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Implementation of a 3D imaging device to collect automated anthropometry measurements in a population survey: lessons learned from training survey teams in Guatemala

Introduction: Anthropometry measurements are used to assess nutritional status of individuals and populations. Poor measurement compromises the use of anthropometric data for program design and evaluation, policy-making, results based management, accountability, advocacy and global reporting. Various factors influence the quality of anthropometry data collected in population-based surveys, including inadequate training or supervision of anthropometrists; poor quality equipment; and lack of standardized procedures. New approaches to improve the quality and efficiency of anthropometric assessment are under development, including an automated imaging device called AutoAnthro system. Scans of children less than 5 years are captured using a 3D camera attached to a tablet and the associated application calculates the height/length and mid-upper arm circumference. An effectiveness evaluation of the precision, accuracy, and acceptability of this device will occur in two population-based survey settings in low- and middle income-countries. In order to finalize the methods for the evaluation, we trained field teams to complete a pilot test among 100 children less than 5 years. Our objective is to describe lessons learned from the training and testing of the AutoAnthro system in preparation for the pilot test of all evaluation procedures among 100 children less than 5 years of age.

Methods: The pilot test was integrated into a population-based household surveillance system in Guatemala that annually collects anthropometry data among young children. Over four days the field teams trained and participated in standardization exercises on the manual anthropometry procedures and measurements and on the AutoAnthro system before testing among households. Unlike manual anthropometry, there is no established method to standardize anthropometrists on collecting scans prior to fieldwork. Children must not move and keep their arms and legs away from the body while 12 scans total are collected of the front and back of the child. Scans cannot be collected in bright sunlight and require the child to stand/lay on a flat plane. For scans, children wear diapers, shorts or tight/fitted pants, with no shirt or socks. Those less than 2 years are scanned lying down and 2 years and older standing up.

Results: Among uncooperative children of less than 2 years, three adults were required to capture scans, hold the child's tips of fingers, and balls of the feet. Families showed little concern with unclothing children, but many did not have diapers/suitable clothing. Field teams gave families disposable diapers/shorts. Some families, mainly of younger children, demanded that scans occur indoors for fear of unclothed children getting sick because of cold weather. Some mothers of uncooperative children rejected the scans. Avoiding direct sunlight sometimes required completing scans indoors. Lack of flat floors inside or outside required purchasing mats to create a plane for the scans. Quality scans required diligent supervision and troubleshooting in the field, and frequent analysis of the scans uploaded in the cloud.

Conclusions: The AutoAnthro system seems promising but still requires multiple trained anthropometrists, standardization, supervision, appropriate clothing and settings, and new challenges may emerge with its use.

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