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Development of Knowledge Discovery Based Interactive Decision Support System on Web Platform for Maternal and Child Health System Strengthening

Authors : Partha Saha, Uttam Kumar Banerjee

Abstract : Maternal and Child Healthcare (MCH) has always been regarded as one of the important issues globally. Reduction of maternal and child mortality rates and increase of healthcare service coverage were declared as one of the targets in Millennium Development Goals till 2015 and thereafter as an important component of the Sustainable Development Goals. Over the last decade, worldwide MCH indicators have improved but could not match the expected levels. Progress of both maternal and child mortality rates have been monitored by several researchers. Each of the studies has stated that only less than 26% of low-income and middle income countries (LMICs) were on track to achieve targets as prescribed by MDG4. Average worldwide annual rate of reduction of under-five mortality rate and maternal mortality rate were 2.2% and 1.9% as on 2011 respectively whereas rates should be minimum 4.4% and 5.5% annually to achieve targets. In spite of having proven healthcare interventions for both mothers and children, those could not be scaled up to the required volume due to fragmented health systems, especially in the developing and under-developed countries. In this research, a knowledge discovery based interactive Decision Support System (DSS) has been developed on web platform which would assist healthcare policy makers to develop evidence-based policies. To achieve desirable results in MCH, efficient resource planning is very much required. In maximum LMICs, resources are big constraint. Knowledge, generated through this system, would help healthcare managers to develop strategic resource planning for combatting with issues like huge inequity and less coverage in MCH. This system would help healthcare managers to accomplish following four tasks. Those are a) comprehending region wise conditions of variables related with MCH, b) identifying relationships within variables, c) segmenting regions based on variables status, and d) finding out segment wise key influential variables which have major impact on healthcare indicators. Whole system development process has been divided into three phases. Those were i) identifying contemporary issues related with MCH services and policy making; ii) development of the system; and iii) verification and validation of the system. More than 90 variables under three categories, such as a) educational, social, and economic parameters; b) MCH interventions; and c) health system building blocks have been included into this web-based DSS and five separate modules have been developed under the system. First module has been designed for analysing current healthcare scenario. Second module would help healthcare managers to understand correlations among variables. Third module would reveal frequently-occurring incidents along with different MCH interventions. Fourth module would segment regions based on previously mentioned three categories and in fifth module, segment-wise key influential interventions will be identified. India has been considered as case study area in this research. Data of 601 districts of India has been used for inspecting effectiveness of those developed modules. This system has been developed by importing different statistical and data mining techniques on Web platform. Policy makers would be able to generate different scenarios from the system before drawing any inference, aided by its interactive capability.

Keywords : maternal and child heathcare, decision support systems, data mining techniques, low and middle income countries
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