

## ABSTRACT

**Background:** The availability of quality data and reliable information is crucial for decision making at all levels of health care systems. School dental service is the only preventive oral health programme in Sri Lanka, which provides comprehensive oral health care to children aged 3 to 13 years. Therefore, accurate complete and timely oral health data in the management information system of school dental service is of paramount to effective control of oral disease burden of children in Sri Lanka. While documenting and quantifying data quality is essential, there is also a need to scrutinize the underlying factors, which determines the efficiency of data management within the school dental service, in order to establish best practices and execute simple interventions to improve the management information system. This research would be the first documented attempt to describe the quality of data in the school dental service.

**Objective:** To evaluate the selected aspects of the quality of data in the routine management information system of school dental service provided by the school dental therapists in the Western Province of Sri Lanka.

**Methods:** This was an analytical study, which included both quantitative and qualitative methods to describe the quality of data and the determinants of data quality in the school dental service. The study consisted of three main components. The first component was to assess the quality of data in the management information system (MIS) of school dental service (SDS). The second component described the determinants of data quality. The findings from the first and second components were utilized to develop a predictive model.

The first component consisted of two subcomponents. In the first subcomponent a method and a tool (DQA checklist) to measure the quality of data was developed and validated. The second subcomponent consisted of describing the quality of data in the SDS with respect to three key dimensions of data quality: accuracy, completeness, and timeliness.

A retrospective cross sectional study design was used to assess the quality of data at three facility levels. The level at which the initial data generation takes place at school dental

clinic (SDC) was named as facility level one. The level at which the initial data compilation takes place at SDC was named as facility level two, and district data compilation stage was named as facility level three. The completeness, accuracy and timeliness of data and the final outcome of quality of data was achieved by applying the developed data quality measurement method and the tool.

A sample of 1040 real world subjects were examined and the findings were cross checked with three records (Patient register, Daily record and History chart) at facility level one, where initial data generation takes place when the health care provider and the patient encounter occurs at the SDCs. All the available records in the first quarter of the year 2019, 156 monthly returns, and 52 quarterly returns were crosschecked to achieve data quality at facility level two. A random sample of 52 school dental clinics was used as the study settings for facility level one and two. The district database of school dental service at the regional director of health services office was assessed under the facility level three. The 52 quarterly returns of the first quarter that were sent to the district office by the school dental therapists were cross checked with the district data base for accuracy completeness and timelines.

The component two was carried out to assess the determinants of data quality under three main constructs of technical factors, organizational factors and behavioural factors that influence the quality of data in the school dental service. The determinants of data quality were assessed at two main levels, which were the school dental clinic level and district level. Two self-administered questionnaires were developed and validated to quantitatively assess the determinants of data quality. Fifty-two school dental therapists whose clinics were selected for the data quality assessment were used as the sample at the level of school dental clinic. All the available district level officers were used to assess the determinants of data quality in the Western Province. This study was supported by a qualitative inquiry into the strengths and weaknesses of the existing management information system. A purposive sample of 12 school dental therapists and six district level officers participated in the qualitative study.

The third component consisted of an analytical study where the descriptive findings from component one and component two were utilized to develop a predictive model for data quality for facility level one. A multiple linear regression model was developed to assess

the association and the magnitude of the influence of the determinants that affects the outcome of data quality

**Results:** A DQA checklist and a student examination form was developed and validated for the assessment of data quality at each level. The weighted averages were computed to achieve data quality at different levels. This method was developed to ensure the validity of data quality by minimizing the measurement errors.

The overall data quality at facility level one was 82.7% (CI 81.4% - 84.1%). The overall quality of data at facility level two where the first compilation of data takes place was 91.7% (CI 89.1% - 94.4%). The overall data quality at district level which was defined as facility level three was 98.9% (CI 98.8% - 98.9%). The lowest scoring domain of data quality at facility level one and two were completeness with values of 79.0% and 90.6% respectively. In facility level three, the accuracy was the most affected domain. An increment of data quality was seen over the higher facility levels. There was a statistically significant difference in data quality among the three districts at 95% confidence level. It was also noted that there was a, statistically significant difference in data quality according to the type of school (base school vs outreach school).

The highest mean score for the determinants was for behavioural factors 3.48 (95% CI 3.38 - 3.59). The lowest mean score was for technical determinants with a mean of 3.15 (95% CI 3.03 - 3.26). There was a statistically significant difference in the mean values of technical factors and behavioral factors between the districts at 95% confidence level. There was a statistically significant association between the status of relief duty and the behavioral factors at 95% confidence level as the corresponding probability value was 0.028. During the qualitative analysis key issues identified as perceived by the school dental therapists were, the repetition of information in documents and the unfavorable physical properties of the operational level reports leading to poor data quality. At district level, the unavailability of guidelines and lack of training on supervision, administration and orientation on management information system of school dental service were identified as issues for data quality.

Multiple linear regression model explained 61% of the data quality at school dental service at facility level one. The technical factors, organizational factors and behavioral

factors were statistically significantly correlated with the data quality while the magnitude of the influence of technical and behavioral factors was much stronger than organizational factors.

**Conclusion and recommendation:** The study concluded that the developed DQA check list and the method was a valid method to assess the quality of data in the school dental service. The data quality was low in the initial stage of data generation, which was facility level one when compared to the other levels. It is recommended to make more effort to improve the technical factors and the behavioral factors at facility level one to achieve a high yield on the quality of data in the school dental service.

**Key words:** Accuracy, Completeness, Timeliness, Data Quality, Management information system, Technical determinants, Organizational determinants, Behavioral determinants-