



Contribution ID: 100

Type: Talk

Applications of 4IR on the diagnosis and management of STIs among key populations in Sub-Saharan Africa: A Systematic Review

Wednesday, 4 December 2024 13:50 (20 minutes)

Introduction: The Fourth Industrial Revolution (4IR) is trending because of the major transformations it has brought to human life. Artificial intelligence including machine learning are 4IR technologies that can generate intelligent machines that can be used for the diagnosis and management of HIV and associated sexually transmitted infections. Key populations are disproportionately affected by HIV and STIs due to specific risk behaviors, marginalization, and structural factors that contribute to a lack of access to health services. The 4IR technologies are used in reporting the key populations' STI vulnerability, transmission, and treatment.

Aim: To explore the use of 4IR technologies in the diagnosis and management of STIs for key populations in Sub-Saharan Africa.

Methods: A review of the literature published from 2015 onwards was done. Manual and electronic searches on various databases including PubMed Central, SCOPUS, and Science Direct were conducted. The Preferred Reporting Items for Systematic Reviews and meta-analysis statements for protocol guidelines were followed, and the review is registered in the International Prospective Register of Systematic Reviews database (Ludwig-Walz, Dannheim, Pfadenhauer, Fegert & Bujard, 2023). PROSPERO Registration ID is CRD42023468734.

Results: Different machine learning algorithms including random forest classifier, support vector machine, and logistic regression can be used to generate models to predict STIs. The 4IR technologies can help to track people who have accessed STI services including those who have the potential to transmit infections including prevention and care for the sake of enhancing patient outcomes.

Conclusion: Machine learning models can help identify individuals at high risk of contracting HIV and assist policymakers in developing targeted HIV prevention and screening strategies informed by socio-demographic and risk behavioural data. There remains a gap in HIV diagnosis for key populations. The 4IR technologies can use available data for building models on HIV diagnosis and care among key populations in Sub-Saharan Africa and significantly improve elements required to facilitate diagnostic and management approaches.

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Session Classification: DIRISA

Track Classification: DIRISA