Improving Data Quality in District Level Routine Health Information Systems:
A Systematic Review

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Background

Studies show that the data quality in routine health information systems (RHIS) is variable in low and middle income countries (LMICs) (1). Ensuring data quality is fundamental to data-informed decision-making at all levels of the health system, as data usage for informed decision making is jeopardised by low quality data. We focused our systematic review at district levels and below as the area of the health system where data generation occurs and timely usage can take place at its best (2).

Objectives

- To identify and synthesise results from interventions aimed at improving routine data quality at the district level according to factors and processes based on the PRISM framework (Figure 1)
- To identify gaps in the current knowledge on the interventions for improving RHIS data quality for the district-level and below in LMICs

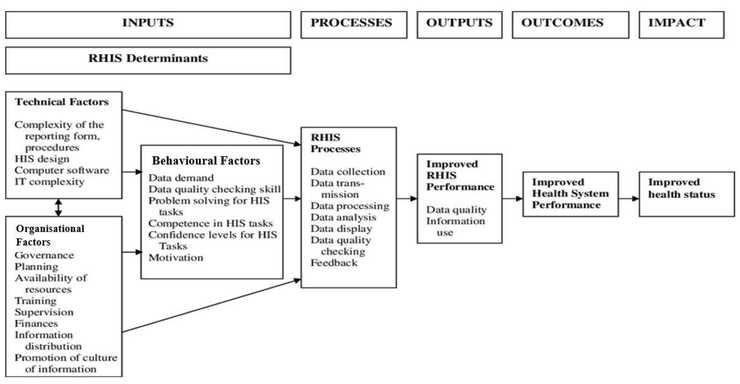


Figure 1. The Performance of Routine Information Systems Management (PRISM) framework

Materials and Methods

- Search was conducted on six electronic databases and six other electronic sources were accessed for grey literature (Figure 2). The search terms were composed of a combination of one or more of three major themes: Routine health information system and terms equivalent, LMICs defined by the most recent World Bank classifications (as of 2017), and data quality and terms equivalent.
- Studies included those that assessed a change in data quality from health facility-generated data within the public health system due to interventions carried out at the district level.
- Outcome measures were limited to four different data quality attributes; data accuracy, completeness, timelines and relevance.

Results

Figure 2. Flowchart for selection of studies

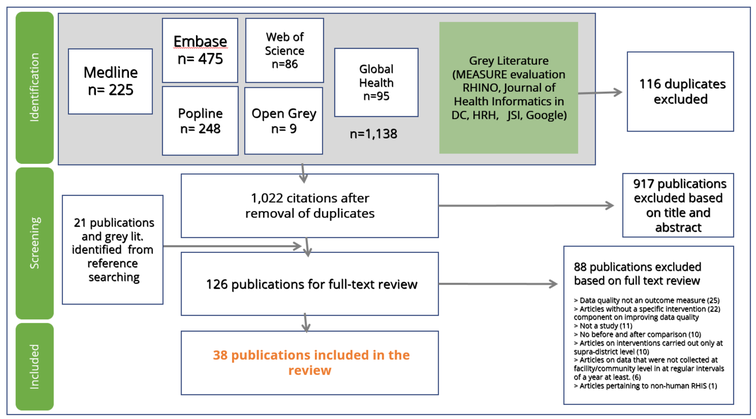


Figure 3. Year of publication of selected studies

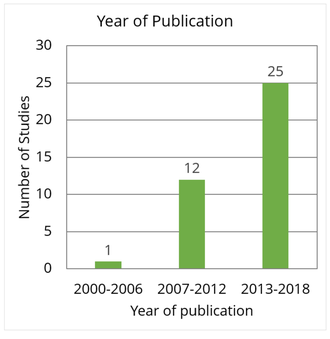


Figure 4. Countries of selected studies by continent

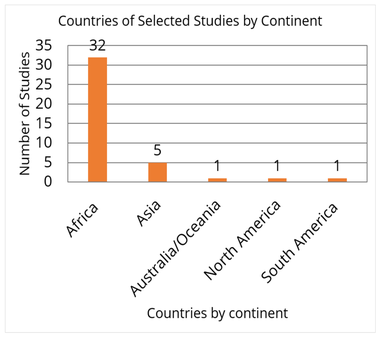
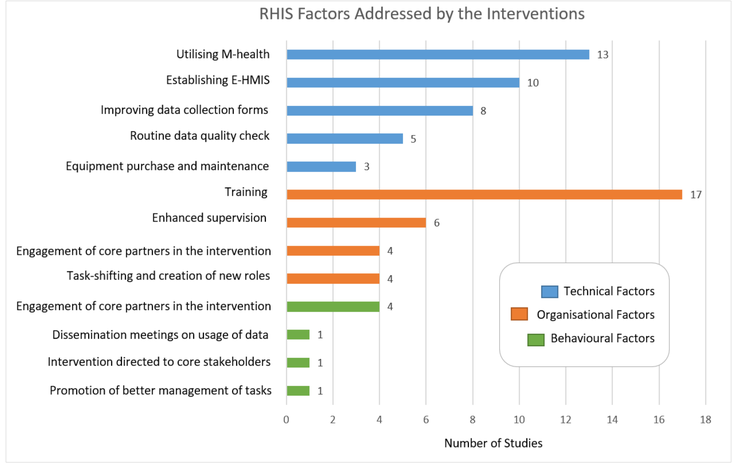


Figure 5. RHIS factors addressed in the interventions



Findings

RHIS determinants addressed

- Interventions most frequently addressed technical (76%) and organisational (76%) factors. Many studies concluded that technical interventions need to be accompanied by organisational and behavioural interventions to be effective.
- Training was part of the interventions in 45% of the selected studies and many accompanied interventions introduced new technology or tools. Studies suggest that long-term on-the-job training or continued supervision and feedback is needed instead of just a one-off training for knowledge transfer.
- Employing digital technology such as Mobile health (Mhealth) and e-Health Management Information System (eHMIS) was described in 60% of total studies. Studies showed that such interventions improved data quality when compared to the paper-based systems. Digital technology enabled the data collection forms to control for pre-defined errors by pre-setting the entry forms, made the transmission more efficient and prevented errors between the data collection and entry process, and performed auto data quality checks.

RHIS processes addressed

- The data collection stage was the most commonly addressed RHIS process (94%). Data processing, analysis and display stage were the least addressed.
- Interventions that resulted in improved data accuracy were those that included components to improve data quality checking and feedback processes.

Limitations of the review articles and further studies needed

- Due to the short study periods of the selected studies, it is not possible to see whether the interventions would result in the same outcome in a longer-term.
- Due to complex compositions of interventions, usually addressing multiple factors, processes and testing multiple data quality attributes with different outcome measures, it was not possible to conduct a meta-analysis.
- Further studies with appropriate study design comparing different intervention components as well as their cost-effectiveness are needed to draw lessons for the prioritisation and targeting of interventions for improving different data quality attributes.

Conclusions

Quality checking and feedback seem to have the most effective results on data quality indicating that contact and ongoing monitoring of data quality is key to continue ensuring good quality data. Duration of studies was short, therefore it was difficult to determine sustainability.

1. Leon, N., Brady, L., Kwamie, A., & Daniels, K. (2015). Routine Health Information System (RHIS) interventions to improve health systems management (Protocol), (12).
2. Lippeveld, T. (2001). Routine Health Information Systems: The Glue of a Unified Health System. Routine Health Information Systems: The Glue of a Unified Health System, 14–16.