Digital Health Information Systems and the Management of Child Stunting in Malawi: A Practice-Based Intervention Study from a Social Work Perspective

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Abstract: **Child stunting, a critical indicator of chronic undernutrition, persists as a debilitating public health and social justice issue in Malawi, with profound implications for children's lifelong development and national productivity. While multisectoral strategies exist, their execution is hampered by systemic inefficiencies in data management at the point of service delivery. This study investigates the potential of a purpose-designed digital health information system (DHIS) to transform the management of child stunting interventions within a frontline social work practice setting in Biwi, Malawi. Employing a quantitative, cross-sectional design, the study engaged 60 key stakeholders including community social workers, clinic-based nutrition officers, health surveillance assistants, and local government administrators through structured questionnaires. Data were analyzed using descriptive statistics. The results demonstrate that the proposed DHIS is perceived to offer a substantial improvement over the prevailing manual, paper-based system, particularly in the domains of data accuracy (reduced errors and duplication), processing speed, timeliness of reporting, and support for data-driven decision-making. The study concludes that digital transformation, anchored in social work practice realities, is a pivotal catalyst for strengthening child nutrition interventions. It recommends strategic investment in integrated, user-centered digital platforms coupled with comprehensive capacity building to foster a culture of evidence-based practice within Malawi's social welfare and health sectors.**

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I. INTRODUCTION

Child stunting, defined as a height for age z-score below -2 standard deviations of the WHO growth standards, is a severe manifestation of chronic malnutrition and a key marker of social and economic inequality. In Malawi, despite concerted policy efforts, stunting affects approximately 37% of children under five, perpetuating cycles of poverty through impaired cognitive development, reduced educational attainment, and lowered economic productivity in adulthood. Social workers operate at the critical nexus of this challenge, tasked with coordinating community-level assessments, facilitating nutrition education, linking households to services, and monitoring at-risk children. However, their effectiveness is critically undermined by reliance on fragmented and archaic information systems.

In typical practice settings, data on child growth, family vulnerabilities, and service uptake are recorded in disparate paper ledgers, complicating consolidation, analysis, and timely action. This manual paradigm is characterized by data latency, loss, and illegibility, which obstructs real-time monitoring, effective caseload management, and agile resource allocation. This study, therefore, seeks to bridge the gap between digital health potential and ground-level social work practice. Its central research question is: How can a tailored digital health information system enhance the efficiency and effectiveness of child stunting management within a Malawian social work practice context?

II. LITERATURE REVIEW

The aetiology of stunting is complex and multisectoral, rooted in intergenerational poverty, food insecurity, suboptimal infant and young child feeding practices, recurrent infections, and inadequate water, sanitation, and hygiene (WASH) infrastructure. Literature consistently frames stunting not merely as a health issue but as a profound social and developmental one (UNICEF, 2021; WHO, 2022).

Health information systems (HIS) in many low-resource settings remain weak, characterized by parallel reporting streams, inadequate feedback loops, and a lack of data utilization at the point of care. Mwansa & Phiri (2020) note that in sub-Saharan Africa, this systemic weakness directly contributes to delayed responses and misdirected resources in nutrition programming. Conversely, evidence demonstrates that well-implemented DHIS can revolutionize service delivery by ensuring data quality, enabling longitudinal tracking, and generating actionable analytics for frontline workers (Kruk et al., 2018).

Within social work, the profession's ethical commitment to person-in-environment and systemic intervention aligns naturally with integrated data systems. Healy (2014) argues that technology, when ethically deployed, can empower social workers by improving case assessment, fostering inter-professional collaboration, and enhancing accountability to clients and funders. However, a significant empirical gap exists regarding the contextual application, perceived utility, and specific design requirements of DHIS for managing child stunting through a social work lens in Malawi. This study aims to fill that gap.

III. METHODOLOGY

➢ Research Design and Setting

A quantitative, descriptive cross-sectional study was conducted in Biwi, an urban catchment area in Lilongwe known for its active community-based nutrition and social support programs. The setting provided a microcosm of the typical challenges and actors involved in child stunting management.

➢ Population and Sampling

A purposive sampling technique was used to select 60 respondents who were directly engaged in child stunting-related work. The sample comprised: community social workers (n=25), health surveillance assistants (n=20), nutritionists/clinic officers (n=10), and local administrative coordinators (n=5).

➢ Data Collection and Instrument

Data were collected using a closed-ended, structured questionnaire administered in person. The instrument was designed around five core constructs: (1) Efficiency (data entry, retrieval, and processing time), (2) Data Quality (accuracy, completeness, consistency), (3) Reporting Utility (ease of report generation, timeliness), (4) Security & Access Control, and (5) Decision-Support Capability. Respondents rated both the existing manual system and the proposed DHIS on a Likert scale for each construct.

➢ Data Analysis and Ethics

Data were cleaned, coded, and analyzed using excel. Descriptive statistics (frequencies, percentages, means, standard deviations) were generated to summarize and compare perceptions. Ethical clearance was obtained, and principles of voluntary participation, informed consent, and data anonymity were strictly upheld.

IV. RESULTS

➢ Perceived System Performance

A overwhelming majority of respondents (92%) rated the existing manual system as "cumbersome" or "very slow." Key deficiencies identified included: high frequency of transcription errors (reported by 85%), difficulty tracing client history (80%), and delays in compiling monthly reports (avg. 5-7 working days).

➢ Anticipated Benefits of the Proposed DHIS

Respondents projected significant improvements across all measured constructs:

- Data Accuracy & Quality: 95% believed a digital system would "greatly reduce" errors and duplication.
- Processing Speed: 88% anticipated a reduction in data retrieval time from hours/minutes to seconds.
- Reporting Efficiency: 90% expected automated reports could be generated within a day, enhancing responsiveness.
- Decision-Support: 87% agreed that features like automated growth chart plotting and risk-flagging would directly improve case prioritization and intervention planning.
- Security & Access: While concerns about digital literacy and electricity were noted, 83% perceived controlled digital access as more secure than paper files vulnerable to physical damage or loss.

V. DISCUSSION

The findings robustly affirm the hypothesis that a DHIS is perceived as a superior tool for managing child stunting interventions by frontline practitioners. This aligns with global evidence on digital health (Kruk et al., 2018) and underscores the latent demand for technological enablement within social work practice.

The anticipated leap in data accuracy and timeliness addresses a core bottleneck. For a social worker, real-time access to a child's growth trajectory and linked family data transforms reactive case management into proactive, preventive support. This capability is crucial for implementing the "first 1000 days" approach effectively. Furthermore, integrated data platforms can bridge the historic divide between health (clinical metrics) and social work (contextual vulnerabilities) sectors, fostering the holistic, multi-agency collaboration essential for tackling stunting.

However, the study also surfaces critical implementation prerequisites. Enthusiasm for the DHIS must be tempered with recognition of infrastructural (internet, power), human (digital literacy), and institutional (sustainable technical support, change management) challenges. Success depends on a co-design process that embeds social workers' practical wisdom into the system's architecture.

VI. CONCLUSION

This study provides compelling, practice-grounded evidence that digitizing health information management can significantly empower social workers and allied professionals in the fight against child stunting in Malawi. By transitioning from error-prone, manual records to an integrated digital system, frontline actors can achieve greater operational efficiency, data reliability, and, ultimately, more timely and targeted interventions for vulnerable children. The research contributes to the fields of social work informatics and global health by demonstrating the tangible nexus between technology adoption and improved service delivery in a low-resource setting.

RECOMMENDATIONS

- Pilot and Scale: The Ministry of Gender, Community Development and Social Welfare, in partnership with the Ministry of Health, should champion the development and phased rollout of an integrated, interoperable DHIS module specifically for child nutrition and social welfare.
- Invest in Human Capital: Implement mandatory, hands-on digital literacy and data use training for social workers and health personnel, integrated into pre-service and in-service curricula.
- Develop Supportive Policy: Formulate and resource a national policy for Digital Social Work Practice, ensuring ethical data governance, infrastructure investment, and sustainable technical support.
- Future Research: Conduct longitudinal, mixed-methods studies to evaluate the *actual* impact of DHIS implementation on child stunting rates, cost-effectiveness, and social workers' job efficacy.

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