Development of a Tool for Health Screening and Assessment in Orphanages in Lesotho

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Abstract. In low- and middle-income countries that have high burdens of disease, simple interventions such as health screenings can have a significant impact on health outcomes. Among vulnerable children, orphans in particular, deaths are often caused by conditions preventable through early identification and provision of basic health and nutritional needs. After consulting local preventative care guidelines and medical providers, a health screening tool for use in orphanages was created. This tool was used to screen children in two orphanages in Lesotho. Overall, the tool was found to be easy, efficient, and valuable in identifying both preventable and immediately treatable conditions in orphans. As a result, orphans with long-term medical needs were linked to community-based providers by developing individualized care plans in collaboration with orphanage colleagues. This preventative tool offers a screening strategy that directly aligns with the United Nations Agency for Development's Sustainable Development Goals and helps to advance the goal of universal health coverage.

Children in Lesotho face many challenges, including high levels of poverty, malnutrition, tuberculosis (TB), and HIV/AIDS.^{1,2} In 2015, more than 200,000 children were living vulnerably without their parents in Lesotho.³ The Lesotho Government designates 29 institutions as places of safety for the care and protection of these children; these institutions house anywhere from 20 to 220 children from birth to 20 years of age⁴ with each child completing a health assessment before enrollment at the orphanage. Subsequently, there are no mandatory health screenings or routine health visits while these children reside in the orphanages. These orphanages have limited funds that impact their ability to provide health care for these children after the initial health assessment.

Children residing in orphanages represent a vulnerable population with unique health-care needs and many risk factors for poor health.^{5,6} Health screening of more than 260,000 international adoptees after United States arrival demonstrates the extensive health needs of this vulnerable group, including malnutrition, infectious diseases, and neurodevelopmental delays.^{7–11} As there is limited evidence regarding health screening of children in orphanages, evaluation of orphans after arrival to high-income countries can inform interventions to improve the health of children who continue to reside in orphanages.

In resource-constrained countries typified by suboptimal health-care conditions, low-technology interventions, such as health screening, have significant potential to improve health. In orphanages in particular, notable causes of death, such as HIV/AIDS and malnutrition, are largely preventable through the provision of adequate care, treatment and nutrition.^{12,13} Health screenings in orphanages are simple interventions to identify opportunities to not only improve survival but optimize quality of life and ensure that children reach their full potential.

Literature regarding health screening of children while resident in orphanages is limited and screening activities are infrequent. A few reports describing health screenings performed in orphanages in Eastern Europe, Ethiopia, Ghana, and Haiti demonstrate previously undiagnosed malnutrition, anemia, TB,

hepatitis B and C, organomegaly, visual and hearing disorders, intestinal parasites, skin infections, and dental caries.^{5,14,15} Despite the broad geographic variation in these sites, all of the studies have consistently demonstrated significant health problems in orphans, many of which are preventable and/or treatable. Nevertheless, no previous report has provided a standardized tool to guide routine screening in orphanages.

The United Nation (UN) General Assembly's Sustainable Development Goals (SDGs) aim to achieve universal health coverage including access to quality essential health-care services, essential medicines, and vaccines for all.^{16,17} This mandate applies to the countless number of children living in orphanages worldwide. Thus, a health screening tool was created for use in orphanages in resource-limited countries that would efficiently identify both preventable and treatable conditions in child residents. It was created with the hope that this tool could be adapted for use in additional settings in low- and middle-income countries.

The health screening tool was informed by local guidelines to ensure that it was aligned with preventive health recommendations for children in Lesotho, such as screening for vaccines and vitamin A supplementation. In addition, the tool was designed to capture prevalent diseases in Lesotho that warrant routine screening, such as HIV/AIDS and TB. The health screening tool (Table 1) was created through discussion with experienced local medical providers and colleagues with expertise in adoption health. This project was approved by Institutional Review Boards at the Baylor College of Medicine Children's Foundation, Lesotho, and Baylor College of Medicine, Houston.

This tool was tested in two orphanages in Lesotho known to have barriers to accessing health care, including limited transportation funds, understaffing, and overall underfunding. Both orphanages are government run and in the capital city of Maseru. The screenings were completed at the orphanages to circumvent transportation barriers. The three- to four-member health screening team included a trained HIV testing counselor, nurse, and physician and required low-cost materials. The health screening team was composed of Baylor Centre of Excellence (COE) employees who were interested in volunteering to promote orphan health. Before study implementation, the health screening team completed training on the screening tool and required equipment. During each screening,

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TABLE 1
General outline of health screenings

Screening	Evaluation	Treatment
Nutritional status	Height-for-age	Refer children with severe acute malnutrition
	Weight-for-age	Provide ready-to-use foods to children with moderate to severe acute malnutrition
	Weight-for-height	Provide vitamin A supplementation if missing
	Review medical record for vitamin A supplementation	
Vaccine completion	Review medical record for vaccine completion	Refer children with incomplete vaccination records
Deworming	Document presence of a TB vaccine scar	
	Review medical record for albendazole prevention	Provide prevention if indicated or missing
HIV	Rapid HIV screening	If screening is positive, link child to care at HIV clinic
TB	Symptom-based screening	If screening is positive, link child or caregiver to a local clinic for diagnosis
	TB symptom screen adult caregivers if TB is suspected among children residing in the orphanage	
Development	Screening of 2–9-year-old children with Ten Questions screening tool	Refer children with development concerns to local clinic
Vision screening	Snellen chart testing (children less than 4 years of age)	Refer children to optometry specialists as indicated
	Symptom screening as component of Ten Questions tools	
Oral health	Presence of caries on examination	Refer to dental specialists as indicated
Skin health	Presence of skin conditions on examination, such as dermatitis, fungal infections, scabies, etc.	Treat with griseofulvin if tinea capitis found Refer children for treatment if another skin condition identified

TB = tuberculosis.

20–30 children from age 2 to 20 years were screened over the course of one afternoon; each screening took approximately 5 minutes per child. All children residing in each orphanage participated in the screening. The children were screened once at each orphanage.

Before initiating testing, the project physician met with community stakeholders including both government leadership in the Ministry of Social Development and leaders at each orphanage to discuss and create a plan for each health screening. Furthermore, before implementation, agreements were established to link orphans with long-term medical needs to community-based care guided by individualized care plans. A site for referral for children with long-term medical needs was identified: the Baylor College of Medicine Bristol-Myers Squibb Children's Clinical COE. On completion of screenings at each institution, the project physician created a written summary which included an overall institutional summary and individualized care plans for each child. All findings were discussed with the orphanage staff.

The screening tool included growth monitoring and assessment of anthropometric status by measuring height, weight, and head circumference. Weight-for-age, weight-for-height, and height-for-age z-scores and BMI were used to categorize children's nutritional status. Children with moderate or severe malnutrition received a 1-month supply of ready-to-use foods to supplement their existing diet from the Baylor COE and a referral to a local health clinic for follow-up.

All children between 2 and 9 years of age completed developmental screening using a validated screening tool referred to as the Ten Questions (Supplemental Appendix A), which was translated into Sesotho, the local language.^{18–21}

This developmental screening tool is an existing tool that was developed for use in resource-constrained settings and was designed to be applicable in almost any cultural setting.¹⁹ As the Ten Questions Developmental Screening is meant to be a screening test only, children with an identified delay received referrals to the local clinic for further testing and therapy. Vision screening was completed with the Snellen chart in children aged 4 years or older. If the child had an abnormal screen, he/she received a referral to the optometrist at the local hospital.

At birth, each child in Lesotho is given a small booklet, called a bukana, which describes his or her medical history. Providers routinely document care in the bukana at each medical visit. Thirty-six (68%) children evaluated were able to provide a bukana for review. Children's bukanas were reviewed for vitamin A supplementation, vaccination completion status according to the Lesotho Expanded Programme for Immunization, and completion of deworming. If children had not received appropriate vitamin A supplementation and/or timely deworming, vitamin A and/or albendazole were administered during the screening. If children were missing vaccinations, the project team arranged a follow-up visit to the Baylor COE to provide the immunizations.

A rapid hemoglobin test was used to screen for anemia. As iron deficiency anemia is the most likely cause of anemia in children, children who screened positive for anemia received iron supplementation and referral to their local clinic for follow-up to assess treatment efficacy and complete further evaluation in the case of persistent or worsening anemia.

Rapid HIV screening was performed for all children by a counselor trained in the HIV test and treat strategy which

includes appropriate pre- and post-test counseling. This testing approach is consistent with national screening guidelines.²² Children and all caregivers completed TB symptom-based screening. If a child tested positive for HIV or had a positive TB symptom screening, they were referred to the Baylor COE, a national referral center for children with HIV/AIDS and TB in Lesotho.

Physical examinations were carried out for evaluation of oral and skin health, as these are areas that can be addressed with low-cost, easy interventions. Children with dental caries were referred to the dentist at the local hospital. Children with tinea capitis received griseofulvin, whereas children with other significant skin conditions were referred to the local clinic for therapy.

In alignment with the UN General Assembly's SDGs,^{16,17} health screening of children residing in institutional settings robustly supports SDG 3.8 that mandates universal health coverage including access to quality essential health-care services and access to safe, effective, quality, and affordable essential medicines and vaccines for all.¹⁷ Growth screening supports SDG 2.2, which aims to end malnutrition and achieving internationally agreed upon targets for the reduction of stunting and wasting in children younger than 5 years by 2030, whereas screening for HIV/AIDs and TB supports SDG 3.3 aiming to end the epidemics of AIDS, TB, and neglected tropical diseases.¹⁷

Arguably, the greatest challenge posed in the implementation of orphanage-based health screening is the ethical conundrum of matching elements of the screening to locally available resources that can address conditions identified. In our setting, the existence of robust services enabled our team to efficiently plan and implement screening while ensuring comprehensive follow-up care for the vast majority of conditions identified. In Lesotho and many other countries, there is lack of professionals to care for children with delayed development, raising concern regarding the ethics of completing developmental screening. However, children's development can be fostered through orphanage-based interventions such as minimizing staff turnover, providing age-appropriate toys that foster development across multiple domains, and increasing consistent one-on-one time with caretakers. Hence, despite the absence of developmental professionals, teams can ethically screen for developmental abnormalities in combination with the introduction of simple, low-cost interventions that foster development.

Lessons learned during the development of our health screening tool included the importance of early engagement of key stakeholders and decision makers to increase the project's potential to inform sustainable change. Because orphans are vulnerable minors that should be afforded special protection by the government, the development of laws and the identification of leaders that will ensure their protection are critical. These key stakeholders can help articulate program aims and provide official program endorsement. Furthermore, program success is dependent on hardy engagement of orphanage leaders and caregivers. In addition, the identification of a local partner, in this case the Baylor COE, that has the capacity to provide the staff, clinical follow-up, nutritional supplementation, vitamin A supplementation, and deworming for these orphans is key.

The health screening tool was demonstrated to be simple to use, efficient, and valuable in identifying both preventable and

immediately treatable conditions in orphans in Lesotho, including HIV, malnutrition, tinea capitis, and dental caries. Orphans with long-term medical needs were linked to community-based providers by developing individualized care plans in collaboration with orphanage colleagues. Lessons learned included the importance of early engagement of key stakeholders, knowledge of local contexts, and advance team training including equipment training. Although elements of our health screening tool may be setting specific, the strategic approach and implementation are amenable to the vast majority of lower and middle-income settings. When adequately adapted for local health guidelines and prevalent diseases, use of such health screening tools in orphanages has the potential to greatly improve the health of millions of orphans and vulnerable children worldwide. Further work is needed to adapt and disseminate the tool for expanded use in Lesotho and other countries. It is our hope that this tool provides a template to enable much needed replication of our project in low- and middle-income countries to help advance universal health coverage for all, including vulnerable orphans.

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