

Maxwell Ayindenaba Dalaba

Dr. sc.hum.

Cost-effectiveness of computer-assisted Clinical Decision Support System (CDSS) in improving maternal health services in Ghana

Promotionsfach: Public Health

Doktorvater: Prof. Dr. med. Rainer Sauerborn

In recent time, computer-assisted CDSS has been used to facilitate the application of knowledge at the point of care and simplifies adherence to guidelines and as a result improves performance. In 2012 as an alternative to the paper based WHO PCPNC guideline, Navrongo Health Research Centre implemented a computer-assisted CDSS in six health care centres in the Kassena-Nankana districts of Ghana. This dissertation examined the cost-effectiveness of the computer-assisted CDSS in comparison with usual manual pattern of maternal care in the identification of maternal complications.

A cost-effectiveness analysis was performed in a before- and after-intervention study. Analysis was conducted from the provider's perspective. The intervention area was the Kassena- Nankana district where computer-assisted CDSS was implemented to be used by midwives in maternal care in six selected health centres. Six selected health centers in the Builsa district served as the non-intervention group, where the normal Ghana Health Service activities were being carried out.

The average annual cost of operating a health centre was estimated at US \$136,014. The mean costs attributable to ANC and delivery services were US\$23,063 and US\$11,543 respectively.

The average economic cost of computer-assisted CDSS implementation was estimated at US\$3,425.60. A financial cost of approximately US\$1,060 is needed to train a nurse to use computer-assisted CDSS for a one year period. Computer-assisted CDSS increased the detection of pregnancy complications (danger signs) during antenatal consultations in the intervention health centres (before-intervention 9 /1,000 ANC attendance versus after-intervention= 12/1,000 ANC attendance; P-value=0.010).

In the intervention health centres, there was a decrease in the number of complications during labour by 1.1%, though the difference was not statistically significant (before-intervention =107/1,000 labour clients; after-intervention= 96/1,000 labour clients; P-value=0.305). Also, at the intervention health centres, the average cost per pregnancy complication detected during ANC (cost –effectiveness ratio) decreased from US\$17,017.58 (before-intervention) to US\$15,207.5 (after-intervention). Incremental cost –effectiveness ratio (ICER) was estimated at US\$1,142. Considering only additional costs (cost of computer-assisted CDSS), cost per pregnancy complication detected was US\$285.

In conclusion, Computer –assisted CDSS has the potential to identify complications during pregnancy and marginal reduction in labour complications. Implementing computer-assisted CDSS is more costly but more effective in the detection of pregnancy complications compared to routine maternal care, hence making the decision to implement CDSS very complex. Policy makers should however be guided by whether the additional benefit is worth the additional cost.