

Comparative Analysis of SNOMED CT and Korea Standard Terminology of Medicine

Mijung Kim^{1,1}

¹ Dept. Of Health Administration, Cheju Halla University, Korea
mjkim@chu.ac.kr

Abstract. Applying to standard clinical terminologies is essential for understanding the precise meanings of the clinical terminology used in EMR systems and sharing clinical data among health providers. In Korea, KOSTOM(Korean standard terminology of medicine) was first introduced as national standard vocabulary for EMR systems in 2014. We compared KOSTOM and SNOMED CT adapted in many countries. This paper will help to utilize and improve KOSTOM.

Keywords: KOSTOM, SNOMED CT, medical terminology, qualitative evaluation

1 Introduction

Recently, the beginning of EHR with the enormous accumulation of medical information is increasing interest in utilizing medical information. Applying to standard clinical terminologies is essential to ensure interoperability of medical information among medical hospitals and increase the utilization value of the information [1]. In the United States and Europe it has been recognized the importance of the standard terminology for a long time, and actively used to specify the standard terminology in the medical field as a national level. By contrast, in Korea, KOSTOM was first adopted as a national standard terminology for clinical terms and details like diagnosis, examination and drug etc. in medical records by health care providers[2]. However, the history of KOSTOM is very short compared to other standard terminologies, there is little hospital utilize this because it is not mandatory to apply for the introduction. Most of the domestic hospitals are using a self-developed terminology. Some of university hospitals are using the international standards such as SNOMED CT, UMLS and LOINC, etc [3]. The purpose of this study is to suggest the way of improvement of KOSTOM by Comparative Analysis between KOSTOM and a health care standard terminology adapted and used in many countries.

¹ Corresponding author

2 Clinical Terminology

2.1 Kinds of Terminology

Terminologies can be distinguished according to their nature as interface terminology, Reference terminology and administrative terminology [4]. Hospitals developed and are using interface terminology for consistent input and output of medical information in their EMRs. The controlled medical vocabulary based on medical concepts have been developed to integrate the resources of the hospital information system and to enable precise meaning and representation of medical information [5].

Reference terminology was made to communicate meanings of terms mutually by assigning the same concept code to the terms having the same meaning even though different descriptions. It is also possible to map the concepts of reference terminology onto the concepts defined in other standard terminologies [6]. UMLS is aimed at the integrated management of existing biomedical terminologies and includes more than 140 terminologies [7]. On the other hand, SNOMED CT is made to support vocabularies of the overall area required to assist in the recording of the clinical data [8].

2.2 Desiderata of Terminology

Cimino enumerated 12 general requirements for controlled medical vocabularies. They are vocabulary contents, Concept Orientation, Concept Permanence, Nonsemantic Concept Identifier, Polyhierarchy, Formal Definitions, Reject “Not Elsewhere Classified”, Multiple Granularities, Multiple Consistent Views, Representing Context, Evolve Gracefully and Recognize Redundancy [9]. Yun et al. suggested the requirements of data dictionary considering versatility and portability. They are concept orientation, a variety of expressions, relation, mapping to standards terminologies, mapping to local vocabularies, domain definition and version control [3]. SNOMED CT and KOSTOM were evaluated based on the qualitative requirements as terminologies made to be used in EMR in this paper.

3 Qualitative Analysis

3.1 General Characteristics of Contents

The SNOMED CT provides vocabularies of the overall area which is used to the EMR to code the means and to help recording the clinical data. It is adopted and being used in 27 countries as their national standard. Core components are concept,

description and relation. The core components are concept, description and relationship. The structure of SNOMED CT has the 19 top level of the hierarchy to include the whole area used to EMR. The concept has different hierarchy, attributes and relationships and enables logical definition and searching for meaning. It can be used as interface terminology since this contains a wealth of synonyms and various expressions even if it is reference terminology. It supports pre-coordination and post-coordination and cross-mapped with other terminologies. In this study, we used the version in January 2015. KOSTOM is designed to manage all the terms that are used in the domestic medical field comprehensively. It consists of 8 subsets tables, they are diagnosis, procedures, radiology, dentistry, public health, nursing and others and a repository for anatomical illustrations. The concepts are defined in the format "English-Korean pairs". Each concept is mapped onto different standard terminologies such as UMLS, KCD7 and ICD-9-CM. We used the KOSTOM 2.0 version in this study [10].

Table1 shows the general characteristics for the contents of the two nomenclatures.

Table 1. The general characteristics for the contents of SNOMED CT and KOSTOM

Heading level	Number of Concepts	Number of Terms	Average of Synonyms	Number of Relations	Domain	concept structure
SNOMED CT	415,184	1,242,012	2.99	41	52	formal definition
KOSTOM	184,844	230,584	1.25	1	8	English-Korean pair

3.2 Qualitative Evaluation

By the comparison SNOMED CT with KOSTOM, I suggest the following. The aim of KOSTOM should be the sharing clinical data among health care providers and it can be utilized easily. So the meaning of each concept is able to be understood exactly through formal definition. The ambiguity of concept codes of UMLS is being raised steadily as a comprehensive vocabulary including more than 140 nomenclatures. Therefore, we should consider the mapping validity on UMLS. As the term representative can be changed according to time and habits, we should consider the profit and loss gained by English-Korean pair structure and problems occurred by equality of concept code and term code of representative. In case of applying a national standard terminology to the hospital information system, it will be difficult to activate, if does not merit the attention. In other words, it must first be improved so that it can be exactly the terminology which operates data exchanges, clinical decision support and providing domain etc. in the domestic hospital information system.

4 Conclusion

Here we compared and analyzed the international standard terminology and terminology system in Korea by qualitative criteria of the terminology and a literature

review and structural analysis. Application of the standard terminology is an important basic factor in the utilization and sharing of medical information among the medical institutions. In South Korea we are discussing various measures for dissemination and activation of KOSTOM. However, studies on effectiveness and refinement of KOSTOM are very insufficient. It is useless no matter how well made where there is no means to apply it. It is necessary to apply it to hospital information system and then to analyze the effectiveness and refine it in the future. Users try to use it for themselves and should take into account the real problems.

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