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An approach for psychiatric data standardization into the OMOP Common Data Model

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Background

OMOP Common Data Model (CDM) has been standardized the data structures for diverse clinical domains, which has enabled us to do network-based studies. However, they were not applied for the psychiatric rating scales, which became essential for accurate diagnosis and treatment of mental disorders in Psychiatric studies yet. Adding on previous efforts, our group introduces an approach on psychiatric data standardization, which can be applied in large-scale network-based studies regarding various mental disorders. To this end, we converted psychiatric rating scales into CDM without loss of data integrity.

Methods

Most frequently used, psychiatric rating scales were selected to be standardized, through examining records for mental disorders and treatment responses in the Department of Psychiatry at Ajou University Medical Center. It includes Positive And Negative Syndrome Scale, Beck Depression Inventory, Global Deterioration Scale, Brief Psychiatric Rating Scale, Geriatric Depression Scale, and Young Mania Rating Scale. For this, we reviewed EMR data from Mar 2010 to Dec 2017 and extracted questionnaire and responses from each psychiatric rating scale. Based on the guidance of "Applying the OMOP Common Data Model to Survey Data" by Margaret S. Blacketer, we adopted ETL process for psychiatric rating scales. We utilized the SOURCE_TO_CONCEPT_MAP table as a mediator through the ETL process. Concepts were selected on a manual review by experienced psychiatrists. We put additional information on subscales with the qualifier_source_value column. Each scale has widely varied responses, which were not mapped to standardized concepts. So they were stored on the value_as_string column. Figure 1 describes how the psychiatric rating scales were mapped into the OBSERVATION table.

Results

We used 111 psychiatric rating subscales along with their original scales across 6,633 patients. All psychiatric subscales, other than the Global Deterioration Scale and the Geriatric Depression Scale, had no standardized concept.
Of the subscales, 80 were manually mapped to standard concepts on manual reviews. We were able to have 100% matched data, 64,971 rows between EMR data and the OBSERVATION table. However, 2,152 rows had 0 values (meaning not defined) as an observation concept id.

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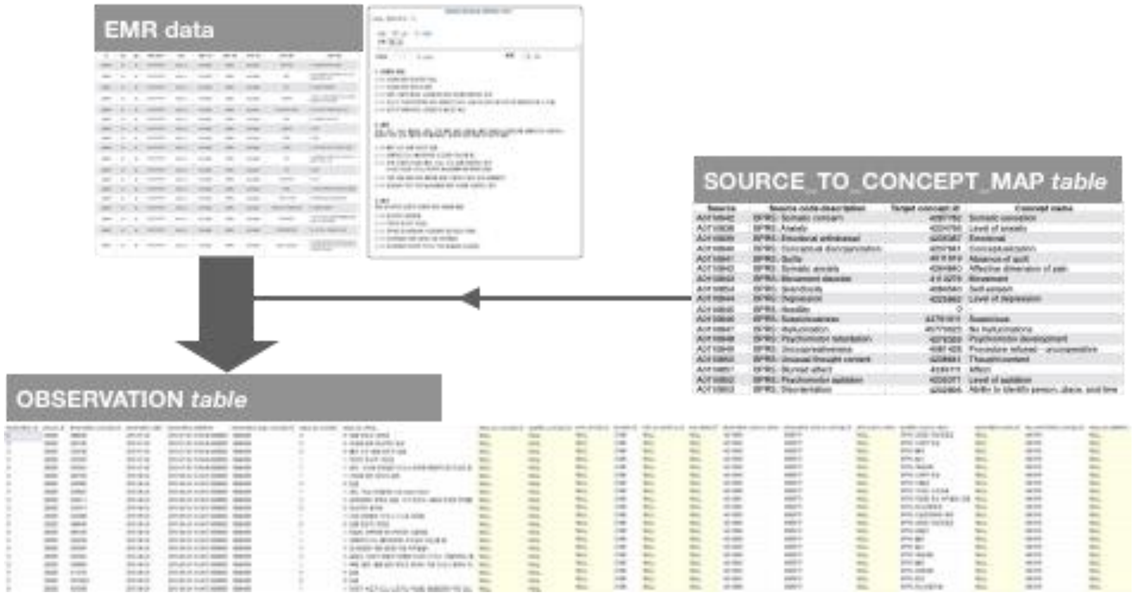

Figure 1. Brief Psychiatric Rating Scale (BPRS) is shown as an example. EMR data were extracted and transformed via the SOURCE_TO_CONCEPT_MAP table. All questionnaires and responses were captured into the OBSERVATION table, even though there were no standardized concepts for them

Conclusions

There were a few limitations for the transformation of psychiatric rating scales; 1) inconsistent domain, 2) no standardized concept for subscales, 3) no standardized concept for responses. It seems that current OMOP CDM was not able to fully accommodate psychiatric rating scales to support psychiatric studies. Appropriate mapping of subscales for each psychiatric scale should be done to facilitate psychiatric study better. Psychiatric rating scales could play an important role in the objective assessment of disease states and psychiatric behaviors 2,3 , so they should be properly mapped with appropriate concepts under structures. This can be a good starting point to expand CDM to psychiatric areas.

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