



**Assessment of Adolescent Girl
Nutrition, Dietary Practices,
and Roles in Zimbabwe**

Mangwe and Tsholotsho Districts
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All photos were taken by Amelia Reese Masterson during data collection for this assessment, 2015.

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ABBREVIATIONS AND ACRONYMS

ANC	Antenatal care
BMI	Body mass index
CNFA	Cultivating New Frontiers in Agriculture
CSB	Corn soy blend
DHS	Demographic and Health Survey
ENSURE	Enhancing Nutrition and Stepping Up Resilience (World Vision)
FANTA	Food and Nutrition Technical Assistance III Project
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
FIES	Food Insecurity Experience Scale
GWP	Gallup World Poll
HAZ	Height-for-age Z score
IFPRI	International Food Policy Research Institute
KII	Key Informant Interview
KPC	Knowledge, practice, and coverage
MCHIP	Maternal and Child Health Integrated Program
MOE	Ministry of Education
MOHCC	Ministry of Health and Child Care
ORAP	Organization of Rural Associations for Progress
PLW	Pregnant and lactating women
RSA	Republic of South Africa
SRH	Sexual and Reproductive Health
TB	Tuberculosis
UNFPA	United Nations Population Fund
UNICEF	United Nations Children Fund
VHW	Village Health Workers
VoH	Voices of the Hungry
WASH	Water, Sanitation, and Hygiene
WDDS	Women's Dietary Diversity Score
WEAI	Women's Empowerment in Agriculture Index

EXECUTIVE SUMMARY

Adolescence is a period of heightened nutritional need, which can be compounded by pregnancy. Based on a need for information on adolescent girl nutrition in Zimbabwe to inform service provision for this group, the objectives of this assessment were to: 1) describe nutrition-related beliefs, knowledge, and practices among adolescent girls; 2) assess adolescent girl nutrition, food security, and dietary diversity status; 3) identify potential risk factors related to poor adolescent nutritional status; and 4) characterize perspectives of 'key influencers' that contribute to determining adolescent girl roles and responsibilities surrounding nutrition.

The assessment utilized both quantitative and qualitative data collection methods. A cross-sectional assessment was carried out among adolescent girls 13-19 years (n=692) using multistage cluster sampling, representative of selected wards in Mangwe and Tsholotsho districts. The questionnaire included demographics, dietary beliefs and practices, sexual and reproductive health, health access, food security, dietary diversity, WASH, community involvement, and anthropometrics. Data were analyzed in SPSS looking at descriptive statistics, correlations, and difference in means. Qualitative data were collected by trained facilitators through focus group discussions and key informant interviews with adolescent boys, mothers and fathers of adolescent girls, as well as with adolescent girls. Qualitative data were analyzed for themes and subthemes through an iterative process.

Of surveyed adolescent girls, 47% were food insecure and 66% had poor dietary diversity, yet rates of stunting and thinness were under 10% and were correlated with pre-menarche. A variety of socio-behavioral factors were identified that may contribute to adolescent girl nutrition status. Adolescent girls were commonly engaged in food preparation (92%), though had little food-related decision making power. Mothers were the primary decision-makers surrounding both food purchases and preparation. Adolescent girls had low levels of knowledge on nutrition, particularly nutrition during pregnancy. Only 14% could correctly identify the five critical handwashing moments, a risk factor for diarrhea and poor nutritional status. Adolescent girls' primary source of health/nutrition information was school (34%), followed by clinics (25%) and community health workers/volunteers (15%). Another 15% reported that they did not receive or did not know where they received health/nutrition information.

Pregnancy was common (27%), and 89% of pregnancies were outside marriage. Aunts were said to be a major source of information on pregnancy and contraceptive use. Most of the sample had never been married (97%), and most reported that they could make their own decision about whether to be married. The average age at first marriage was 16.6 (SD 1.2).

Reported health-seeking was high, with 97% of adolescent girls saying they seek assistance when they are sick or have a health-related concern. While 43% of adolescent girls said they seek healthcare for themselves, others pointed to their mother or grandmother as the primary decision-maker on their own health-seeking.

Only 36% attended school, and many older girls did not complete secondary school due to lack of money for school fees, pregnancy, long distances, household demands, or migration for work. School attendance is primarily decided by parents, with some adolescent girls reporting that they make this decision themselves.

Overall, this assessment found that adolescent girls in Mangwe and Tsholotsho face multifaceted barriers to good health and nutrition, including limited knowledge, low decision making power, and poor access to resources.

It is recommended to provide integrated behavior change activities on sexual and reproductive health, WASH, and nutrition through platforms where adolescent girls spend time: school clubs, sports, Care Groups, religious gatherings, and water collection points. Incentives to keep older adolescent girls in school while promoting improved diets and delayed pregnancy/marriage are recommended, potentially including peer-to-peer models, income-generating activities contingent on school attendance, take-home food rations, community conversations among 'key influencers', and mobile phone messaging. Men and boys should be engaged in efforts to reduce adolescent pregnancies. Finally, programs addressing food insecurity alongside ongoing nutritional surveillance among adolescent girls are critical.

This assessments begins to address the gap in knowledge on adolescent girl nutrition in Zimbabwe, but further research is needed, including: assessment in other provinces or at the national level, further assessment to confirm adolescent use of health services across the Zimbabwe, research on the nutritional value of indigenous/traditional foods and adolescent preferences, measurement of anemia status, follow up research on men's perspectives and roles/behaviors to determine best approaches to engage men to prevent unplanned/early pregnancy, and general research to establish age-appropriate cutoffs for measurement of adolescent girl nutritional status.

1. INTRODUCTION

BACKGROUND AND JUSTIFICATION

USAID-funded Amalima program (2013-2018) is a five-year development project being implemented by CNFA, International Medical Corps, The Manoff Group, Organization of Rural Associations for Progress (ORAP), Africare, and Dabane Trust in two provinces, Matabeleland North and Matabeleland South in Zimbabwe. The program is being implemented across four districts (Tsholotsho in Matabeleland North and Bulilima, Mangwe and Gwanda in Matabeleland South) in these provinces, with a goal to improve household food and nutrition security. The four districts are in agro-ecological regions 4 and 5, which are prone to low rainfall patterns and consequently are largely food insecure. Amalima aims to improve household food and nutrition security through three Strategic Objectives: 1) household access to and availability of food improved, 2) community resilience to shocks improved, and 3) nutrition and health among pregnant and lactating women and boys and girls under 2 improved. International Medical Corps is the technical lead for the third objective, of which the key activities

are providing food rations to PLW and children 6-23 months, and implementing care group activities, community health clubs, and water and sanitation rehabilitation of health centers.

This group – PLW and children 6-23 months – represents the ‘1000-day window’ of heightened nutritional need from the period of conception to a child’s second birthday. However, the pre-‘1000’ day window period is crucial to ensure optimal nutrition, especially for adolescent girls who have heightened nutrition needs during this time due to puberty and development. According to the 2013 Lancet series on maternal and child nutrition, undernutrition during pregnancy, affecting fetal growth, is a major determinant of stunting and development of non-communicable diseases in adulthood.¹ In fact, 20% of child stunting is attributable to intra-uterine growth restriction (estimated by low birth weight) due to maternal malnutrition.² This evidence supports the focus on the crucial 1000 day window period, as well as the importance of intervening early in pregnancy, and even before conception. The Lancet series highlights the need for expansion of interventions aimed at addressing adolescent girls’ health and nutrition.

Based on experiences through the Amalima program, International Medical Corps has noted significant numbers of pregnant teenage girls; however, there are currently no Amalima activities specifically designed to address the nutritional needs of adolescent girls (beyond the wider program activities, which adolescent girls may participate in). There are high numbers of young mothers/ teenage pregnancies (with program staff noting anecdotally girls as young as 14), indicating early sexual debut, possibility of school drop-out, and increased risk of maternal morbidity and mortality.

The Ministry of Health and Child Care (MOHCC) of Zimbabwe has noted that there is a gap in knowledge, and lack of sufficient information to guide programming priorities for adolescent nutrition in Zimbabwe. According to the 2012 national census in Zimbabwe, 41% of the population is below 15 years of age³. Subsequently, adolescent nutrition is of key priority for MOHCC, and an absence of tailored nutrition services to meet the needs of adolescent girls has been highlighted in Zimbabwe’s National Nutrition Strategy.⁴ No actors or partners in Zimbabwe have a strong focus on addressing adolescent nutrition (though the Amalima program and other programs may be doing so minimally by including adolescents in existing programs). Furthermore, no information is available to guide strategies to improve adolescent nutrition in Zimbabwe. This gap is reflective of a broader gap in adolescent nutrition knowledge and programmatic evidence worldwide.

In addition to adolescent girls themselves, fathers, mothers,

mothers-in-law, and other adults and peers in an adolescent girl’s life have an influence on her beliefs, practices, behaviors, and nutrition knowledge. Some of these influencers may be the gatekeepers, providing or denying adolescent girls permission to engage in certain activities or make certain decisions pertaining to their health and nutritional wellbeing. It is important to understand the perspectives and influence of these key key players in adolescent girls’ lives to understand what may be driving their behaviors, and therefore, what strategies will work to improve nutrition and dietary beliefs/practices among adolescent girls. Adolescent boys – who are schoolmates, brothers, and boyfriends now, and who will grow up to become fathers, grandfathers or leaders in the communities where adolescent girls live – are another important group to understand. Their perspective, current influence on adolescent girls, and drivers of their behaviors will help guide strategies to improve adolescent girl health and nutrition.

While adolescent girls have not been a specific target group through the Amalima program until this point, International Medical Corps recognizes the need for tailored services for adolescent girls through a life cycle approach that would ensure good nutritional practices and status throughout the adolescent period and better prepare them going into the critical 1000 day window period.

OBJECTIVES OF THE ASSESSMENT

This assessment was conceived to address the knowledge gaps in adolescent nutrition noted above, and gather a body of information useful for programming nutrition and related services for adolescent girls in Zimbabwe. Overall, the assessment aims to identify, describe and understand adolescent girl dietary practices and nutritional status and needs in Amalima districts (Mangwe and Tsholotsho) in Zimbabwe, as well as identify opportunities to reach them with key services.

Specifically, this study aims to:

1. Describe nutrition-related **beliefs, knowledge, and practices** among adolescent girls (including perspectives from adolescent girls, adolescent boys, and parents)
2. Assess adolescent girl **nutritional, food security, and dietary diversity** status
3. Identify **potential risk factors** associated with adolescent nutrition-related outcomes (stunting, wasting, dietary diversity, food security), examining: marital status, education, having children, employment status, WASH-related factors, sexual/reproductive health practices, dietary beliefs, dietary practices, decision-making ability, health seeking behavior
4. Identify perspectives of key influencers (adolescent boys, mothers, fathers and others) on **adolescent girl roles, responsibilities, decision-making/empowerment** surrounding school, health access, marriage, pregnancy, and childcare

2. METHODS

QUANTITATIVE METHODS

A. Study Design

To meet study objectives, we utilized a cross-sectional,

1. Maternal and Child Nutrition, Executive Summary of *The Lancet* Maternal and Child Nutrition Series, 2013. (Available at: <http://www.thelancet.com/series/maternal-and-child-nutrition>)

2. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, de Onis M, et al.; the Maternal and Child Nutrition Study Group. Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet* 2013;371:243–60.

3. ZimStat, Census Results 2012, Zimbabwe National Report. http://www.zimstat.co.zw/dmdocuments/Census/CensusResults2012/National_Report.pdf

4. Zimbabwe National Nutrition Strategy (2014-2018) (Available at: <file:///C:/Users/areese/Downloads/Zimbabwe%20National%20Nutrition%20Strategy.pdf>)

representative assessment of adolescent girls, ages 13-19 years (inclusive). The study was designed to describe the adolescent girl population in Mangwe and Tsholotsho districts (Amalima program areas) in terms of nutritional status, diets (including beliefs and practices), nutrition-related decision-making in the household, and factors affecting nutritional status, and provide a basis for nutrition program design and services for adolescent girls. Informed consent was sought among all adolescent girl participants.

B. Sample Design

Table 1. Sample structure for quantitative assessment

District (purposively selected)	Ward (purposively selected)	Village/cluster (selected using pps)	Adolescent girls (selected 'chain referral')
Mangwe	1	Mkhaya	24
		Mhlotshana	31
	4	Makuzeze	31
		Guqukani	34
	5	Patse	27
		Bulu	33
	14	Zibanani	34
		Bhatanani	32
		Matsota	26
	15	Nkedile	41
		Simelamela	17
	16	Lumawe	26
Ross Common		32	
Tsholotsho	10	Zibalongwe	26
		Sontulani	30
	12	Thabani	30
		Zamani	30
		Khangela	34
		Sizwile	28
	15	Dinyane W	26
		Kulumausenza	32
		Sigogo	35
		Siyaphambili	33
TOTAL			692

The sample for the cross-sectional assessment was selected using a multistage cluster sampling approach to select a statistically representative sample within selected wards, while accounting for limitations (such as limited time/resource, security concerns, and lack of household listing or listing of adolescent girls). At stage one, purposive sampling was used to select two districts where Amalima is operational and security permits data collection. We selected one district from each province where Amalima is operational, Mangwe from Matabeleland South and Tsholotsho from Matabeleland North, with the aim of gathering information from each province. Resources did not permit us to conduct the assessment in more than two districts.

At stage two, we used purposive sampling to select nine wards in Mangwe and Tsholotsho on the basis of providing geographic variation and avoiding security threats associated with ongoing elections (specifically in Tsholotsho district). At stage three, we randomly selected villages (clusters) proportional to population size (pps) within each ward. And at stage four, we used chain sampling to select adolescent girls, 13-19 years, for study recruitment. Chain sampling was deemed the most appropriate method for selection of adolescent girls given the low numbers of adolescent girls per village, lack of household or adolescent girl listing (i.e. no study frame), distance between households (often kilometers apart due to the rural setting), and limited time and resources. Informed consent was administered at the beginning of each interview, emphasizing that participation was optional and all responses would remain anonymous and confidential.

Sample size for this assessment was calculated based on adequate power to detect prevalence of underweight in adolescent girls, and assuming adolescent girls 13-19 years made up on average 10% of the populations. Calculations used 5% precision, a 95% confidence level, a design effect of 1.5 (based on relative homogeneity of the population) and a 90% response rate to reach a target sample size of 718 (and a minimum of 24 clusters, with 30 adolescent girls per cluster). Table 1 demonstrates the actual sampling structure that was achieved, based on the sample target.

C. Questionnaire

The questionnaire was developed and pilot tested to assess adolescent girl demographics, dietary beliefs and practices, sexual and reproductive health, health access, food insecurity, dietary diversity, WASH, roles and community involvement, and anthropometric measurements. Dietary beliefs and practices were measured using a set of questions developed by International Medical Corps headquarters and field staff, with input from a team of nutritionists (including MOHCC staff) from Zimbabwe, and covered knowledge about the major food groups, diets during pregnancy, and adolescent girls' roles in food purchasing, preparation, and dietary practices in the home. We used a standard pregnancy and birth history questionnaire adapted from the MCHIP Knowledge Practices and Coverage Survey (KPC),⁵ standard questions on antenatal care (ANC), and standard contraceptive use questions adapted from the UNFPA Adolescent Sexual and Reproductive Health Toolkit.⁶ Self-rated health was assessed, as well as health-seeking behaviors and access. Food security experience was assessed using the FAO Food Insecurity Experience Scale (FIES)⁷, which had previously been translated to isiNdebele and used in Zimbabwe. The FAO 9-Item Women's Dietary Diversity Score (WDDS)⁸ was used to

5. USAID, Maternal and Child Health Integrated Program (MCHIP), The Knowledge, Practices and Coverage Survey (KPC) Resources (Available at: http://www.mchipngo.net/controllers/link.cfc?method=tools_mande)

6. UNFPA, Save the Children, Adolescent Sexual and Reproductive Health Toolkit for Humanitarian Settings (Available at: http://www.unfpa.org/sites/default/files/pub-pdf/UNFPA_ASRHtoolkit_english.pdf)

7. Ballard TJ, Kepple AW & Cafiero C (2013). The food insecurity experience scale: developing a global standard for monitoring hunger worldwide. Technical Paper. Rome, FAO. (Available at <http://www.fao.org/economic/ess/ess-fs/voices/en/>)

8. FAO (2010), Guideline for measuring household and individual dietary diversity. (Available at: <http://www.fao.org/3/a-i1983e.pdf>)

assess dietary diversity among adolescent girls. To our knowledge, there is no dietary diversity score questionnaire developed specifically for adolescent girls. We used standard WASH questions pertaining to adolescents, including questions on water access, handwashing, and hygiene during menstruation. Finally, we used an adapted version of the Women's Empowerment in Agriculture Index (WEAI)⁹ to examine decision-making power in the household. According to anthropometric measurement recommendations, weight and height were taken twice for each girl who was physically able and the average was used for analysis. We used a mix of Seca and UNICEF height boards (calibrated at the beginning and middle of the study) and Seca scales (calibrated regularly).

D. Quantitative Data Analysis

Data were analyzed for descriptive statistics, correlations (using Pearson's X^2 and Fisher's Exact Test), and difference in means (T-Test). Dietary diversity score was established using the nine food groups recommended by the FAO for assessing women's dietary diversity score. Nutritional status was assessed using BMI-for-age (thinness) and height-for-age (stunting), compared to the WHO reference population. Among pregnant adolescents, nutritional status was not assessed as there are no established mid-upper arm circumference (MUAC) cut-offs for adolescents. Food security results were sent to staff at the FAO who performed Rasch Modeling to determine appropriate cutoffs for the scale in Zimbabwe (see Annex 1).

There are several potential biases related to this assessment approach. This assessment is intended to assess only Amalima project areas, Mangwe and Tsholotsho, meaning the results cannot be extrapolated to adolescents outside of these districts. Additionally, we had to exclude areas where there were elections taking place, and cannot rule-out some differences between those in more secure versus insecure areas (though we did conduct the assessment very close to election areas). Finally, we aimed to address any potential social desirability bias (systematic over-reporting of positive behaviors or under-reporting of negative behaviors) by hiring data collectors outside the Amalima program and training them in objective data collection approaches.

QUALITATIVE METHODS

Qualitative data collection explored the following topics: basic demographics and health status, adolescent marriage, adolescent pregnancy, adolescent girl roles in the community and household, decision-making surrounding food and 'nutritional gatekeepers' for adolescent girls, time use, risky behaviors, and access to health services. Fathers, mothers, mothers-in-law, adolescent boys, and adolescent girls¹⁰ were included in qualitative data collection in order to gain a range of in-depth perspectives from those who play a role in adolescent girls' health and nutrition decisions, beliefs, and practices. We sought to identify key nutrition 'gatekeepers', that is, those providing adolescent girls with permission to engage in certain activities or make certain decisions pertaining to their health and nutritional wellbeing.

9. IFPRI, WEAI Resource Center: <http://www.ifpri.org/topic/weai-resource-center>.

10. Note: husbands of adolescent girls were not included in qualitative data collection as there were too few to easily form a FGD in a given village.

A. Study Design

A total of eight focus groups (FGD) and three key informant interviews (KII) (Table 2) were conducted in Mangwe and Tsholotsho districts during the month of June 2015, with an average of 10 participants per group. All focus groups were led using detailed facilitator guides developed by the research team, and verbal informed consent was sought at the beginning of each FGD or KII. All the facilitators were trained on conducting focus groups and standard moderation techniques were used throughout. Participants were recruited by community leaders, who were sensitized to the study previously. The Ministry of Health and Child Care (MOHCC) Provincial Medical Directorates approved the study and objectives, and the letters of approval were provided to both MOHCC districts.

B. Qualitative Data Analysis

All FGDs and KII were audiotaped by the facilitators, and then transcribed verbatim, translated, and reviewed by the Study Coordinator, a nutritionist, and the Research Advisor to identify major themes. The nutritionist and the Study Coordinator then went through each transcript and manually coded the presence of each major theme as well as identifying the quotations exemplifying these themes. The nutritionist and the Study Coordinator discussed any differences in opinion on the meaning of any specific passages in the transcripts. The Research Advisor reviewed these themes and raised any issues needing clarification. The themes that recurred in each of the focus groups conducted are presented throughout the results section, alongside quantitative results.

3. RESULTS

Table 2. Focus Groups (8) and Key Informant Interviews (3)

Group	Mangwe	Tsholotsho
Adolescent girls	1 KII	1 FGD
Adolescent boys	1 FGD, 2 KII	1 FGD
Fathers	1 FGD	1 FGD
Mothers / Mothers-in-law	1 FGD	2 FGDs

DEMOGRAPHICS

For the survey assessment, 692 adolescent girls age 13-19 years (average age 15.94, SD 1.9) were interviewed in Tsholotsho and Mangwe districts, with a response rate of 98.5% (10 total refusals).

Education:

Based on the quantitative assessment, 36% of adolescent girls reported currently attending school, a number which is supported by the estimate given by parents during FGDs that less than half of school-aged girls are currently attending school. According to survey results, when asked about the highest education level they had attained, 49% reported attending some secondary school, while only 14% had completed secondary school. Parents were the primary decision-makers on adolescent girl school attendance. Focus group results identified a few reasons for girls dropping out of school. Adolescent girl FGD participants agreed that they

endure long distances to schools, and that only 30 to 40% complete secondary level, largely due to pregnancies and/or lack of money to pay school fees. Some adolescent girls who also happen to be household heads, dropped out of school as they failed to find a balance between school and home demands. There were more older girls out of school than younger girls, as the majority do not complete Form 4 (the final level in secondary school) or continue into high school.

Additionally, during an FGD, parents estimated that about half of adolescent boys are currently attending school. According to parents, boys become “unmanageable” at this age, which may contribute to them leaving school. Other reasons include lack of interest in school or lack of money for school fees. The fathers and older women were in agreement to say that the majority of boys drop out of school between the ages of 14 – 15 years. Adolescent boys seemed to have more say in whether they attended school than adolescent girls. Finally, for adolescent boys, there are additional pressures from other older boys who have dropped out of the school to go drink alcohol or smoke cigarettes instead of attending school.

Table 3: Demographic characteristics of adolescent girls¹

Mangwe & Tsholotsho	
	N(%) or Mean(SD)
Age	15.94 (1.9)
Percent in school	250 (36.2)
Education Level Attained	
≤ Primary school (grade 1-7)	243 (35.2)
Some secondary (form 1-4)	341 (49.4)
Completed secondary (form 4)	99 (14.3)
Some high school (form 5-6)	3 (0.4)
≥ High school (form 6+)	4 (0.6)
Percent employed	56 (8.1)
Occupation ²	
Domestic worker (not in own home)	21 (51.2)
Agriculture, gardening	6 (14.6)
Vendor, shopkeeper	6 (14.6)
Baby sitter	3 (7.3)
Cook for pre-school	2 (4.9)
Hairdresser	2 (4.9)
Other	1 (2.4)
Marital status	
Never married	660 (96.8)
Married	21 (3.1)
Widowed	1 (0.1)
Age at first marriage ³	16.60 (1.2)
Perceived common marriage age	19 (2.6)
Perceived ‘good age to get married’	23 (3.8)
Household size	5.92 (2.4)
1. Numbers may not sum to total due to missing. Valid percents are used throughout.	
2. Among those who were employed (n=56)	
3. Among those ever-married (n=22)	

“Adolescent boys decide for themselves, they leave home in the morning and the next thing they are spending the day at the shops. There is nothing you can do once they start absconding from school, eventually they stop attending school”

- Mother from Tsholotsho

Most father and mother FGD participants were of the view that bread winners, household heads, and guardians make the decision for adolescents to attend school or not. Most adolescent girl and boy participants, however, expressed that they can also choose to stop going to school without being influenced by peers or parents.

Marriage and decision-making surrounding marriage:

The majority of adolescent girls (97%) had never been married, and among those who had been married (n=22), the average age of marriage was 16.6 years. Twelve of these reported that their husbands were living with them at the time of this study, and eight said their husbands were working in the city or a neighboring country (the other two were missing). Adolescent girls reported that the common age of marriage in their community was 19 years (on average), yet they perceived age 23 as a ‘good age to get married.’ When asked who made the decision for them to get married, 60% of ever-married girls said they decided for themselves, followed by parents (20%), mother (10%), and other (10%). When asked about the primary reason they got married, 55% cited love, 15% said pregnancy, 10% said ‘escape from poverty, and 10% said ‘decision was made for me’ among other reasons. Notably, 5% reported getting married to escape from abuse.

Based on FGDs and interviews, most groups were of the view that very few adolescent girls are married, and that the majority have children outside of marriage. It is stated that it is a common phenomenon in the village that girls get pregnant from 15 years of age.

“Some girls rush into marriage as a way of escaping from poverty in their homes, and others would be fleeing from emotional and physical abuse from guardians.”

– Adolescent boy from Tsholotsho

“Most of the girls in this area have kids but are not married. Some elope with boys to RSA [Republic of South Africa]; cohabit without the knowledge or consent of parents.”

– Father from Tsholotsho

The majority of adolescent girls said they decide whom they desire to get married to. Parents play a vital role in facilitating the marriage. According to the fathers and older mothers the boy/men’s family initiates the process of asking for the girl’s hand in marriage and the two families approve of the union. The boys were of the view that the boy and the girl concerned decide whether they would like to get married. Mothers were unanimous in saying that while the adolescent girl is empowered to make the decision about whom she marries, there are very few of them who are married.

“What is surprising is that these girls have the power to choose whom they wish to be married to, but most of them are not married still, probably if the parents were responsible for arranging their marriages, they would all be married.”

– Mother From Mangwe

Employment and livelihoods:

Only 8% of the sample was employed, and the most common type of the employment was domestic work (Table 3). Qualitative

data further confirms that the majority of adolescent girls (and boys) were not involved in any livelihood activities. A few were involved in brick molding, and fetching firewood for resale. Lack of livelihood activities has been cited as a push factor for adolescents relocating to cities and neighboring countries.

“We don’t have any livelihood activities in this area, no jobs. What I just think of is to get my axe and get into the bush but I don’t fetch much from selling firewood and logs for fencing and roofing”

—Adolescent Boy from Mangwe

Among those adolescents girls who were employed, the assessment found that 31% said they made the decision about employment themselves, while the others said that any family member (mother, father, grandparent, or aunt) made this decision for them. According to FGDs, most adolescents make their own decision to be involved in any livelihood activity. It was not common for the school-going adolescents to seek jobs or be involved in livelihood activities, but it was common among adolescents with children. Additionally a large number of adolescents migrate to neighboring countries where they were involved in menial jobs such as housekeeping, seasonal-casual labor, and construction sector work.

Migration:

Migration was common among adolescent girls, particularly older adolescent girls. There were a few motivations identified for this migration, all related to poverty and the potential for income generation. Some wards along the border with Botswana were said to have very few adolescent girls present (notably, in Simelamela, Lumawe and Paste), because girls were moving to Botswana for employment. The girls are said to use undesignated entry points into Botswana and also have an advantage of speaking the local languages of Botswana (Tswana and Kalanga).

Based on FGDs and interviews, it was revealed that either relatives, parents/guardians, or adolescents themselves may make the decision to migrate. Some mentioned that relatives employed in South Africa inspire adolescents to migrate, and facilitate the illegal movement of adolescent girls and boys to their country of employment by providing monetary support. These adolescents are relocated across the border, some with and some without the consent of parents or guardian. Across both districts, many respondents said that adolescents may migrate of their own will – including both school-going and non-school-going girls. For these adolescents, poverty is the main driver, pushing them and their peers out of their villages to neighboring countries or big cities. They partly blamed their parents for failing to pay their school fees; as a result they are forced to leave school. This is said to be demotivating and ultimately one voluntarily leaves the village to seek casual employment.

Parents in FGDs reported that they wouldn’t encourage their children to leave school and seek employment. Some adolescents do migrate to neighboring countries to join their parents there; however, there are few respondents across FGDs who felt that parents influence adolescents to migrate to other places for employment purposes.

“Some parents envy what their neighbor’s children living in RSA do for them, and in turn influence their children to leave the country and seek employment”

– Father from Tsholotsho

“We are consistently chased away from school for the non-payment of school fees and eventually we stay at home with nothing to look forward to, we have no option but to cross the border”

– Adolescent girl from Mangwe

PREGNANCY AND REPRODUCTIVE HEALTH

Just over 27% of the sample had been pregnant; and of these, most (89%) were not married. Antenatal care use (at least 1 visit) was high among the ever-pregnant (96%). All adolescent girls were asked who they would turn to for advice if they became (or were) pregnant; 34% (293) said they would turn to an aunt, followed by health care provider (144, 21%), grandmother (113, 16%), and mother (93, 13%).

Among those who had delivered a baby, we asked two questions to triangulate responses and ascertain an estimate of low birth weight prevalence. Twenty-four percent reported that their last baby was “very small” or “smaller than average” at birth. Further, when asked about birth weight in grams, 13% reported <2500g (which is classified as low birth weight). If reported birthweights equal to 2500g were included, this figure would rise to 25%.

Table 4: Pregnancy & Birth History

	N(%) or Mean(SD)
Ever been pregnant	187 (27.1)
Percent of ever-pregnant who were not married	167 (89.3)
Currently pregnant	29 (4.2)
ANC use (at least 1 visit) among ever-pregnant	176 (95.7)
ANC services included:	
Iron/folic acid supplementation	171 (95.0)
Counseling on mosquito net usage	66 (36.5)
Deworming treatment	16 (8.8)
Intermittent, preventive treatment for malaria	74 (40.9)
Counseling on nutrition during pregnancy	108 (60.0)
Counseling on breastfeeding	157 (86.7)
Felt comfortable with the ANC services	178 (98.3)
Reported “very small”/“smaller than average” birth size	38 (23.8)
Reported LBW (birthweights <2500g)	21 (13.4)

Among those who had ever been married or ever been pregnant, 120 (60.6%) reported using a condom at last sexual encounter, while 36.9% did not, and 2.5% refused to answer. Based on qualitative findings, adolescent girls were more knowledgeable about “protection” (condom use) than about contraception for the purpose of limiting or spacing births. Among those that use contraception, 87% reported that they normally make the

decision about whether or not to use family planning to space or limit birth, followed by their mother or grandmother as primary decision-maker. Only 8% of adolescent girls reported that they could not make the decision regarding use of family planning even if they wanted to. Health facilities were the primary source of contraception obtained by adolescents, followed by shops/stores (where many adolescents were said to spend their free time). During FGDs with mothers, some reported that they helped ensure their daughters had access to family planning.

Table 5. Sexual and Reproductive Health Indicators

	N(%) or Mean(SD)
Have not yet reached menarche	147 (21.2)
Avg. age at menarche (n=540)	14.27 (1.15)
Ever heard of contraception (including protection)	534 (77.4)
Currently using method to delay/avoid pregnancy	203 (29.5)
Contraceptive methods used	
Female sterilization	1 (0.5)
IUD	1 (0.5)
Injectables	52 (25.6)
Implants	20 (9.9)
Pill	32 (15.8)
Condom	85 (41.9)
Other (combinations of the above, abstinence)	12 (5.9)
Where obtained contraception	
Health facility	159 (78.3)
Store	27 (13.3)
Family/friend	5 (2.5)
Boyfriend	4 (2.0)
Other (CHW, pharmacy, boyfriend, school, natural)	8 (3.9)
Used a condom at last sexual encounter ¹	120 (60.6)
1. Denominator is 197 (some refused to answer, and if girl was unmarried/never been pregnant we did not ask this question)	

“For family planning services the majority of the mothers take them to the clinic so as to avoid unplanned and unwanted babies.”

– Mother from Mangwe

FGDs further confirmed much of the survey assessment findings, with respondents reporting that it was more common for adolescent girls to become pregnant outside of marriage. In fact, according to the older women and men, more than half of adolescent girls are pregnant or have children. Older women observed most girls start to have children at the age of 15 years to 16 years while the community felt that the good age for a woman to start having children is between 20 to 25 years. Most parents felt that moral decadence and technology are the major causes for these early pregnancies. The social platforms like WhatsApp and Facebook have made it easy for girls to communicate in real time and thus get engaged in unguided relationships. Some girls are lured into sexual relationships with

men/boys working in neighboring countries as most of these men/boys are usually perceived to have a better income and social status.

According to parents FGDs the early pregnancies are mostly blamed on men, namely three groups of men – namely *injiva* (a local term for men working in neighboring countries), cattle headers and local non-school going adolescent boys. Men working in the neighboring countries visit home during the main holidays and are said to lure young girls with gifts and money and as a result some school-going girls fall pregnant. Some mothers reported that in some instances the men working outside of Zimbabwe elope to neighboring countries with adolescent girls without the knowledge of their parents or guardians.

Mangwe and Tsholotsho districts attract adolescent boys from other districts, such as Binga, Nkayi and Lupane, who are employed as cattle herders while in transit to neighboring countries or simply for long term seasonal-casual labor. During FGDs, fathers tended to blame this group of people for impregnating adolescent girls and failing to marry them.

“The highly mobile cattle headers are also to blame for the high numbers of girls with kids yet unmarried. This group of men waits for school girls after school and walk them to their villages, they are to blame for all these kids without fathers in our village. One boy can be responsible for impregnating four girls” – Father from Tsholotsho

The cattle herders are said to be mobile, and once they impregnate a girl they either relocate to another area or move to South Africa depending on how much money they would have saved. Either way, they are said not to take any responsibility for the child. Lastly the non-school-going local boys were said to be partly to blame for adolescent pregnancies. Some adolescent boys interviewed mentioned that they cannot marry because they are unemployed and as such cannot afford to look after the adolescent girl. The very few married adolescent girls were married to older men.

Early pregnancy and decision-making:

Our survey results do not show high rates of early marriage, but rather early pregnancy. FGD participants reported that most adolescent pregnancies are unplanned, hence they tend to be concealed till very late (month of pregnancy not specified); however, most girls sought advice either from the health care center, health workers, aunt, sister-in-law, mother, or grandmother after they got pregnant. It was stated by a number of female FGD participants (adolescent girls and young mothers) that at times girls are pushed into marriage due to factors such as poverty and emotional abuse from guardians (i.e. next of kin who care for adolescent girls if parents are away).

“We don’t plan for pregnancy, it’s something that just happens unexpectedly, a girl will just tell you that they skipped their monthly periods and that’s it and I can’t do much about it as I am also still being looked after by my parents.”

– Adolescent boy from Tsholotsho

NUTRITION-RELATED KNOWLEDGE, BELIEFS, AND PRACTICES

Less than 1% of girls were the primary food purchaser for the household, and only 28% reported that they can decide what they personally consume. Most commonly, the head of household (mother, aunt, uncle, grandparent, or father) makes food purchases for the family or sends food from outside the country. Only 5% of adolescent girls reported that they decide what food is *purchased* for the household, and 14% decide what is *prepared* for daily meals. Mothers were the primary decision-makers on what is prepared for daily meals (40%), followed by grandmother/grandfather, adolescent girls, and then aunts/uncles. Almost half of girls reported that they could not make the decision about what to prepare for daily meals even if they wanted to. Mothers and grandparents were also the primary decision makers regarding minor household expenditures, such as food for daily consumption or household needs (36% and 23%, respectively). Fathers play very little role in deciding what food is prepared at mealtime, or what food is purchased for daily consumption; this is likely because fathers were often absent.

Qualitative findings confirmed the above, and revealed further that decisions at homesteads are centralized and girls have little autonomy on deciding on their diet. Decisions on diet were also informed by the availability of resources to buy food. In cases where food insecurity was critical, choices on diet were limited to what was available to the family. Most families relied on remittances from South Africa and Botswana this also had a bearing on their diet. The family member who purchases the food for the family makes the decision on what to buy for the family (mothers, in many cases). The adolescents eat what is available, and the same applies to married adolescents who live with in-laws.

“We don’t have money so at the end of the day money for food becomes a determinant. Also food availability is a determinant, for example around this season there are very limited choices but soon after harvest we normally have plenty of choices”

– Adolescent Boy from Mangwe

When asked whether certain family members are prioritized during mealtime, 53% of girls reported that no one in the family is prioritized, 14% said grandparents, and 13% said children, while other responses varied. Generally, it seems male family members are not prioritized in terms of receiving food before other family members.

FGD respondents confirmed that adolescent girls eat what the whole family eats, there is no specific diet for them (whether married or unmarried). An adolescent girl’s diet may change after she is married, either improving or becoming poorer depending on the financial status of the in-laws. The majority of families all eat at the same time, and in instances where fruits and snacks are available, one women’s FGD reported that those were reserved for children. Adolescent girls overwhelmingly agreed that the diet does not change when an adolescent girl becomes pregnant. They continue with their normal diet. Adolescent girls with children have knowledge on the recommended diet during pregnancy; however few follow

the recommended diet citing poverty and limited income to purchase food as reasons why they cannot consume nutritious food. It also appears that locally available nutritious foods – such as millet, Mopani worms, and wild fruits – are looked down upon and only consumed among those of low socio-economic status.

Table 6: Nutrition Knowledge, Beliefs and Practices

	N(%) or Mean(SD)
Primary source of health/nutrition information	
School	237 (34.3)
Clinic	173 (25.1)
CHW/CHV	102 (14.8)
Care Group	39 (5.7)
Other	36 (5.2)
Did not receive/DK	103 (14.9)
Knowledge of food groups	
None	91 (13.2)
Poor	257 (37.1)
Fair	195 (28.2)
Good	149 (21.5)
Knowledge of diet during pregnancy (correct response)	520 (75.1)
Knowledge of “4-star diet” ¹ during pregnancy ¹	
Poor (0-1)	239 (34.7)
Medium (2-3)	378 (54.6)
Good (4)	72 (10.4)
Who is prioritized at mealtime (top 4)	
All eat at same time	371 (53.6)
Grandparents	100 (14.5)
Children	94 (13.6)
Mother	37 (5.4)
Adolescent girl is primary meal preparer in household	327 (47.3)
Adolescent girl often/always prepares household meals	632 (91.7)
1. The “4-star diet” is promoted in Zimbabwe among pregnant women. It consists of: grains & staples, legumes, vegetables and fruit, and animal source foods.	

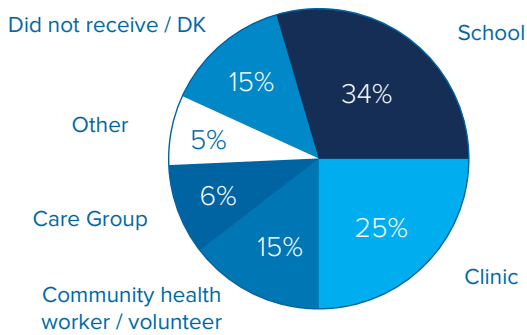
“Millet porridge mixed with pounded Mopani worms does not look appetizing at all, I doubt it tastes good and besides grinded millet tastes bad such that even dogs can’t eat it, what’s more a human being.”

– Adolescent mother from Mangwe

Adolescent girls receive most of their information on health or nutrition from their schools, local health clinics, or community health workers/outreach workers (Figure 1). Fifteen percent of adolescent girls, however, said that they did not receive any health or nutrition information, highlighting the need for increased health/nutrition education targeting this age group. Of the 15% who did not receive any health/nutrition information, the majority (85%) were not attending school and 80% were not participating in any group or community activity on a regular basis. This indicates the need to target this group through specific activities designed to reach them where they are, primarily at the homestead (as this group was not found to be largely employed).

Figure 1. Primary sources of health & nutrition information reported by adolescent girls

PRIMARY SOURCE OF HEALTH/NUTRITION INFORMATION



Adolescent time use:

Parents and peers have an influence on how the adolescents spend their time at home and around the community. Qualitative findings revealed that adolescents were generally either at school or at home, while the data collection team also observed adolescents going to church on Sundays. The non-school going adolescents are expected to carry out household chores such as fetching water, working in the fields, and other domestic chores. Those who are married are expected to do more household chores per cultural norms. In cases where the married adolescent girl lives with in-laws, she is expected to do most of the work at home, even when pregnant. There are specific roles for adolescent boys such as gathering firewood, clearing fields and watering livestock. After they finish doing chores, some boys spend their time at the shops, watching TV, and dancing to loud music till late while others play local soccer. ‘The shops’ (centrally located stores in a village or villages with basic supplies, bars, food, and meeting places) were said to have become a convergence zone for adolescents (typically after school), and parents expressed dissatisfaction as they felt that this is where relationships among adolescents are developed.

After household chores are completed, it is up to the adolescent girl how she spends her free time. School-going adolescents often read their books, while the non-school going roam around the village with peers. One adolescent boy, when asked how girls spend their time, commented that they are concerned with staying clean and therefore roam around the village aimlessly, not wanting to get dirty. Time-use also depends on the time of the year, during the rainy season, girls spend most of their time in the field, ploughing and cultivating. At harvest time married or unmarried girls spend most of their time in the fields harvesting and fetching water.

“During this time of the year, this area experiences water shortage; hence girls spend more time queuing at the borehole to fetch water for domestic use and watering of livestock. Queuing can take up to 4 hours and the girls can visit the borehole three times a day.”

– Mother from Mangwe

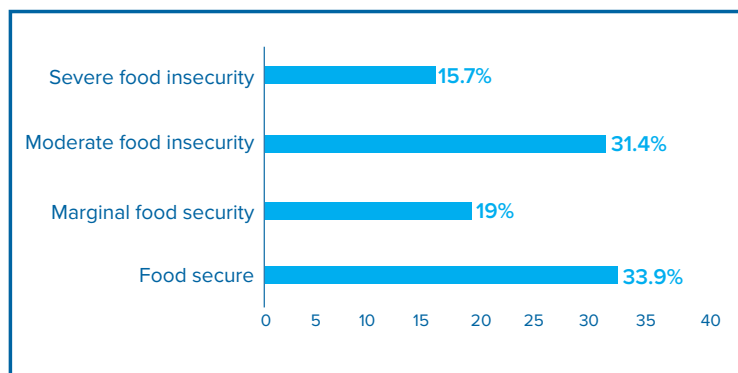


FOOD SECURITY, DIETARY DIVERSITY, AND NUTRITIONAL STATUS

With 47.1% (324) adolescent girls found to be food insecure (moderate plus severe), food insecurity was found to be a significant issue. The scale used, the Food Insecurity Experience Scale (FIES), was developed by FAO as an experience-based metric of severity of food insecurity that relies on an individual’s direct responses to 8 questions regarding their access to adequate food over the past year.¹¹ Event-based cues were used to help adolescent girls recall this time period.

11. Ballard, T.J., Kepple, A.W. & Cafiero, C. 2013. The food insecurity experience scale: developing a global standard for monitoring hunger worldwide. Technical Paper. Rome, FAO. (available at <http://www.fao.org/economic/ess/ess-fs/voices/en/>).

Figure 2. Percent food insecurity among adolescent girls



Dietary diversity score was 3.17 (SD 1.09) on average, with a slightly higher score in Mangwe compared to Tsholotsho. Dietary diversity score does not vary by age or marital status. Dietary diversity was measured using the 9-Item Women's Dietary Diversity Score (WDDS). According to recent FAO validation study examining different options for analyzing the 9-Item WDDS scale data, a threshold of 5 or more food groups consumed during the previous day is used as a positive indicator, demonstrating greater probability of meeting micronutrient needs. Consuming less than 5 food groups, however, does not indicate 'poor' dietary diversity. Rather, poor dietary diversity is indicated by consuming 3 or fewer food groups during the past 24 hours. Among our sample, the prevalence of good dietary diversity is 11.2%, and poor dietary diversity is 66.4%. Poor dietary diversity was slightly higher in Tsholotsho (70.3%) compared to Mangwe (63.3%).

Comparing mean dietary diversity score across levels of food insecurity (Figure 3), we find that greater food insecurity is statistically significantly correlated with lower dietary diversity (Pearson χ^2 28.14, $p < .001$). This indicates food insecurity may be contributing to poor dietary diversity among adolescent girls. The majority (96%) of respondents said that yesterday (the recall period for the dietary diversity scale) was not a holiday or unique day in any way, indicating that the data is not biased by unusual food consumption. Survey interviews were carried out on every day of the work, thus avoiding bias related to day of the week.

Height-for-age Z score (HAZ) less than -2 standard deviations was used to classify girls as stunted, and a Z score less than -3 indicates severe stunting, using the WHO reference population for girls 13-19 years of age.¹⁰ We found stunting rates to be at 6.7% and severe stunting at 1% in this population (excluding pregnant adolescents, and any adolescent girls in their 19th year, as there is no internationally established cutoff for these populations).

Thinness, measured by BMI-for-age Z score less than -2 standard deviations using the WHO reference population,¹² was at 6%, and 0.8% were found to be severely thin (BMI-for-age Z < -3) (Table 7). Previous research has shown that menarche (or puberty) may be an opportunity for catch-up growth. Thus, we explored whether stunting was higher in those pre-menarche

or post menarche. Interestingly, we found that of those adolescents who were pre-menarche, 17.7% were stunted (HAZ < -2 SD), while among those who were post-menarche only 2.3% were stunted. The correlation between menarche and stunting was significant ($p < .001$), but should be interpreted with caution due to the smaller sample size.

Figure 3. Food Security Status by Level of Dietary Diversity (n=690)

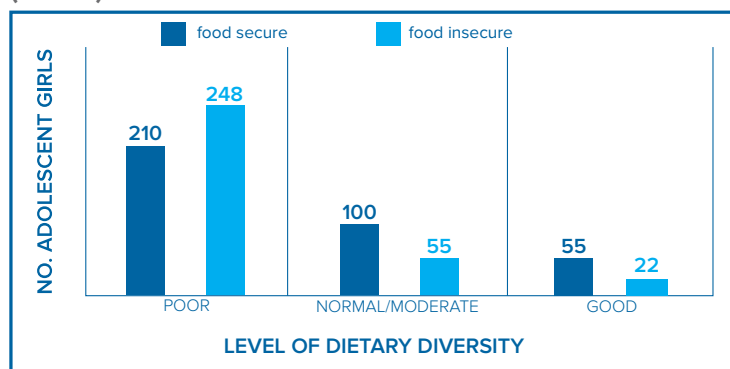


Table 7: Food Security, Dietary Diversity, and Nutritional Status

	All n=692	Mangwe n=406	Tsholotsho n=286
	N(%) or Mean(SD)	N(%) or Mean(SD)	N(%) or Mean(SD)
Food Security¹			
Food secure	233 (33.9)	101 (25.1)	132 (46.2)
Marginal food security	131 (19.0)	81 (20.1)	50 (17.5)
Moderate food insecurity	216 (31.4)	146 (36.3)	70 (24.5)
Severe food insecurity	108 (15.7)	74 (18.4)	34 (11.9)
Women's Dietary Diversity Score (Average)²	3.17 (1.09)	3.23 (1.14)	3.08 (1.02)
Women's Dietary Diversity			
Good (≥ 5 food groups)	77 (11.2)	56 (13.9)	21 (7.3)
Poor (≤ 3 food groups)	458 (66.4)	257 (63.6)	201 (70.3)
Stunting (HAZ < -2 SD)³	40 (6.7)	19 (5.4)	21 (8.5)
Severe stunting (HAZ < -3 SD)³	6 (1.0)	1 (0.3)	5 (2.0)
Thinness (BMI/age Z < -2)³	36 (6.0)	26 (7.4)	10 (4.0)
Severe thinness (BMI/age Z < -3)³	5 (0.8)	4 (1.1)	1 (0.4)

All percents are column percents.

- From the FAO Food Insecurity Experience Scale (FIES) tested for use in Ndebele language in Zimbabwe
- Based on the 9-Item FAO Women's Dietary Diversity Score (WDDS). A diet is more likely to meet micronutrient needs at ≥ 5 food groups. Poor dietary diversity is defined at ≤ 3 food groups consumed.
- Only among non-pregnant adolescents 13-19 years as there are established cutoffs for this group (n=599)

HEALTH AND HEALTH ACCESS

Adolescent girls were asked about key health indicators and health seeking behaviors, as well as their perspective on and comfort level with the health services they received (Table 8). We asked adolescent girls about several risky behaviors.

12. Woodruff BA and Duffield A (2002). Anthropometric assessment of nutritional status in adolescent populations in humanitarian emergencies. *European Journal of Clinical Nutrition*, 56:1108-1118.



Most girls (97.2%) reported that they never drink alcohol, and the questionnaire did not include smoking as this was said to be very uncommon during the pilot test. (Findings regarding condom use at last sexual encounter are reported in the reproductive health section.)

Most adolescent girls said they seek healthcare when sick or having a health-related issue. Among those who said they do not seek healthcare, reasons given were primarily lack of need, a feeling that she could take care of herself, or distance. Similarly, the majority (97.3%) said they feel comfortable seeking health services as an adolescent, and that the services meet their needs. Among those who said they were uncomfortable (2.4%) or felt the health services did not meet their needs (2.7%), the following reasons were given: nurse attitude (nurses were said to be ‘mean’, aloof, rude, or accusing the girls of ‘loose morals’), slow service/long lines, hesitancy to go accompanied by parents, lack of medications or corruption in distribution.

While many adolescent girls (43%) said they typically decide about seeking healthcare for themselves for any reason,

others said that their mother (24%), grandmother (20%), or aunt (4%) typically decides this for them. Very few adolescent girls reported that their father or brother decides when or if they should seek healthcare for themselves. And, most (78%) said if they wanted to make their own decisions about seeking healthcare they could some or most of the time.

Most FGD participants believed that adolescents between the ages of 13 to 15 were healthy, while those over 15 with children were said to be showing signs of poor health. Parents felt that the poor health was due to poverty and diseases, and did not attribute it to malnutrition of any kind.

Table 8: Health Status & Health Access by District

	All	Mangwe	Tsholotsho
	N(%) or Mean(SD)	N(%) or Mean(SD)	N(%) or Mean(SD)
Health status			
Self-rated health			
Excellent	81 (11.7)	59 (14.6)	22 (7.7)
Good	369 (53.6)	199 (49.3)	170 (59.9)
Acceptable / fair	212 (30.8)	131 (32.4)	81 (28.5)
Poor	26 (3.8)	15 (3.7)	11 (3.9)
Diarrhea in past 2 weeks	55 (7.9)	28 (7.0)	27 (9.5)
Ever taken deworming medication	85 (12.3)	45 (11.2)	40 (14.0)
Health seeking behavior			
Seeks assistance when sick or have health-related need	667 (96.8)	393 (97.3)	274 (96.1)
Where health assistance sought			
Health facility	666 (98.5)	396 (98.0)	270 (94.4)
Faith/Traditional healer	6 (0.9)	2 (0.5)	4 (1.4)
Friend or relative	2 (0.3)	1 (0.3)	1 (0.4)
Other (village health worker, home-based care)	5 (0.3)	0	5 (1.7)
Respondent felt comfortable seeking health services	658 (97.3)	381 (96.5)	277 (98.6)
Healthcare services met respondent's needs as an adolescent	658 (97.1)	384 (96.5)	274 (97.9)

“It is difficult to say with certainty because it is difficult to distinguish between actual malnutrition and a disease. Lack of food exacerbates disease states and at the end of the day its combined disease and malnutrition. Reasons for lack of food range from difficult economy, limited rainfall to laziness.”
– Mother from Mangwe

Mothers have great influence when it comes to health access for school attending adolescent girls. Mothers accompany the adolescent girls to health care centers for health attention, while adolescents with children make their own decision to seek medical attention. Married adolescent girls living with in-laws stated that they make their own decision to seek health advice for themselves and for their children.

WATER, SANITATION, AND HYGIENE (WASH)

WASH indicators, such as handwashing with soap, diarrhea prevalence, and drinking water source and treatment have been shown to be predictors in nutritional status. Among those adolescent girls who had reached menarche (n=540), the majority (83%) reported that they bathe more often during menstruation (while one respondent said that bathing the full body was considered taboo during menstruation). Girls have access to products to manage menstruation (92%), but some (7%) were using found items (such as rags or leaves) rather than purchased sanitary products. While most girls keep going to school during menstruation, about 12% do not. This could potentially be related to poor sanitation at school or lack of access to sanitary products, though this was not included in the questionnaire.

Table 9: Water and Sanitation indicators among adolescent girls

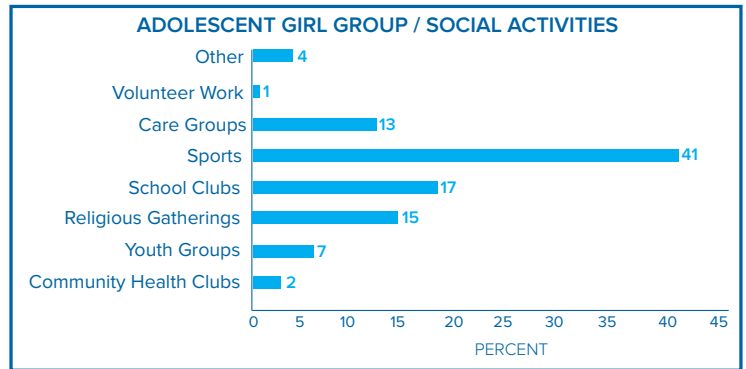
	N(%) or Mean(SD)
Main source of drinking water	
Piped water, into home	10 (1.4)
Piped water, public tap	10 (1.4)
Tubewell or borehole	457 (66.2)
Dug well (protected)	83 (12.0)
Dug well (unprotected)	34 (4.9)
Surface water	90 (13.0)
Digging into a dry river bed	5 (0.7)
Irrigation canal	1 (0.1)
Number(%) of girls who collect water	604 (87.5)
Avg. liters per day carried by girls (n=604)	31.6 (29.15)
Avg. time to get water for girls (n=604)	
≤ 30 minutes	323 (66.7)
31-60 minutes	118 (24.4)
1-3 hours	38 (7.9)
Family has a latrine	413 (60.0)
No. of Respondents who identified the 5 critical handwashing moments	94 (13.6)
Respondent bathes more often during menstruation	452 (83.5)
Respondent has access to products to manage menstruation	499 (92.1)
Respondent continues to go to school during menstruation	283 (88.2) ¹
1. Low response rate 173 missing in error	

Finally, respondents reported that menstruating women in their communities are prohibited from the following activities: gathering wild fruits (4%), herding cattle (5%), milk consumption (8%), farming (10%), cooking (12%), sexual activity (33%), religious activities (54%), and in some cases other activities such as meeting/gathering, handshaking with men, salty food, touching glasses, bathing the whole body (only bathing limbs permitted), and milking the cattle.

ADOLESCENT SOCIAL/COMMUNITY ENGAGEMENT

We asked adolescent girls about their social or community engagement, and specifically the types of activities they engage in socially. Forty-three percent (295) said they are engaged in some type of group or community activity on a regular basis. The most common group activity for girls to be engaged in was sports (41%), primarily associated with schools. This was followed by school clubs, religious gatherings, Care Groups, and youth groups (see Figure 4.)

Figure 4. Adolescent girl involvement in group/social activities



4. DISCUSSION & RECOMMENDATIONS

This assessment identified a variety of socio-behavioral and other factors that may contribute to adolescent girl nutritional status and practices in Zimbabwe. Adolescent girls in Mangwe and Tsholotsho were commonly engaged in food preparation, though had little food-related decision making power and low levels of knowledge surrounding general nutrition, particularly nutrition during pregnancy. Many experience food insecurity, and related, poor dietary diversity, indicating their diets are unlikely to meet micronutrient adequacy. The overall women's dietary diversity score for adolescent girls in our sample was 3.2, which is corroborated by the dietary diversity score (3.1) found by a recent Title II Food for Peace baseline survey in Amalima and ENSURE program areas.¹³

Pregnancy among unmarried adolescent girls is common, and only about 29.5% of girls are using some type of contraception, indicating more work is needed to increase both knowledge and use of contraception for delaying/avoiding pregnancy or spacing births. Due to heightened nutritional needs in this age group, pregnancy poses additional risks. In addition, although 60.6% of married/sexually active adolescent girls reported condom use at last sexual encounter, continued promotion of condom use for protection against sexually transmitted infections (STIs) is important.

A variety of 'key influencers' or 'gatekeepers' were identified. As mentioned, the aunt was identified as a major source of information for adolescent girls on pregnancy, and contraceptive use, and may have influence over nutrition or food-related decisions depending on household structure. The mother

13. USAID, Baseline Study of Title II Development Food Assistance Programs in Zimbabwe, 2014

was identified as the primary decision-maker surrounding both food purchases and food preparation. Adolescent girls commonly decide for themselves about seeking health services, and many identified their mothers or grandmothers as key influencers in health-seeking decisions. Decision-making on school attendance, on the other hand, is mixed. Adolescent girls identified either their parents or themselves as the primary decision-makers; however, during FGDS parents said they usually make this decision, while some adolescents (boys and girls) said they can make this decision for themselves. This indicates a need to involve parents in any programs intending to incentivize adolescent girl school attendance.

Adolescent girls were largely unable to name the five key handwashing moments, which is a risk factor for diarrheal disease. Only 8% of adolescent girls, however, reported having diarrhea in the past two weeks. Most households where adolescents were residing get their water from a borehole, and about 87% of adolescent girls are involved in fetching and carrying water regularly, with distances typically less than 30 minutes away, but sometimes reaching 1-3 hours of walking. Most girls reported being able to bathe more often during menstruation, and most had the products they needed to manage menstruation, though some were using found items rather than sanitary products from a store. A previous assessment carried out by International Medical Corps found that a major reason for girls using found items was embarrassment to ask for sanitary products. Because over 12% of menstruating girls reported not going to school during menstruation, further inquiry is needed at the school level to find out if any barriers exist (lack of clean latrines, running water, sanitary supplies) to menstruating girls attending school.

Stunting was lower than expected among this population. This could be related to the reduced sample size for this measure (n=599), as currently pregnant adolescents and those in their 19th year were excluded due to lack of established cutoffs for these populations. Alternatively, this could be related to potential catch-up growth during adolescence. Research shows that there could be an opportunity for catch-up growth in adolescence related to growth during puberty, yet this is under-studied.^{14,15} To explore the possibility of catch-up growth in our population, we looked at stunting by menarche status. Interestingly, we found significantly higher rates of stunting among those adolescents who were pre-menarche, compared to those who were post-menarche (X^2 35.29, $p < .001$). Stunting in children age 48-59 months (just before their fifth birthday) is

26% according to the Zimbabwe DHS,¹¹ so the rate of stunting we found in pre-menarche adolescents (17.7%) is only slightly lower in comparison. The correlation between menarche and stunting is significant, yet should be interpreted with caution as the sample size is small. More research is needed to determine if stage of puberty is related to stunting among adolescent girls in general, and specifically in Zimbabwe. Previous research has noted the difficulties associated with measuring catch-up

growth in adolescence, namely: “the large variability in timing, expression and duration of pubertal growth and somatic development, and the relationship between the measurement error and the increase in growth observed within a defined time period.”¹⁰

According to the Zimbabwe DHS, prevalence of thinness among adolescent girls 15-19 years was 13.5%.¹⁶ Our study found a 6% prevalence of thinness among adolescent girls 13-19 years, which is below the national average from 2010-11. While this assessment was powered to look at undernutrition in adolescent girls, this finding should be interpreted with caution due to the reduced sample size for this statistic, and should not be extrapolated beyond the districts represented by this study.

RECOMMENDATIONS

Worldwide, interventions for adolescent nutrition need to be scaled up.¹⁷ The following program and policy recommendations are based on the findings of this assessment, and aim to respond to the unique nutrition and health-related needs of adolescent girls in Mangwe and Tsholotsho districts of Zimbabwe (though many of the lessons here may be applicable to other districts as well).

I. Integrated behavior change promotion on SRH, WASH, and Nutrition through school and other platforms: Based on findings of high pregnancy rates (particularly outside marriage), poor knowledge of proper hygiene and sanitation, and poor dietary diversity, integrated programming for adolescent girls (and potentially boys) is recommended where possible.

Below are some suggested approaches and considerations:

- a. Integration of WASH, Nutrition, and SRH education can occur through school classrooms, school clubs, youth clubs, etc. – places where education is already ongoing
- b. It is important to provide age-sensitive SRH information, including fertility awareness, sex education and contraception. Promotion of birth spacing and delayed pregnancy can go hand-in-hand with good nutrition messaging.
- c. WASH and nutrition are inextricably linked, and it makes sense to integrate behavior change promotion on these areas. Because so few girls could identify the five critical handwashing moments, this could be one key behavior promoted through schools, as well as discussing diarrheal disease and the impact on nutritional status.
- d. Behavior change programs should promote both general hygiene and menstrual hygiene as part of outreach, linking WASH and SRH. This is particularly needed in schools, where about 12% of girls do not attend during menstruation (though reasons for lack of attendance during menstruation should be explored first).
- e. Ensure nutrition is added to the current health curricula and activities promoted in schools. This includes education

14. Coly AN, Milet J, Diallo A, et al. (2006). Preschool Stunting, Adolescent Migration, Catch-Up Growth and Adult Height in Young Senegalese Men and Women of Rural Origin. *J Nutr* 136: 2412-2420.

15. Largo RH (1993). The Physical Status: The Use and Interpretation of Anthropometry in Adolescence. *Horm Res* 39(suppl 3):41-48.

16. Demographic and Health Surveys (DHS), Zimbabwe, 2010-2011.

17. Save the Children (2015) *Adolescent Nutrition: Policy and programming in SUN+ countries*

on the importance of proper diet, diet diversity, frequency of meals per day, and diet during pregnancy.

f. School gardens are a hands-on way to both teach girls about dietary diversity, and provide them with foods to take home and include in their diets.

II. Meet adolescents where they are: This report identifies venues where adolescent girls spend their time. In order to reach this group, interventions should target behavior change promotion, services, and activities through existing social mechanisms. These include: sports groups or events, schools and school clubs, religious gatherings (church youth groups), Care Groups (for pregnant adolescents and adolescent mothers), and other peer groups. Boreholes should be considered as most adolescent girls fetch water. Additionally, for those adolescents (primarily older adolescent girls) who spend most of their time in the home or in domestic work in another home, a peer group model (such as Care Groups) that meets in the community and is targeted specifically for adolescent girls should be considered. Finally, because mothers and grandparents were identified as the primary decision-makers on food expenditure and preparation, and aunts were identified as an influential group on information surrounding pregnancy and contraceptive use, a session for these individuals on important nutrition, contraception, and pregnancy-related information for adolescent girls is another recommended route to reaching adolescent girls.

III. Promote good diets during pregnancy: Adolescent girls have very little knowledge about dietary requirements and recommended changes during pregnancy, and may have very little say in decisions surrounding their own diets (unless they are the female head of household). Zimbabwe already promotes the “4-star diet” for pregnant women,¹⁸ and it is recommended that this (along with messages on increasing consumption) are incorporated into programs teaching nutrition to adolescents and ‘key influencers’ (such as mothers, grandmothers, and aunts) so that those making food purchase and preparation decisions are aware of the recommended diet during pregnancy. In addition, ANC nutrition counseling was found lacking (only 60% reported receiving counseling on nutrition during ANC sessions). It is recommended that the “4-star diet” is promoted through ANC nutrition counseling for every mother.

IV. Interventions targeting nutritional improvement during meal preparation: Adolescent girls play a key role in food preparation in the household, with 47% being the primary food

preparers, and 92% preparing food often. Girls, however, have little say in what food is prepared and almost no say in food purchases. Mothers are primary decision-makers on what is prepared for meals, followed by grandparent, and then the adolescent girl. For this reason, programs targeting behavior change surrounding recipes and meal preparation (such as Care Groups, and potentially Community Health Clubs or a Positive Deviance/Hearth approach) are best placed if they target both the adolescent girl and her mother (or the primary

female head of household). Such interventions could have a positive effect on both adolescent girl nutrition and household nutrition.

V. Contraception promotion and education should be incorporated into adolescent programming: Pregnancy rates are high (27%), with the majority of ever-pregnant adolescents being unmarried, indicating unintentional pregnancies may be common. Overall contraceptive use was 29.5% and condom use at last sexual encounter was around 60%, indicating room for improvement. Due to awareness surrounding STIs, particularly surrounding HIV as Zimbabwe has one of the highest prevalence rates in the world (16.7% in adults 15-49), adolescent girls seemed to have more knowledge about ‘protection’ than the importance of family planning and birth spacing for their own health and the health of their babies. In addition to lack of knowledge, a previous International Medical Corps assessment found that adolescent girls in Tsholotsho district faced the following barriers to accessing contraceptives: fear of society’s perceptions, distance to nearest services, shortages, and lack of information or knowledge. Based on these barriers, it is recommended to increase targeted contraception promotion, education, and access among adolescent girls, as well as men and boys. Below are some potential platforms:

a. Introduce contraception education and behavior change to existing programs that adolescents participate in, such as: Care Groups, Community Health Clubs, religious activities, and school activities (clubs, peer groups, sports).

b. Work with ‘key influencers’ identified through this assessment to introduce important contraception and nutrition messages for adolescent girls. This could include working with aunts and mothers to facilitate conversations with adolescent girls about delaying marriage, delaying pregnancy, birth spacing, and recognizing the importance of contraceptive use if sexually active, as well as sources to obtain contraceptives.

c. Utilize mobile phones to distribute information on contraceptive use, access, and the benefits of delayed pregnancy and birth spacing. Adolescent girls were reported to use Facebook and WhatsApp regularly.

d. Establish maternity homes near clinics for women waiting to deliver where nutrition education could be provided on optimal health actions, and healthy spacing of babies utilizing family planning could be introduced.

e. Work with men and boys to engage them on issues of contraception, including exploring whether and how fathers support unmarried, pregnant adolescent girls. (This will require further study for program planning purposes).

f. Explore working with local shops, pharmacies, and health clinics to provide contraceptive methods that girls are interested in using. This includes training health facility staff in adolescent-friendly services.

VI. Creative solutions for targeting older adolescent girls (14-19 years) are needed: Older adolescent girls are often incentivized to drop out of school after Form 4 (secondary

18. The 4 star diet can be found in this promotional flyer by UNICEF: http://www.unicef.org/nutrition/files/Brochure_maternal_nutrition.pdf

education) due to lack of funds for school fees, the need for income, demanding household chores, pregnancy, marriage, or migration for work. Adolescent girl respondents also agreed that they endure long distances to reach school. Some adolescent household heads drop out to take care of household demands. Many older adolescents take up domestic work outside their own homes, and many migrate for work. Early marriage is not a big issue in the population, but pregnancy is common. This is a hard-to-reach population, and programs must be creative in targeting approaches for older adolescents both to incentivize school attendance, delay pregnancy and marriage, and promote good nutrition. Potential program platforms include:

a. Peer-to-peer models: Peer groups – based at school for school-going girls or using the existing Care Group or Community Health Club model – can be used to promote adoption of healthy behaviors related to contraceptive use, WASH, and nutrition. This is a good opportunity to discuss the culture of unplanned pregnancies, as related to the transient male populations or the need to migrate for work. This would also provide a forum to discuss the consequences of engaging in unprotected sex. Peers can provide condoms through this platform, and encourage the use of other forms of contraception for delaying/avoiding pregnancy. Such groups can also provide links to clinics and other services available to adolescent girls. Other organizations have successfully implemented such peer-to-peer groups in the form of ‘Community Clubs’ or ‘Safe Spaces’ for adolescent girls (see Mercy Corps programs in Niger¹⁹), and in Zimbabwe this could build upon existing Community Health Club or Care Group models.

b. Take-home food rations to incentivize high school attendance: While take-home rations have been used largely in primary school settings to incentivize girl attendance, this may be a good incentive for adolescent girl attendance during secondary or high school as well, particularly in the Zimbabwe setting where lack of funds for school fees, poverty, and need for employment or help at the homestead are common reasons for adolescent girls dropping out of school. Parents, primarily, were said to decide whether adolescent girls attend school, and such an incentive may help change parents’ minds as well.

c. Income generating activities associated with schools/school clubs: Recent research in sub-Saharan Africa by the Population Council shows one model particularly effective in delaying marriage among adolescent girls and keeping them in school longer. This model included a conditional economic transfer of a goat or chicken for families who keep adolescent girls unmarried and in school. They found that “in communities where girls were offered two chickens for every year they remained unmarried and in school, girls aged 15–17 years were half as likely to be married at endline than were girls in that age range at baseline (adjusted odds ratio 0.50, 95% confidence interval 0.29–0.83).”²⁰ This approach could also help address the migration patterns among older

adolescent girls, by giving them an income-generating activity at home and encouraging them to stay in the area. Such livelihood activities could contribute not only to the adolescent girl’s wellbeing, but also to her family’s wellbeing. Community norms may be at play here as well, and when planning this activity consideration should be taken to work with parents of adolescent girls, and the relatives abroad (if possible) who are said to support girls to migrate before they complete school.

d. ‘Community conversations’: As part of the same study, the Population Council found that “in communities that were engaged in conversations about the value of educating girls and the harms of child marriage, girls 12–14 year were two-thirds less likely to be married at endline than were girls in that age range at baseline (adjusted odds ratio 0.37, 95% confidence interval 0.18–0.76).”¹³ When planning ‘community conversations’ it is important to include all ‘key influencers’ who adolescent girls identified through this assessment (see Table 10).

Table 10: Key influencing groups and areas of influence

Key Influencing Group	Area
Schools, Clinics, Community health workers	Health/nutrition information
Aunt	Pregnancy, contraception
Mother	Food preparation and purchase, health seeking behavior, school attendance
Father	Food purchase, school attendance
Head of household	Food purchase
Self	Marriage, sometimes school attendance, sometimes health-seeking behavior
Grandmother	Health-seeking behavior, sometimes food preparation
Shops, shopkeepers	(a place where adolescent girls spend time)
Boreholes	(a place where adolescent girls spend time)

e. Mobile phone platforms: Girls were said to use mobile phones, particularly WhatsApp and Facebook, as a main mode of communication. These platforms should be considered when planning adolescent-specific activities as a tool for organizing, messaging, and sending reminders/cues for action.

VII. Establish ‘Safe Spaces’ for all ages of adolescent girls:

Establish safe and welcoming spaces where adolescent girls are free to come together. Provide information and activities related to the key behaviors and practices identified in this report that may be resulting in poor health/nutrition. There is a model for ‘Safe Spaces’ in the *Girl-Centered Program Design: A Toolkit to Develop, Strengthen and Expand Adolescent Girls Programs*.²¹

19. Mercy Corps model in Niger: <http://reliefweb.int/report/niger/nigerien-girls-find-place-discuss-marriage-health-nutrition>

20. “New Research from the Population Council Shows Child Marriage Can Be Delayed.” <http://www.popcouncil.org/news/new-research-from-the-population-council-shows-child-marriage-can-be-delayed>

21. *Girl-Centered Program Design: A Toolkit to Develop, Strengthen and Expand Adolescent Girls Programs* (Available at: <http://www.popcouncil.org/research/girl-centered-program-design-a-toolkit-to-develop-strengthen-and-expand-ado>)

VIII. Nutritional Surveillance: There is a need to expand and enhance nutritional surveillance to collect information on the nutrition situation of all adolescent girls (from as young as age 10 up to 19 years). This could include collecting data on adolescents through routine government-led data collection. If adolescent girl nutritional status goes unmeasured, then it is not possible to know if it is being addressed. New approaches and technologies for data collection among adolescents could be considered, including: cell phone platforms, utilizing the CHW workforce, or using peer leaders to collect and report data. The approach must be culturally appropriate, and seek the advice of traditional and village leaders to help design the data collection system.

IX. Link girls to vocational centers: More research is needed on what vocational activities girls and their families consider useful. This information could be used to develop or link adolescent girls to centers where they are offered training on a particular skill, one which they envision providing them an income in the future. Examples include sewing, agricultural activities, livestock, first aid, and others.

X. Address food insecurity, which is linked to dietary diversity: Two potential approaches were identified for addressing food insecurity, which was found to be high in this population:

a. Work with the private sector to improve access to nutrient-rich local foods (animal-source foods, fruits, vegetables), considering micronutrient supplements and fortification to improve the diets of adolescent girls if found to be effective through further research. Private sector participants to consider include input dealers, especially those of improved seeds. A voucher scheme (below) could be linked to this approach, by providing access to agricultural inputs (e.g. improved seeds, vegetables, farm tools, etc.) or a hen/chicken. The latter are easier to tend by both girls and their parents.

b. Consider providing conditional vouchers as part of other interventions. Criteria should be established and beneficiaries sensitized on criteria for qualification and timelines. Cash vouchers grant greater flexibility; thus a combination of vouchers and working with the private sector should be considered. Commodities selected for conditional vouchers must be available in local communities.

Interventions targeting availability of and access to food must go hand-in-hand with behavior change promotion. Poor dietary diversity and food insecurity are highly correlated, indicating food availability and access are an issue in achieving variety in the diet. For this reason, any behavior change interventions aimed at improving dietary diversity should go alongside interventions that practically address food insecurity among adolescent girls and their families. Dietary diversity interventions can include keyhole gardening (focusing on increasing diet diversity), animal husbandry (chickens, small ruminants, etc.), or school gardening. (Also see Recommendation VI).

XI. Working with men and boys: Based on qualitative findings, several groups of men and boys stood out as key groups to target in reducing adolescent pregnancy. These include: cattle

herders, local non-school-going adolescent boys, and men returning home during the holidays from work cross-border. Although we did not interview husbands of adolescent girls, this group should be considered as well. Working with these populations to ensure they have both contraception knowledge and access to contraceptives may help prevent adolescent pregnancy.

XII. Policy Recommendation:

a. First, *further studies in other provinces or at the national level* are needed to confirm and expand upon results from this study. This assessment cannot be extrapolated to a larger population; however, these findings can contribute toward informing MOHCC, NGOs, and other key partners on the most common health and nutrition issues affecting adolescents and designing practical, relevant activities to effectively reach adolescents.

b. The MOHCC's National Nutrition strategy has prioritized adolescent nutrition (key Result Area 1 of the strategy), but acknowledges that there are no specific adolescent nutrition programs in Zimbabwe. *This assessment can be used to support the development of new programs or approaches to target adolescent nutrition* (pending findings from further research).

c. Findings from this assessment should be shared with the Ministry of Education, a key player in reaching adolescents due to the school platform. *The MoE should be included in any discussion of strategy for reaching adolescent girls, as it is important to meet girls where they already are.* Many girls identified schools, school clubs, and school-related sports activities are places where they gather, spend time, or receive health/nutrition information.

d. It is recommended that any strategy to address adolescent nutrition include ministry-level interventions aimed at addressing the issue of food insecurity, which is highly prevalent and is related to poor dietary diversity in this age group.

e. As adolescent nutrition strategy is developed, it is important to remember the 'key influencers' who adolescent girls identified in different areas, and work with them as well. (See Table 10)

XIII. Recommendations for Follow-On Research:

a. Further assessment in other provinces or at the national level is needed to confirm findings and represent other parts of Zimbabwe.

b. More research is needed to confirm if adolescents across the Zimbabwe are using health services, or if this was more common among our sample alone. This should include both discussion with the MOHCC, health service providers, and assessment among adolescents. It should also include questions regarding who is paying or making payment decisions surrounding healthcare use. If the majority of adolescent girls across Zimbabwe are using health services, then this is an opportunity through which to reach them with other nutrition services.

c. More research is needed on indigenous or traditional foods, to identify which are nutrient rich, available to adolescent girls, and liked by adolescent girls, as well as barriers to eating certain nutrient-rich indigenous/traditional foods.

d. Future assessment of adolescent nutrition in Zimbabwe should include measurement of anemia status, as this is a common issue facing adolescent girls worldwide. Deworming treatment use in our sample was low, and is largely absent (9%) at ANC visits. Future research could examine the links between deworming and anemia in this population, as deworming has been found to be a safe and effective intervention that can be administered at the school level or through ANC for adolescent girls.²²

e. Research is needed on men's perspectives, roles, and behaviors to determine best approaches to engaging men to prevent early marriage/pregnancy.

f. Overall, further research is needed to establish age-appropriate cutoffs for measurement of adolescent nutrition. Additionally, establishing more appropriate adolescent reference populations by region or country is recommended to enable more accurate calculation of adolescent nutritional status.

ANNEX 1: Assessment of Food Insecurity Experience Scale Data in an International Medical Corps Survey of Adolescent Girls in Zimbabwe in 2015

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August 6, 2015

The Food Insecurity Experience Scale (FIES) was included in a survey of adolescent girls (ages 13-19) in Zimbabwe, conducted by International Medical Corps in 2015. The survey was conducted in two Districts (Mangwe and Tsholotsho) and focused on adolescent health and nutrition. The Voices of the Hungry (VoH) project of the United Nations Food and Agriculture Organization (FAO) was asked to assess the quality of the FIES data and provide guidance for food security status classification.

The assessment includes two parts:

- Assessment of the quality of the FIES measure in the International Medical Corps data for use within the survey (and, by extension, the potential usefulness of the same measure in future surveys of similar populations)
- Assessment of the comparability of FIES-based results in the International Medical Corps data with national and global results from other surveys using the same instrument.

Psychometric statistical methods based on the Rasch measurement model are the main basis of the assessment. I provide brief descriptions of the statistics reported, but readers who are not familiar with these statistical methods may want to consult the VoH report, *Introduction to item response theory applied to food security measurement: Basic Concepts, Parameters and Statistics*, available at <http://www.fao.org/3/a-i3946e.pdf> for further information on the statistics.

QUESTIONNAIRE

The questionnaire was the standard Food Insecurity Experience Survey Module for Individuals, FIESM-I (i.e., referenced to the individual respondent, not to the household as a whole). All interviews were conducted in the Ndebele language, using the Gallup World Poll (GWP) 2014 translation. Questions were referenced to the 12 months prior to the survey.

DATA AND MISSING RESPONSES

Data were provided to VoH for 692 girls. Of these, 45 were in households in which more than one girl was interviewed. Separate analyses were conducted including all cases and including only one case per household. Results were essentially identical, and only the all-cases analysis is reported here.

The sample design was complex, and sampling weights were not available in the data provided to VoH. The psychometric analysis is, in general, not sensitive to weighting, but prevalence estimates for the target population based on unweighted data

would not be correct and are not reported here.

Missing responses to the FIES questions were rare. Only 7 cases (1.0 percent) had any missing responses, and 4 of those missed only a single question. Two respondents missed all 8 FIES questions. No item was missed by more than 2 of the respondents who gave valid answers to any of the FIES questions. This low proportion of missing responses indicates that the questions were not unreasonably sensitive or difficult to answer. The seven cases with missing responses were omitted from all analyses here. For substantive use, those with only a single missing response could be included, with their raw score calculated as the sum of valid responses (i.e., effectively imputing “no” to missing responses. The remaining 3 cases should probably be omitted from analyses of food insecurity.

COMPARISON DATA

I compared psychometric statistics of the International Medical Corps data with GWP 2014 data for Zimbabwe, for a subsample of those data interviewed in Ndebele, and for a subsample of those data for females ages 15 to 20. (The International Medical Corps survey included girls 13 to 19. GWP does not survey individuals younger than 15. I included age 20 in the comparison subsample to get enough cases for even marginally reliable results.) The two subsamples were too small for reliable psychometric statistics, but provide some indication as to whether differences between the International Medical Corps and GWP data may be related to language of administration or to unique characteristics of young women and girls.

QUALITY OF THE FIES MEASURE IN THE INTERNATIONAL MEDICAL CORPS DATA FOR USE WITHIN THE SURVEY

Here, I report statistics that assess the consistency of the data with assumptions of the Rasch measurement model, and I report a statistic indicating the reliability of the measure. The extent to which data are consistent with assumptions of the Rasch model is important, as those assumptions justify the use of raw score as an ordinal indicator of severity of food insecurity. The validity of the respondent parameter as an interval-level measure of severity also relies on the data meeting model assumptions.

Item “infit” statistics assess the important Rasch-model assumption that all items discriminate equally (i.e., are have the same strength of association with the latent trait of food insecurity). Infit is an information-weighted chi-square-type statistic that compares the observed responses to the item to the expected responses given item severities as estimated in the model and the raw score of the respondent. The expected value is 1.0 for all items. Higher values indicate weaker association with the latent trait (i.e., higher chi square). Values between 0.8 and 1.2 are generally considered to indicate good consistency with the model assumption of equal discrimination, and 0.7 to 1.3 indicate acceptable consistency for positive contribution to the measure.

The infit statistics for these data are unusually good in my experience of food security measurement. The highest is 1.07

and the lowest 0.84 (Table 1). The sample is rather small for a definitive psychometric assessment, but the lack of statistical power is as likely to overstate as to understate model-fit problems.

Outfit statistics are also very good. Outfit is similar to infit except that, since it is not information-weighted, it is very sensitive to unexpected outliers. Such outliers may indicate idiosyncratic conditions, careless responses, or incorrect coding of responses. No such problems are suggested by these outfit statistics.

The second model assumption to be tested is conditional independence of items. The Rasch model assumes that responses to any two items are correlated only because of their mutual association with the underlying latent trait. In practical terms, this means that we do not want two questions that ask about essentially the same behavior or condition caused by food insecurity. Conditional independence is assessed by comparing observed correlations among items with the correlations expected given item and raw-score parameters and the distribution of cases across raw scores. I have not shown the conditional correlation matrix, but note that the conditional correlation between HEALTHY and FEWFOODS is marginally high enough to be of concern ($r=.41$). These two items have shown conditional correlations in several other datasets, and it is readily apparent why this could be the case, as they both reflect similar expressions of reduced diet diversity. In the GWP Zimbabwe data, however, the conditional correlation is only .26 (analysis not shown). While this is the highest inter-item conditional correlation in those data, it is far below the level at which it would be considered problematic. The conditional correlation for these two items was .29 in the GWP Ndebele subsample, and .37 in the GWP “females 15-20” subsample. These statistics are not very reliable given the small sample sizes, but may suggest that the marginally high correlation in the International Medical Corps data may be typical of young women and girls. In a future administration, it may be worthwhile to examine the translations of these two items to see if they can be tweaked to refer to more distinct conditions. However, for use in the current International Medical Corps data, any distortions caused by this conditional correlation will be small enough to not be worrisome.

Finally, we examine the Rasch reliability statistic as an indication of overall model fit. Rasch reliability is, conceptually, the proportion of total variance of severity of food insecurity in the sample (actually, in the sample omitting raw scores 0 and 8) that is accounted for by the measure (i.e., by the difference in raw scores of respondents). Rasch reliability of the International Medical Corps data was .74. A second version of Rasch reliability, useful for comparing across surveys using the same scale, weights all raw scores equally rather than by the number of cases in each raw score. This variant of Rasch reliability for the International Medical Corps scale is .73. (This latter measure is used within the VoH project to compare model fit across countries, since the “true” Rasch reliability is affected both by model fit and by the distribution of cases across raw scores.) For a measure of 8 items, .74 indicates reasonably good reliability, and is slightly better than the reliability for the GWP 2014 Zimbabwe data (.72). Higher reliability is expected in a more homogeneous population, but the reliability in the

International Medical Corps data is also higher than in either of the GWP subsamples (.71 for respondents interviewed in Ndebele and .69 for females ages 15-20.) For a further comparison, in the 2014 GWP data for about 147 countries, the mean Rasch reliability (the equally-weighted variant) was 0.74. In general, higher reliability indicates response patterns that are more consistent with the severity-order of the items. We expect that if a respondent says “yes” to an item, she will also say “yes” to all items that are less severe, and if she says “no” to an item, she will also say “no” to all items that are more severe. It is not expected that this pattern will be absolute—only probabilistic. The extent to which this pattern predominates increases the dispersion of item parameters, which, in turn, increases the dispersion of respondent parameters relative to measurement error and, thus, increases reliability. In practical terms, high reliability indicates that respondents understood questions consistently, responded thoughtfully, that responses were recorded accurately, and that the way food insecurity is experienced and described in the sample is consistent across respondents.

In summary, raw score on the FIES in the International Medical Corps data can be used with confidence as a valid ordinal measure of severity of food insecurity. Statistics for respondents by raw score are presented in Table 2. Food security status as presented in Table 2 will be fairly consistent with severity levels indicated for Zimbabwe and other countries in the forthcoming VoH report on the 2014 GWP survey data. The severity parameters in Table 2 can be used as an interval-level measure of severity of food insecurity in analyses such as regression and correlation that require an interval-level measure. (Raw score is ordinal, but not interval, and is not suitable for regression or correlation analysis.) An alternative, if food insecurity is an independent variable, is to use a set of dummy variables to indicate either raw score or raw-score-based categories. This allows for a more flexible fit, since associations of many outcomes with food insecurity may not be linear.

COMPARABILITY OF FIES-BASED RESULTS IN THE INTERNATIONAL MEDICAL CORPS DATA WITH NATIONAL AND GLOBAL RESULTS FROM OTHER SURVEYS USING THE SAME INSTRUMENT

Methods to assess the extent to which the measured severity of food insecurity of individuals and the prevalence of food insecurity at specified levels of severity in the International Medical Corps survey are comparable with corresponding statistics from other surveys using the same instrument are based on the following assumptions:

1. The corresponding items in the various surveys are intended to register the same objective conditions.
2. The same objective conditions are expected to indicate similar levels of severity of food insecurity in all populations.
3. In principle, this would result in the same difference in severity of each pair of items in all surveys.
4. However, in practice, the severity of items that are intended to mean the same thing may differ somewhat among surveys due to differences in nuance of translation and differences in how food insecurity is experienced and managed in different

cultures. Furthermore, the severity of one or more items may differ substantially between any two surveys for the same reasons.

5. The extent of consistency of responses to items relative to their severity may differ from survey to survey. Inconsistency of response patterns introduces statistical noise, which affects the dispersion of items (measured by differences in the standard deviation of item severity parameters.)

6. And (a technical detail), Rasch-based scales are indeterminate with respect to location, meaning that they have no natural zero point. (I.e., they are interval measures, but not ratio measures.) Thus, adding or subtracting a constant to all item parameters leaves the scale unchanged.

Given these assumptions, scales from two surveys are adjusted to a common metric (usually the metric of one of the two surveys—or, in the VoH project, the metric of the global standard, which is based on results from about 147 countries) using the following general protocol:

1. Item parameters of the second scale are adjusted by a linear transformation calculated to equate the mean and standard deviation of item parameters to those of the first scale. The additive constant is unimportant given point 6 above. The multiplicative constant in the linear transform adjusts for the difference in dispersion of items, which (point 5 above) is assumed to reflect differences in the extent of statistical noise in the two surveys. This difference does have meaning and importance as it reflects differences in average item discrimination, which, in turn affects adjusted measurement error in a later process.

2. Adjusted item parameters for scale 2 are compared with the parameters for scale 1, typically using a scatterplot.

3. If an item is obviously an outlier in terms of difference between the surveys, that item is declared “unique,” and steps 1 and 2 are repeated with the linear transformation recalculated to equate the mean and standard deviation of the remaining (“common”) items in the two scales. This iteration is repeated if necessary until the remaining common items are within acceptable limits of being equal.

4. The respondent parameters are then adjusted by the same linear transformation as in the final iteration and the respondent error is adjusted by the multiplicative constant in that linear transform. These adjusted respondent parameters and errors are then on the same metric as scale 1 and provide the bridge for comparing severity of respondents and prevalence rates between the two surveys.

Note that “unique” items are retained within each scale for calculating raw score, but they are not used to adjust the two scales to a common metric, since they are considered to represent different objective conditions.

In addition to the possible interest in establishing equivalence of the scale across surveys, it is also of interest to know how consistently the scale “works” across subpopulations within a country. Stability across subpopulations is a desirable property in a measure.

With this in mind, I compared the International Medical Corps scale with the scale based on the GWP 2014 Zimbabwe data. Figure 1 shows the comparison of item parameters after two iterations in which first WORRIED and then SKIPPED MEALS were specified as unique. The greater severity of WORRIED in the International Medical Corps survey indicates that girls in that survey were *less* likely to report this condition than respondents in the GWP Zimbabwe survey, *given their responses to other items*. The opposite is true for SKIPPED MEALS. With these two items unique, the correlation among the remaining (i.e., common) item parameters was .94 (analysis not shown), and the standard deviation of the parameters for the common items was 1.37 times as high for the International Medical Corps survey as for the GWP survey (analysis not shown). The higher standard deviation indicates higher average item discrimination and, thus, moderately better model fit.

The differences between these scales are somewhat larger than I expect for a subpopulation. To explore two possible reasons for the differences, I compared the International Medical Corps scale with scales calculated for two subpopulations in the GWP that would more nearly resemble the International Medical Corps sample: those interviewed in Ndebele, and females ages 15-20 (analyses not shown). Scales from both GWP subsamples were somewhat more consistent with the International Medical Corps scale than was the overall Zimbabwe GWP sample (a bit more-so for the females ages 15-20.) But the improvements were not dramatic. It may also be the case that the inclusion of 13- and 14-year-olds in the International Medical Corps could explain part of the difference, although I did not test this hypothesis.

Table 1. Item parameters and fit statistics, Zimbabwe IMC survey of adolescent girls

Item ¹	Severity parameter	Error	Infit	Outfit
Worried food would run out	-0.16	0.144	1.07	1.22
Could not afford healthy nutritious meals	-1.61	0.158	0.99	0.84
Ate only a few kinds of food	-1.57	0.157	0.96	0.121
Skipped meals	-0.55	0.146	0.97	0.97
Ate less than should	-0.48	0.145	0.84	0.89
Household ran out of food	0.83	0.148	1.01	1.06
Hungry and did not eat	0.32	0.144	0.96	0.97
Did not eat for whole day	3.22	0.225	1.05	1.34
Mean	0.00			
Standard deviation	1.55			
N ²	344			

I also adjusted the International Medical Corps data to the VoH global standard, which provided the food security classifications in Table 2. Similar adjustment for the overall Zimbabwe GWP data indicates that for those data, raw score 4 should be considered marginally secure (or marginally insecure, depending on your labeling preference) rather than moderately food insecure. Thus, raw scores at this level are not directly comparable between the International Medical Corps and GWP

Zimbabwe data, but classifications are nearly comparable if the range for moderate food insecurity is specified as 5-7 for the GWP data and 4-7 for the International Medical Corps data. In both cases, raw score 8 is a good proxy for severe food insecurity. (This information is provided in case research using the two data sources is contemplated after release of the GWP data.)

Notes:

¹Full wording of each question included additional detail, a reminder of the 12-month reference period, and the specification that the behavior or condition occurred “because there was not enough money or other resources to get food.”

²Respondents who responded “no” to all 8 questions (n=233) or “yes” to all 8 questions (n=108) were omitted from the psychometric analysis. They will be included in substantive analysis, classified as being very food secure and very food insecure, respectively, but their responses provide no information about the relative severity of items.

Table 2. Respondent parameters and measurement errors in the Zimbabwe IMC survey of adolescent girls

Raw score	Severity parameter	Measurement error ¹	Provisional food security status ²
0 ³	-2.32	1.50	Food secure
1	-2.50	1.12	Marginally food secure/ marginally food insecure
2	-1.53	0.89	
3	-0.80	0.82	
4	-0.14	0.81	Moderately food insecure
5	0.55	0.86	
6	1.40	1.00	
7	2.71	1.32	
8 ³	3.78	1.66	Severely food insecure

Notes:

¹Measurement error can be thought of as the standard deviation (around the severity parameter—which is the mean severity within the raw score) of true severity of food insecurity of respondents represented by the sampled individual.

²Provisional food security status is based on the thresholds used by the Voices of the Hungry project to classify respondents in the Gallup World Poll. Those thresholds are used with probabilistic assessment to estimate national prevalence rates after adjusting each country’s scale to the global standard. The raw-score assignment indicated here most nearly approximates the prevalence rates calculated by adjusting the IMC scale to the global standard for 2014.

³Severity parameters and measurement error cannot be calculated for raw scores 0 and 8 using the conditional maximum likelihood methods used in this analysis. Rough approximations presented here are based on pseudo-raw-scores of 0.5 and 7.5.

Figure 1

