clinical case reports to analyze semantic relations including synonymy, polysemy, and hypernymy-hyponymy. The research identifies a profound structural-semantic asymmetry between the two languages, where English compact nominal structures often necessitate descriptive expansion or internal lexical formation in Uzbek. Evaluation of translation quality reveals a high risk of semantic distortion in machine-mediated transfer for polysemous abbreviations. The study concludes with a proposal for terminological standardization to mitigate "terminological chaos" and enhance clinical safety in English-Uzbek medical communication.

Keywords: Medical terminology, corpus linguistics, translation equivalence, cardiology, structural asymmetry, multi-word terms, English-Uzbek translation, terminological standardization.

Introduction: Medical English is a highly specialized linguistic subsystem characterized by extreme precision, systematic organization, and an internationalized core rooted in Greco-Latin traditions. Historically, this classical foundation served as a stable lingua franca for medical professionals globally, providing a common vocabulary for anatomy and pathology. However, the contemporary landscape of medical science is defined by an immense pace of technological development, which introduces new concepts, diseases, and surgical instruments more rapidly than standardized nomenclature can be established. This phenomenon has led to what scholars describe as "terminological chaos," where the lack of

unified naming conventions across different medical branches creates inconsistencies in communication.

In clinical settings, terminology is not merely a vocabulary list but an indispensable tool for effective academic and professional communication. Within medical "genres" – ranging from formal research articles to informal clinical jargon—a significant trend toward "nominalization" has been observed. This process involves packing complex pathological and anatomical information into dense multi-word terms and multi-component noun phrases. In cardiology, these structures often function as single semantic entities, yet their internal complexity poses severe challenges for cross-linguistic transfer, especially in

low-resource language pairs like English and Uzbek.

A critical research gap exists regarding the authentic alignment of these complex structures in English-Uzbek medical translation. While international classifications like ICD-10 provide a framework for global reporting, real-world usage in hospitals often reflects "onomastic angst" and terminological variation that traditional bilingual dictionaries fail to document. This study employs corpus linguistics as a methodological foundation to bridge this gap, identifying real-world usage patterns through objective statistical evidence. By analyzing semantic relations and translation equivalence, the research aims to provide a data-driven model for terminological standardization in the Uzbek medical register.

LITERATURE REVIEW

The study of terminology has evolved from prescriptive, concept-oriented models to modern communicative paradigms.

Classical and Functional Terminology Eugen Wüster, the founder of modern terminology science, emphasized the "concept-to-term" approach, where each term should ideally correspond to a single, unambiguous concept. This study utilizes Wüster's principles to advocate for standardization in Uzbek cardiology. Conversely, Maria Teresa Cabré's Communicative Theory of Terminology (CTT) argues that terms are linguistic units whose meaning is derived from specific contexts. This is vital for cardiology, where a term's meaning may shift between a research article and a patient information leaflet. [7]

The Soviet and Post-Soviet Schools V.M. Leychik and D.S. Lotte provided foundational insights into terms as special units of the lexical system that serve as tools for professional activity. Lotte's requirement that terms belong to a unified terminological field is essential for building a consistent English-Uzbek kardiologik register. Modern researchers like Džuganová and Shpak have explored the structural-semantic patterns of medical terms, noting the productivity of Greco-Latin components in modern neologisms [8; 14].

Asymmetry and Variation Terminology in a bilingual context is rarely symmetric. "Structural-semantic asymmetry" arises when one language (English) uses a compact phrase while the target language (Uzbek) requires descriptive expansion. Furthermore, the study

of "onomastic angst" highlights the tension between traditional eponyms and standardized descriptive terms [2].

METHODOLOGY

This study employs a quantitative and descriptive corpus-driven methodology to extract and analyze cardiological terminology.

Subcorpus Construction The research data was elicited from an English-Uzbek cardiological subcorpus representing three distinct registers: [6; 16]

1. **Academic Register:** Articles from The New England Journal of Medicine.
2. **Clinical Register:** Anonymized medical case reports (MCRs) from the Journal of Medical Case Reports (JMCR).
3. **Instructional Register: Medical Terminology: An Illustrated Guide (9th edition).**

Extraction Tools and Quantitative Metrics. Primary processing was conducted using Sketch Engine and AntConc. Terms were evaluated based on: [4; 13]

- **Frequency:** Normalized measurement (pmw) to prioritize clinically relevant units.
- **Keyness:** Significance in the cardiological corpus compared to general language.
- **Dispersion:** Consistency of appearance across diverse documents.
- **C-value method:** Used to identify nested phrases (e.g., heart failure within congestive heart failure).

RESULTS

Analytical findings reveal that cardiological discourse is predominantly multi-component and prone to structural asymmetry.

Structural Distribution

- **One-Component Terms:** Comprise 48% of the unique units in the anatomical sub-domain, primarily Greco-Latin units
- **Two-Component Terms:** The dominant model in clinical settings, representing 34% of the terminological load.
- **Three-Component/MWTs:** Functional diagnostic units accounting for 18% of variety.

Cardiological Terms: English-Uzbek Alignment

No	English Term	Uzbek term	Translation Technique
1.	Aorta	Aorta	Direct Borrowing
2.	Atrium	Bo'lmacha	Internal Formation
3.	Ventricle	Qorincha	Internal Formation
4.	Myocardium	Miokard	Direct Borrowing
5.	Pulmonary artery	O'pka arteriyasi	Calque
6.	Mitral valve	Mitral qopqoq	Mixed
7.	Left ventricle	Chap qorincha	Full Equivalence
8.	Heart failure	Yurak yetishmovchiligi	Calque
9.	Myocardial infarction	Miokard infarkti	Direct Borrowing
10.	Cardiac arrest	Yurak to'xtashi	Calque
11.	Blood pressure	Qon bosimi	Calque
12.	Cardiac output	Yurak chiqarish hajmi	Descriptive Expansion
13.	Coronary artery disease	Koronar arteriya kasalligi	Mixed
14.	Acute coronary syndrome	O'tkir koronar sindrom	Mixed
15.	Atrial fibrillation	Bo'lmachalar fibrillatsiyasi	Mixed
16.	Thrombosis	Tromboz	Transliteration
17.	Embolism	Emboliya	Transliteration
18.	Hypertension	Gipertoniya	Direct Borrowing
19.	Chest pain	Ko'krak qafasidagi og'riq	Descriptive Expansion

20.	Shortness of breath	Hansirash (Nafas qisishi)	Semantic Adaptation
21.	Echocardiography	Exokardiografiya	Direct Borrowing
22.	Electrocardiogram	Elektrokardiogramma	Direct Borrowing
23.	Pacemaker	Elektrokardiostimulyator	Semantic Adaptation
24.	Stenting	Stentlash	Direct Borrowing
25.	Cyanosis	Sianoz	Transliteration
26.	Oedema	Shish (Edema)	Native / Borrowing
27.	Heart block	Yurak blokadasi	Mixed
28.	Fallot's tetralogy	Fallot tetradasi	Eponymic Translation
29.	Purkinje fibers	Purkine tolalari	Eponymic Translation

DISCUSSION

The analysis confirms a pervasive structural-semantic asymmetry in English-Uzbek alignment.

The Asymmetry Phenomenon English relies on compact noun phrases (Adj+N), while Uzbek often requires descriptive expansion to ensure semantic transparency for laypersons. This mediation is critical because nearly 30% of medications are taken incorrectly due to patient misunderstanding of terminology. For instance, translating infectious disease as yuqumli kasallik provides better comprehension than using a Greco-Latin loanword. [7; 10]

Polysemy and AI Risks "Terminological chaos" is exacerbated by polysemy and ambiguous abbreviations. A single abbreviation like "RS" can represent Rett, Reye, or Raynaud syndromes. Research shows that Neural Machine Translation (NMT) achieves ~81% accuracy for unique terms but fails significantly with multi-word units, leading to potentially fatal clinical errors. [11]

Eponyms and Standardization. Cardiology remains an "eponym-heavy" field. Despite WHO efforts to

promote descriptive naming, clinicians persist in using eponyms for mnemonic convenience. In Uzbek, this leads to "parallel terminology" where international honorifics (Fallot tetradasi) coexist with native descriptive formations [2; 12; 15].

CONCLUSION

A corpus-based analysis confirms that cardiological terminology is inherently multi-word and dynamically evolving. Successful English-Uzbek translation requires moving beyond word-to-word matching toward phrase-level alignment.

RECOMMENDATIONS

- 1. Translators:** Prioritize descriptive expansion in patient-facing documents to bridge knowledge asymmetry.
- 2. Lexicographers:** Focus on developing corpus-derived MWT dictionaries that capture real-world collocations.
- 3. Educators:** Integrate etymological training to empower students to decode complex English MWTs independently.

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