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THE IMPACT OF DATA QUALITY ASSURANCE AND CONTROL SOLUTIONS ON THE COMPLETENESS, ACCURACY AND CONSISTENCY OF DATA IN A NATIONAL REGISTRY

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ABSTRACT

Introduction: Data quality is of enormous importance in disease registries as the basis for research, evaluation and policy-making in the health system. The complexity of data quality assurance and control processes in the registries varies depending on scope, methods of data collection, expertise level of registers and the number of data sources. The aim of the present study was to develop and evaluate a systematic plan to improve data quality for the National Spinal Cord and Column Registry of Iran (NSCIR-IR) - a multicenter hospital-based registry.

Methods: Our plan to improve data quality included quality assurance (i.e. Preventive actions before starting the registry) and quality control (i.e. Corrective actions during execution of the registry). Quality assurance was started when determining the data set. We considered availability and accessibility of each data item because it seemed to have a major impact on completeness. In addition, the reliable sources for each data item were specified in the data gathering guideline. Other solutions for data quality assurance were considered in designing paper-based case report forms and our software. We designed structured paper forms and minimized the use of free text. In addition, to prevent the entry of incorrect data into the software, validation rules were defined and implemented including 70 semantic rules, 18 syntactic rules, seven temporal rules and 13 rules for acceptable value range. For quality control, trained staff were employed as quality reviewers to identify any defect, inaccuracy or inconsistency of the data. A set of functions was implemented in the software to check data by reviewers, feedback to registrars and correction. Finally, we evaluated the effects of this plan on the completeness, accuracy and consistency of our registry data through a seven-month pilot phase.

Results: Completeness was 100% for 20 socio-demographic data items (e.g. Birth date, gender, occupation etc.), 97% for national ID and 92.3% for education level. Completeness was 100% for admission data (n=5), incident causing injury data including external cause code (n=17), emergency department data (n=11), comorbidity data (n=9), vertebra injury type, level and number (n=6), spinal cord injury data (n=2), other injuries (n=2), interventions (n=19), complications and outcome (n=13) and also American Spinal Cord Association (ASIA) impairment scale (n=163). Completeness was 100% for all of the emergency medical services data except arrival and transfer time (99.43%) and

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oxygen saturation (48.93%). Consistency was 100% for all of the data. Accuracy of all data collected by two centers located in Tehran was 100%. Accuracy of vertebra injury type, level and number (n=6) and interventions (n=19) for our collaborating center outside of Tehran was 100%, but it was not evaluable for other data due to lack of access to primary data source.

Conclusion: The solutions for assurance and control of consistency were fully effective. Regarding completeness, our solutions led to a decrease in the missing data. Although designed solutions for the assurance and control of accuracy were effective to registry centers in Tehran, it is necessary to develop an appropriate solution to control the accuracy of the recorded data by centers outside of Tehran.

KEYWORDS: Registries, Quality control, Quality assurance, Heath care, Spinal cord injuries