“It must be in the thoughts”: A mixed-methods study to validate a mental health assessment and to identify family influences on mental health of Kenyan caregivers

by

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Thesis submitted in partial fulfillment of
the requirements for the degree of
Master of Science in the Duke Global Health Institute
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ABSTRACT

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Abstract

Background: With the increasing burden of mental health disorders worldwide, strategies are needed to identify salient issues related to mental health and to locally validate mental health screening measures in order to ultimately inform and improve mental illness prevention and treatment. This is particularly the case in regions such as Sub-Saharan Africa, where the burden of illness caused by mental health and substance use disorders is putting increased pressure on an already severely under-resourced healthcare system with few mental health professionals. This study had two aims: (1) to validate items assessing general mental health distress in a Kenyan sample and (2) to identify salient family-level influences on caregiver mental health in Kenyan families.

Methods: This study used a mixed-methods approach with cross-sectional data collected from a sample of 33 caregivers from two communities in Kenya. Each caregiver participated in a survey and a semi-structured interview. Based on the interview data, presence of emotional problems in each study participant was determined such that each participant was designated a mental health "case" or "non-case." For Aim 1, individual mental health survey items were evaluated for their ability to discriminate between mental health case status groups. For Aim 2, a mixed-methods approach was used to examine relationships between family functioning domains and individual mental health using survey and interview data.

Results: Survey items found to discriminate between individuals with and without emotional problems included 23 items adapted from existing measures of mental health, as well as 5 new items developed for the cultural context. Positively-worded items tended to have poor discrimination between individuals with and without emotional problems. Through examination of quantitative and qualitative data, both family functioning and couple functioning were found to be associated with individual mental health. Satisfaction with roles in terms of provision for family needs was a particularly salient issue affecting individual mental health, as corroborated by the qualitative data. Religiosity was also found to be an important factor in the population, with generally high religiosity among all participants and some differences in use of religion for coping with stressors between individuals with and without emotional problems.

Conclusions: Integration of both adapted and locally-developed mental health screening items should be considered to fully capture the construct of mental health in a given setting, and both content and structure of questions should be considered when developing measures. Both family functioning and couple functioning domains were found to be important, with implications for areas of focus for future research and interventions. Future contextually-sensitive research is needed to comprehensively validate measures of mental health and to further identify predictors of individual mental health in the Kenyan setting.

Dedication

I dedicate this thesis to all those who have supported me and encouraged me throughout my educational and professional journey to date. Thank you for your relentless belief in me.

I especially want to thank my parents, who are my global health heroes, and who have always pushed me toward being the best possible version of myself. I love you both immensely.

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Finally, I want to thank the caregivers who participated in this study and who willingly shared their stories with us. It has been my privilege to learn from their experiences.

1. Introduction

1.1 Mental health in sub-Saharan Africa

Mental health has received disproportionately little attention in research and policy given the growing recognition of the increasing burden of illness caused by mental health disorders [1]. In Kenya, the site of the current study, mental and substance use disorders are currently the leading cause of years lived with disability (YLDs) for adults between the ages of 15 and 49 years; prevalence of major depressive disorders and anxiety disorders particularly contribute to this burden, a trend seen across sub-Saharan Africa [2]. As many countries in Africa proceed through a demographic transition with falling mortality rates and consequently longer life expectancies, the burden of disease caused by mental illness is expected to rise by 130% by the year 2050 [2, 3]. Despite the recognized contribution of mental illness to burden of disease in the region and the consequential effect on healthcare systems in Kenya and across sub-Saharan Africa, measurement of prevalence and epidemiology of mental health disorders has been largely ignored, and research continues to be underrepresented and underfunded [1, 4, 5]. Multiple factors contribute to this lack of recognition, including limited training and employment opportunities for mental health professionals, different cultural understandings of pathogenesis of mental health disorders, and lack of universal diagnostic criteria for mental illnesses [3, 6, 7].

1.2 Validation of mental health instruments

Because of the growing burden of illness caused by mental and substance use disorders, validation of mental health assessment instruments in both local and international contexts has been the subject of extensive research and debate [3]. In order to comprehensively address mental and substance use disorders in any population, validation of mental health assessment tools is a critical step in mental health research and practice. Establishing a measure's validity ensures that assessment of mental health epidemiology in the population truly reflects the presence of mental health problems in the population, enabling appropriate and effective clinical practice and intervention development. For measures to be considered culturally adapted, content and criterion equivalence must be established so that accurate diagnoses of mental illness can be made in the setting. The language and structure of the measure must also be considered to maximize comprehensibility [8, 9].

Mental health screening tools adapted from Western instruments as well as locally developed tools based on qualitative research have been validated and used successfully in multiple settings. Existing scales as well as items developed specifically for different contexts contribute to a comprehensive understanding of mental health in a given setting [8-12]. Measure validity studies performed in Kenya and other low- and middle-income countries (LMIC) have largely focused on validation of screening tools that have been used in the US to detect common mental disorders [10]. However, studies

evaluating the utility of these instruments in African contexts have shown mixed results in terms of validity in each setting, which speaks to the importance of ongoing validation efforts that explore the added value of new items developed for low-resource contexts and/or specific cultures [10].

Additional research has been invested in identification of gold standards of mental health diagnoses within and across LMIC contexts. Clinician diagnosis of mental health disorders is frequently considered to be the gold standard in terms of validity and reliability of local constructs of mental health. In previous studies, tools used by clinicians and mental health professionals to facilitate mental disorder diagnoses in sub-Saharan Africa have taken the form of semi-structured clinical interviews administered by the professional [10, 13-19]. However, due to the severe lack of human resources for mental health in LMIC as well as the time-intensive nature of clinical interviewing, use of clinician diagnosis as a gold standard by which to evaluate screening instruments is frequently impossible [8, 12]. This makes validation of screening instruments in areas with few mental health professionals more complex.

In sub-Saharan Africa, previous studies have validated mental health instruments against well-known mental health screening instruments used in HICs as substitute gold standards for clinical diagnosis, although imperfect sensitivity and specificity of both instruments in the setting introduces bias into this validation procedure [8, 12]. This has been referred to as an "etic" criterion: an approach involving

acceptance of a particular set of criteria as universally valid and reliable [8]. As an alternative to use of other mental health screening instruments in the absence of clinician diagnosis, multiple studies on cross-cultural validation of measures of mental health have relied on local informant diagnosis of culturally-specific mental health syndromes as a gold standard against which to evaluate screening instruments [20-24]. This approach, referred to as an "emic" criterion for a gold standard, suggests that local assessment of mental health should be considered the most valid gold standard in the setting [8]. The simultaneous use of both etic and emic criteria for identification of gold standards has been proposed for validation of mental health assessment tools in LMIC settings [8].

1.3 Caregiver mental health in the family setting

As the study of mental health and its impact has increasingly become an area of academic focus, large-scale prevalence studies quantifying mental health disorders in adult general and sub-populations have begun to describe the extent of the burden of mental illness in Kenya and worldwide [2, 25]. The last few decades have witnessed a significant increase in the number of studies of adult mental health, along with international organizations' recognition of the importance of addressing mental health as a healthcare burden [1, 26]. Much of this recent research is epidemiologic in nature and focuses on establishing the prevalence of various common mental disorders. A

smaller, but increasing amount of research is being dedicated to the causes and symptoms of mental illness in local contexts [26].

To establish and contextualize etiology of mental health and illness, much of the research performed on adults in sub-Saharan Africa has focused on identification of individual mental disorders or on larger-scale, community-level influences on mental health. However, the impact of the family system and familial relationships on adult parent/caregiver mental health outcomes has been relatively unaddressed to date. Bronfenbrenner's ecological systems theory identifies multiple ways in which a person's environment influences their development [27]. His seminal 1979 book identified five systems of influence on development, ranging from groups and institutions most closely related to daily functioning, outward to societal-level influences such as governmental structures or cultural affiliation [27]. Given the ways in which ecological systems theory has established the importance of proximate influences to individual development, research examining the impact of family-level influences on individual well-being promises to yield a fuller picture of factors that influence growth and development.

The effect of caregiver mental health and well-being as a determinant of health and well-being of other family members has been established, especially within the context of parent-child dyadic relationships [28-30]. However, we know much less about how other family members influence the mental health of the caregiver her- or himself. Both the physical and mental domains of caregiver health are linked to the health of the

children for whom the caregivers are responsible, and parental mental illness in particular has been shown to be correlated with negative emotional and behavioral outcomes in children [31, 32]. Previous studies suggest that abusive parenting patterns, caregiver social support, psychological effect of a family member's HIV infection, and caregiver substance abuse are associated with child and adolescent well-being [28-30, 33, 34]. Studies performed in the US have additionally shown that presence of mental illness in parents is correlated with high risk of unemployment, leading to increased risk of poverty and destabilized family structure [35]. Overall, research on caregiver mental health has largely focused on how caregiver mental health affects psychosocial outcomes of children, with much less on how it affects caregiver functioning [28-30].

The research that investigates family-level influences on adult mental health outcomes in sub-Saharan Africa has been limited in scope. Some studies have examined the impact of intimate partner violence (IPV) within couple dyadic relationships and have documented depressive symptoms, suicidal ideation, and other poor mental health outcomes among women [36-39]. Other research in this area has focused on maternal mental health, including prevalence of postpartum depression [39-43]. The few studies that have been performed on stress of parenting in sub-Saharan Africa have largely been conducted in the context of various sub-populations, such as caregivers of children with HIV infections [44], urban mothers [45], or grandparents caring for children orphaned due to AIDS [46, 47]. Another family-level stressor that has been frequently studied is

presence of HIV/AIDS infection in the family as a burden on the family unit; previous studies have examined parenting in high-risk groups such as HIV-infected caregivers or HIV-infected children [14-16]. From a practice angle, the literature suggests that interventions such as parenting programs can be effective in improving caregiver mental health outcomes [48]. Notably, most of the research that has been done focuses on women, with much less on family influences on the mental health of men.

1.4 Study aims

This study had two primary aims. The first aim of the study was to validate mental health assessment items for caregivers in the study setting. Items adapted from existing scales as well as new, culturally-specific items were evaluated to establish which items best discriminated between individuals with or without clinically significant mental health problems. The second aim was to identify salient family-level influences on caregiver mental health outcomes in the sample, using survey and interview data collected from study participants and their family members. Using a mixed-methods analysis approach, data on overall family functioning, couple functioning, caregiver-child dyadic relationship, and religiosity were analyzed to determine association of these domains with whether or not an individual is experiencing mental health problems.

2. Methods

This study was conducted as part of a broader validity study of measures of family functioning and individual mental health and well-being. The study uses a mixed-methods approach; primary data sources included in the study were survey measures and semi-structured interviews, both of which were administered to each participant in the study.

2.1 Setting

This study was conducted in Kipkaren and Kipkenyo communities in Uasin Gishu province in northwestern Kenya. The research staff were based in the nearest urban centre of Eldoret, approximately 10 kilometers east of Kipkaren and Kipkenyo communities and 330km northwest of Nairobi. With a population of 289 380, Eldoret is the fifth-largest city in Kenya and is the capital city and primary commercial centre in the province [49]. It is also home to multiple hospitals and centres of education, including Moi Teaching and Referral Hospital (MTRH), as well as Moi University, which includes the Moi University School of Medicine [50]. The population of Uasin Gishu county is largely of Kalenjin tribal affiliation, but the Luhya, Kikuyu, Kisii, and Luo tribes also have a significant presence. Christianity is the predominant religion in the region [51].

2.2 Procedures

2.2.1 Recruitment

Participants were recruited for the study via referral by community leaders residing in Kipkaren and Kipkenyo communities; these leaders were identified and approached by local study staff. The study staff explained the purposes and procedures of the study to the leaders, and leaders interested in participation were asked to list families under their jurisdiction (such as within their congregation or living in their neighborhood) who met the following eligibility criteria:

1. The family has a child between the ages of 8 and 17 currently living in the home.
2. At least one caregiver for the child is over 18 and is currently living in the home.
3. The family is considered by the leader to be functioning either poorly, i.e. in need of immediate advising, or doing very well (referred to as "leader diagnosis" of family functioning).
4. The leader knows the family well or very well.

After listing potential study participants, the leaders served as a point of contact between the participants and the study staff by explaining the study to them and inviting them to be contacted to learn more. Working with the study staff, leaders then completed referral forms for interested families; these referral forms included family

contact information, family demographics, the leader's "diagnosis" of family functioning, the rationale behind the leader's diagnosis, and a map to assist in finding the family's home. Referred families who were interested in participating were then assigned ID numbers for the purposes of the study. Families not interested in participation were never discussed.

2.2.2 Data collection

After the recruitment process for the family was completed and the household assigned a household ID number, included caregivers and a target child between ages 8 and 17 years old were all invited to attend a data collection day during which family members were able to complete multiple types of assessment in one day. This was done in an effort to streamline activities and minimize the time required. Data collection days were typically Saturdays when children were out of school; they were located at local public buildings deemed neutral to study staff and participants, such as local schools. The family members were led through the consent process by a trained enrollment assistant. Consent procedures were read to each family member in their choice of English or Kiswahili, and all members signed consent forms with a signature, thumbprint, or "X" mark. One caregiver per family signed a permission form for the target child in the family, and the child also signed an assent form. If any family member did not consent, no data were collected for any family members. In total, two to three

participants were interviewed per family, including one or two caregivers and one target child.

After completion of the consent process, caregivers each completed an enrollment survey, which gathered demographic information on participants and household members and was administered by an enrollment assistant. After completion of the enrollment surveys, all family members completed their individual surveys and interviews.

Surveys were administered by trained survey enumerators in private locations at the data collection site; these surveys contained measures from both existing and culturally-adapted instruments assessing family functioning and mental health. Different survey enumerators were available to be assigned to each family member depending on enumerator availability.

Each participant also participated in a semi-structured interview conducted by a trained interviewer in a private location; one interviewer was assigned to all members of one family. Interviewers were provided with interview guides on which they took notes during the interview, and they also audio recorded each interview. Interviewer notes were scanned and stored on a secure server, with the original copies kept in a secure location in the Eldoret research office. Audio recordings were also uploaded to the secure server and deleted from the recording device.

Families participating in the study received 100 Kenyan shillings (KSh) for each family member that completed all data collection activities. In addition, families attending the data collection days on Saturdays received either tea and a snack or a full lunch, depending on the timing of data collection. All study procedures were approved by the ethical review boards at Duke University and Moi University School of Medicine.

2.3 Measures

Two primary measures were used in the collection of data for this study: a tablet-administered survey and a semi-structured interview.

2.3.1 Survey

A survey containing approximately 400 items per caregiver, with an additional 115 items for married caregivers, was administered to each participant. The survey was administered in two parts. The first part included demographic information on the participant and participant's household. The second part of the survey contained items assessing multiple domains of family functioning and individual mental health. This included items adapted from standardized scales, many validated in other high-income country contexts and some used in LMICs, as well as new items developed for the local context to reflect the same domains.

Table 1 describes the adapted and culturally-specific scale items, scoring for each scale based on response options, and number of items used in the study. The formative

work that led to development of the survey items preceded the current study and is described briefly in the following section.

Table 1: Survey scales and scoring by domain.

Scale	Description	Scoring	Number of items
Family functioning			
New items – all caregivers	Evaluates overall family functioning, including structure, roles, emotional climate, and problem solving.	Numeric rating 1 through 10 based on level of agreement with item	55
New items – married caregivers only	Evaluates family functioning issues regarding 2-caregiver structure in the family.	Numeric rating 1 through 10 based on level of agreement with item	7
Couple relationship			
Dyadic Adjustment Scale (DAS) [52]	Evaluates overall couple relationship quality, with subscales for dyadic satisfaction and dyadic cohesion between the participant and partner.	Likert scale 0-5 based on frequency of occurrence of event	17
New items	Evaluates overall dyadic couple relationship quality.	Likert scale 0-5 based on frequency of occurrence of event	26
Couple co-parenting			
Parenting Alliance Measure (PAM) [53]	Identifies the participant's perception of their alliance with their caregiver in raising their child or children.	Likert scale 0-4 based on level of agreement with item	20
New items	Identifies the participant's perception of their alliance with their caregiver in raising their child or children.	Likert scale 0-4 based on level of agreement with item	6
Couple conflict resolution			
Revised Conflict Tactics Scale (CTS2) [54]	Identifies presence and frequency of physical and psychological domestic violence within the couple relationship.	In the past year: 0 = "Never", 1 = "1 Time Only", 2.5 = "2-3 Times", 6 = "4-8 Times", 10 = "More Than 8 Times"	20
New items	Identifies presence and frequency of physical and psychological domestic violence within the couple relationship.	In the past year: 0 = "Never", 1 = "1 Time Only", 2.5 = "2-3 Times", 6 = "4-8 Times", 10 = "More Than 8 Times"	12
Caregiver-child relationship			
Parental Acceptance-Rejection Questionnaire (PARQ) [55]	Identifies perception of own parenting behaviors. Contains subscales for warmth/affection, hostility/aggression, rejection, and indifference/neglect.	Likert scale 0-4 based on level of agreement with item	60
Parent-Adolescent Communication Scale [56]	Evaluates quality of communication between parent and child based on both positive and negative-valence items.	Likert scale 0-4 based on level of agreement with item	24
New items	Identifies participant perception of parenting behaviors.	Likert scale 0-4 based on level of agreement with item	29

Individual mental health			
General Health Questionnaire – 12- and 28-item scales (GHQ-28) [57, 58]	Screens for common minor psychiatric disorders. Contains 4 subscales: somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression.	Likert scale 0-3 based on frequency of symptom, thought, or feeling	28
Patient Health Questionnaire – 9-item scale (PHQ-9) [59]	Screens for presence and severity of depression as a module of the Primary Care Evaluation of Mental Disorders (PRIME-MD) instrument.	Likert scale 0-3 based on frequency of symptom, thought, or feeling	9
New items	Evaluates factors related to adult psychological/emotional health	Likert scale 0-3 based on frequency of symptom, thought, or feeling	8
Religiosity			
New items	Evaluates factors related to intrinsic and extrinsic religiosity.	Numeric rating 1 through 10 based on level of agreement with item	9

Prior to the current study, extensive formative work led to the selection and development of items included in the survey. Domains covered in the survey were identified during initial qualitative research in 2013. Kenyan mental health professionals and para-professionals as well as parents and adolescents participated in focus group discussions that aimed to identify primary domains related to family functioning. Using the results of the qualitative research, domains and specific characteristics of the family-level relationships and individual mental health were matched to the above seven existing scales that had been validated for use in other settings. Survey items were then selected from these scales. When the qualitative findings yielded important areas that were not reflected in existing measures, new, culturally-valid items were developed and added to the survey where needed. These scales are summarized in Table 1.

Each item was translated into Kiswahili and back-translated into English. Each item also underwent a cognitive interview process completed by a minimum of three participants, who were not otherwise involved in the study, to ensure comprehensibility

and acceptability in the setting. During the cognitive interviews, which were conducted in Kiswahili, participants were asked to respond to the question using the answer choices provided, and to identify why they chose their answers as well as whether the question was understandable and appropriate within the cultural setting. Appendix A contains a sample form used during the cognitive interview process for an item.

2.3.2 Semi-structured interview

All participants in the study participated in a semi-structured interview lasting approximately 1.5 hours. The goal of the interview was to get a full picture of influences on family functioning that are important in the Kenyan cultural context. Because each participant in the study participated in an individual interview, multiple members of the family contributed their perspectives to these domains of functioning, enabling a detailed level of analysis for each domain. Domains covered in the interview were decided upon during the same qualitative research in 2013 that led to the development and selection of the survey items.

Based on the domains that were identified as culturally important, the Global Assessment of Relational Functioning (GARF) Scale, based on the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), was found to correlate well with the key concepts that emerged from the qualitative research, and served as a model on which the semi-structured interview format was based [60]. The purpose of the GARF is to assess the relational context, or the family functioning, of an individual in

order to assist in evaluation of individual mental health problems [60]. The GARF assesses three primary dimensions (subdomains) relevant to overall family functioning: structure/organization, emotional climate, and joint problem solving [60]. To score the GARF overall family functioning domain, a numeric score is assigned to each family, taking any value from 0-100 and corresponding to one of five levels of functioning: 0-20 (Most Dysfunctional), 21-40 (Critically Dysfunctional), 41-60 (Somewhat Dysfunctional), 61-80 (Somewhat Functional), and 81-100 (Most Functional) [60]. For the purposes of this study, categorical ratings based on the above levels of functioning were also assigned to each subdomain, in order to facilitate scoring the overall domain that encompassed the subdomains [60].

The interview guide, used by the interviewing team during data collection, was developed to accompany the interview manual and to be used during the interview itself; it contained broad questions for each domain and subdomain, and suggested open-ended probes based on each question's content. Appendix B contains a sample interview guide used for this study.

A manual for the interview was developed to model the interview on the GARF structure and scoring system, as well as to expand the interview material to include additional aspects of family functioning, including couple functioning and caregiver-

child dyadic relationships. The interview ultimately included seven domains each with respective subdomains, summarized in Table 2. Definitions of domains and subdomains were adapted to fit the cultural context using findings from the qualitative research process. Additionally, domains for individual mental health of each participant were added to the interview to allow for information to be captured in this area. Instead of being scored on a 0-100 scale, each subdomain of individual mental health was scored from 1 (severe problems) to 4 (no problems). The manual contained both definitions and indicators of all interview domains and subdomains, and was used for training of the interviewers and raters in addition to its use as a reference during scoring.

Table 2: Outline of semi-structured interview domains and subdomains.

A. Family functioning (GARF domains)
Structure, organization, roles, boundaries/alliances/ hierarchies
Emotional climate
Problem solving and conflict resolution
B. Couple relationship
Communication
Conflict resolution
Co-parenting
Emotional closeness
C. Male caregiver-child relationship
Communication and time together
Emotional closeness
Discipline
Consistency of effort to provide for needs and promote safety
D. Female caregiver-child relationship
Communication and time together
Emotional closeness
Discipline
Consistency of effort to provide for needs and promote safety
E. Male caregiver individual mental health
Emotional health
Behavioral health
Daily functioning
F. Female caregiver individual mental health
Emotional health
Behavioral health
Daily functioning
G. Child individual mental health
Emotional health
Behavioral health
Daily functioning

2.4 Analysis: Data management, preparation, and scoring

2.4.1 Survey

Results of the enrollment and validity surveys were uploaded to a secure online server. The data were downloaded from the server and were merged and analyzed using Stata SE statistical software (version 14.2) [61]. Items with opposite valence to the majority of their subscale were reverse scored. Missing data were examined and determined to be missing at random for all caregivers in the sample. Mean scores for each scale were generated to account for data missing at random.

2.4.2 Semi-structured interview

The procedure of using the semi-structured interview information to assign the ratings described above was a rigorous, multi-step process involving multiple raters, outlined as follows:

1. **Transcription.** The Kiswahili audio recordings of all interviews were directly transcribed into written English by a member of the Kenyan research team.

2. **Individual ratings.** Both US and Kenyan raters reviewed the transcripts and interviewer's notes for each family member. The Kenyan raters also listened to the interview audio recording. Members of both teams then used the structured manual to rate the family and individual family members on multiple domains and subdomains (Table 2). The scoring system for each domain and subdomain was based on the structure of the GARF as described above. Mirroring the GARF scoring system,

interview scoring was implemented using the five rating levels described in Section 2.3.2. Overall domains (family functioning, couple functioning, and caregiver-child relationship) were rated numerically from 0-100 based on the rating levels, and each subdomain was rated categorically, according to the same levels, to facilitate overall domain scoring. Each individual mental health domain was rated on a scale from 1, indicating severe problems, to 4, indicating no problems. Appendix C contains a summarized ratings sheet that was completed by each individual rater for each family.

3. **Consensus ratings.** Each of the US and Kenyan teams decided upon consensus scores and category ratings for every domain and subdomain. The US and Kenyan teams met during conference calls to discuss the teams' consensus ratings and to decide final domain and subdomain consensus scores for each family. Detailed notes were taken to document the decision-making process, with particular attention to culture- and context-related factors that led to different initial ratings from the US vs. Kenyan rating teams.

2.4.3 Determination of mental health case status

Mental health case status for each participant in the study was determined based on the final consensus ratings of the individual emotional health scores from the interviews. Emotional health scores were chosen as the determinant of mental health case status as they most closely mirrored the constructs reflected in the mental health assessment items included in the survey. Sample probes reflecting emotional health that

were included in the interview guide to be asked by the interviewer included the following:

- "Please tell me about your mood and whether you feel a lot of stress or sadness, or whether you think too much or have other bad feelings."
- "What are your concerns?"
- "Please tell me how you feel and what you do when you have these problems."
- "How often? How severe? When did they start?"
- "How has this affected your life or health?"

As described above, emotional health was rated on a scale from 1 to 4 for each participant, with a 1 representing severe negative emotional symptoms and a 4 representing excellent mental health with no negative emotional symptoms. For the purposes of this study, participants rated as a 1 or a 2 on the 4-point scale for emotional health were designated mental health "cases," and participants rated as a 3 or a 4 were designated mental health "non-cases." This created a binary mental health variable by which to compare other ratings and scores included in this study.

2.4.4 Qualitative data coding

Qualitative data from the interviews was analyzed to examine how participants described the associations between family relationships and mental health. First, the verbatim transcripts from all interviews were coded in NVivo analysis software (version 11.4.0) [62]. A deductive coding process was used, as the codebook was developed based on the interview subdomains (Table 2). Using this codebook, two raters coded the same

interviews until 80% inter-rater agreement was reached, and then divided the remaining interviews for coding.

2.5 Analysis: Study aims

2.5.1 Aim 1: Validation of individual mental health survey items

One of the goals of this study was to compare the scores on mental health survey items to the binary mental health case status derived from the interview process, in order to determine which survey items best discriminated between individuals with and without emotional problems. The purpose of the validation procedure is to ultimately pare down the number of individual mental health items in the survey to develop a smaller set of core items that are best for screening and monitoring mental health status in the setting.

The validation of the mental health survey items was completed using a scoring method similar to that used by Rothberg to develop the General Health Questionnaire [57]. All 48 individual mental health items in the survey, including those adapted from the General Health Questionnaire and Patient Health Questionnaire as well as newly-developed items, were scored on a 4-point Likert-type response scale from 0 (low frequency of symptom) to 3 (high frequency of symptom) [57, 59]. Of all items, 39 had a negative valence; the remaining 8 items, all of which were adapted from the General Health Questionnaire, had a positive valence and were therefore reverse scored to align with the majority of the individual mental health items.

For each item, the proportions of both cases and non-cases endorsing the item with a 2 or 3 were calculated. The proportion of non-cases endorsing the item was then subtracted from the proportion of cases endorsing the item to create a gradient score; this procedure was followed for every item and yielded a continuous gradient score variable. A higher gradient score value indicated better discrimination between mental health cases and non-cases; a negative gradient score indicated that a higher proportion of non-cases than cases endorsed the item.

For example, if 8 out of 10 mental health cases endorsed Item A and only 2 out of 10 non-cases endorsed item A, the gradient score would be 0.6. Likewise, if 4 out of 10 cases endorsed Item B and 3 out of 10 non-cases endorsed item B, its gradient score would be 0.1. Therefore, Item A would be considered superior to item B in terms of its ability to discriminate between individuals with and without emotional problems.

Items with a gradient score of less than 0.05 were considered to be invalid, as a gradient score this low indicated that the item showed negligible or no discrimination between mental health cases and non-cases. In addition, endorsement of a symptom by more than 25% of non-cases also invalidated the item, as this would suggest that the item did not represent the theoretical mental health construct that distinguishes individuals with mental health problems from those without mental health problems.

2.5.2 Aim 2: Identification of relationships between family-level factors and caregiver mental health

Both quantitative and qualitative data were used to identify ways in which family-level influences were related to caregiver mental health. To do this, the mental health cases were compared with non-cases across all of the data obtained on family functioning. These data included two sources of quantitative data—survey scores and numerical ratings from the interviews—as well as qualitative data from the interview transcripts. The following steps were taken for comparison of mental health cases and non-cases:

1. **Survey scores.** Mean scores and standard deviations of all survey scales were calculated separately for mental health cases and non-cases.

2. **Semi-structured interview ratings.** Mean scores and standard deviations of interview domain and subdomain ratings were calculated separately for mental health cases and non-cases. For categorical subdomain ratings, a score corresponding to the midpoint of the appropriate numerical range was assigned to each subdomain; for example, a family rated Somewhat Dysfunctional for the Problem Solving subdomain was assigned a score of 50, in the middle of the subdomain range of 41-60.

3. **Effect size calculations.** A Cohen's d statistic was calculated to compare means of mental health cases and non-cases on all numerical scores derived from both the survey scores and interview ratings [63]. The Cohen's d statistic effect size value cutoffs are generally considered to be $d < 0.2$ for no appreciable effect size, $0.2 \leq d < 0.5$ for a

small effect size, $0.5 \leq d < 0.8$ for a medium effect size, and $d \geq 0.8$ for a large effect size [63].

4. Qualitative Data Analysis. Queries were designed to facilitate identification of patterns in the data where caregivers described connections between the family functioning domains and impacts on their individual mental health. The domains and subdomains from the interview manual were all implemented as individual codes during the coding process. To examine intersection of family-level influences and individual mental health, codes for emotional health were identified that overlapped with codes for family functioning domains and subdomains such as couple conflict and joint problem-solving. Themes arising from the data that occurred frequently in mental health cases, mental health non-cases, both groups, or neither group were noted. In addition, areas of concordance and discordance between the findings of the quantitative and qualitative data were considered; for example, themes found to be salient in the quantitative data but that were not present in the qualitative data were identified.

3. Results

3.1 Description of the sample

Table 3 contains a summary of the demographics and characteristics of the participants in the sample (n = 33).

Table 3: Characteristics of study participants.

Characteristics	Male (n = 13)	Female (n = 20)
Mean age, in years (SD*)	45.7 (9.0)	33.5 (6.6)
Married (n, [%])	13 (100.0%)	13 (65.0%)
Mean weekly household income, in Kenyan shillings (SD†*)	1950.00 (1725.48)**	1521.05 (1493.53)***
Mean household size (SD*)	6.5 (2.1)	5.9 (2.1)
Biological parent of target child (n, [%])	11 (84.6%)	19 (95.0%)
Emotional health cases as determined by interview (n, [%])	3 (23.1%)	11 (55.0%)

† 1 KES = 0.0097 USD at the time of writing
* SD = standard deviation
** Sample size reduced by 1 to n = 12 due to missing data
*** Sample size reduced by 1 to n = 19 due to missing data

3.2 Validation of mental health survey items

A total of 48 candidate survey items were included in the gradient scoring validation procedure. Figure 1 illustrates the gradient score outcomes by survey mental health variable. Table 4 contains the items that met the validation criteria for inclusion: a gradient score above 0.05, and mental health non-case endorsement lower than 25%. Table 5 contains items that did not meet the inclusion criteria, either having a gradient score equal to or less than 0.05 or a non-case endorsement proportion equal to or greater than 25%.

In total, 28 mental health survey items were found to meet validation inclusion criteria. Gradient scores ranged from 0.538 to -0.211; the average gradient score across all items was 0.276, with a standard deviation of 0.179. The full scales or subscales whose items all fit the validity criteria included all nine items derived from the PHQ-9 questionnaire, as well as all seven items derived from one subscale of the GHQ questionnaire—the "D" subscale designed to measure severe depressive symptomology. Both the PHQ-9 scale and the GHQ-D subscale are specifically intended to measure presence of depressive symptoms in the population [57, 59]. In addition to the items adapted from these two scales, 7 additional adapted items from the other three GHQ subscales were found to discriminate between mental health cases and non-cases in the sample. It should be noted that some of the items from the GHQ or PHQ measures were adapted quite significantly while retaining their original meaning. For example, one of the best performing items in the sample, with a gradient score of 0.538, was an adapted item from the somatic symptomology subscale of the GHQ: "Over the past few weeks, do you feel like your head has been pressed like a chapati?" Finally, 5 newly-developed items reflecting individual mental health constructs in the setting were also found to discriminate between mental health case status groups.

Five out of the six items with gradient scores below the cutoff of 0.05 were from the social dysfunction subscale of the GHQ, with an additional item from the 12-item version of the GHQ. Each of the bottom six items had a positive valence, meaning that

participants were requested to answer a positively worded question, with the anticipated response of high mental health non-case endorsement and low case endorsement. The gradient scoring data show that these six low-scoring items were unsuccessful in discriminating between mental health cases and mental health non-cases, suggesting that negative-valence wording better discriminates between case status groups in the setting. In fact, the gradient scores for these items were either very low, indicating essentially no discrimination between mental health cases and non-cases, or the gradient scores had negative values, indicating a reversal of the anticipated direction of responses to the theoretical construct of mental health problems.

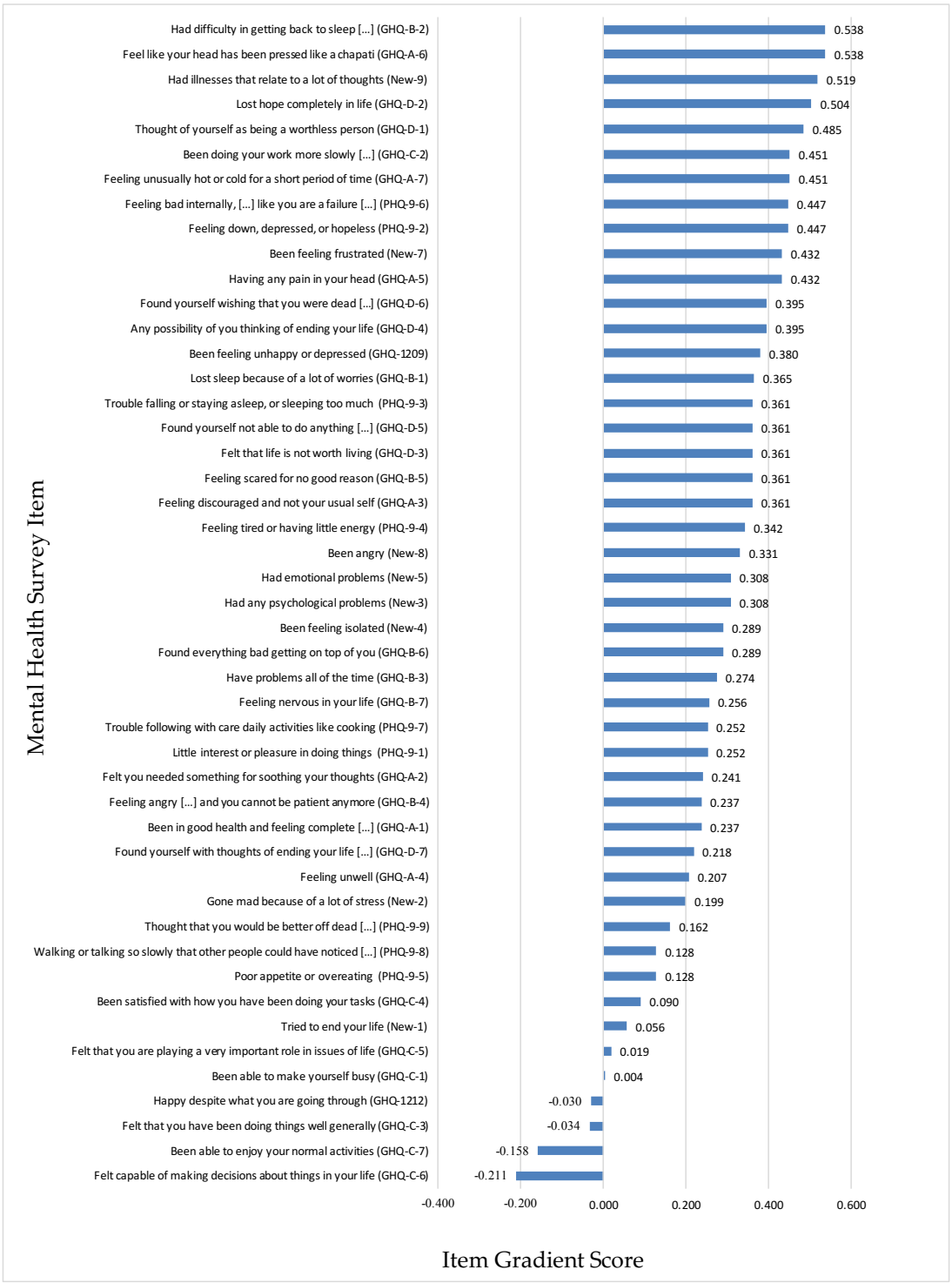

Figure 1: Mental health survey items by gradient score based on mental health case status (n = 33).

Table 4: Mental health survey items meeting validation criteria[a].

Item	English translation	Case endorsemt. proportion	Non-case endorsemt. proportion	Item gradient score
GHQ-A-6	Over the past few weeks, do you feel like your head has been pressed like a chapati?	0.643	0.105	0.538
GHQ-B-2	Over the past few weeks have you had difficulty in getting back to sleep once the sleep is interrupted?	0.643	0.105	0.538
New-9	Over the past few weeks, have you had illnesses that relate to a lot of thoughts?	0.571	0.053	0.519
GHQ-D-2	Over the past few weeks have you felt that you have lost hope completely in life?	0.714	0.211	0.504
GHQ-D-1	Over the past few weeks have you thought of yourself as being a worthless person?	0.643	0.158	0.485
PHQ-9-2	Feeling down, depressed, or hopeless	0.500	0.053	0.447
PHQ-9-6	Feeling bad internally, feeling like you are a failure or that you have let yourself or your family down	0.500	0.053	0.447
GHQ-A-5	Over the past few weeks have you been having any pain in your head?	0.643	0.211	0.432
New-7	Over the past few weeks have you been feeling frustrated?	0.643	0.211	0.432
GHQ-D-4	Over the past few weeks was there any possibility of you thinking of ending your life?	0.500	0.105	0.395
GHQ-D-6	Over the past few weeks have you found yourself wishing that you were dead and be away from issues of your life?	0.500	0.105	0.395
GHQ-A-3	Over the past few weeks, have you been feeling discouraged and not your usual self?	0.571	0.211	0.361
PHQ-9-5	Over the past few weeks have you been feeling scared for no good reason?	0.571	0.211	0.361
GHQ-D-3	Over the past few weeks have you felt that life is not worth living?	0.571	0.211	0.361
GHQ-D-5	Over the past few weeks have you found yourself not able to do anything because you were overwhelmed by nervousness in your life?	0.571	0.211	0.361
PHQ-9-3	Trouble falling or staying asleep, or sleeping too much	0.571	0.211	0.361
PHQ-9-4	Feeling tired or having little energy	0.500	0.158	0.342
GHQ-B-6	Over the past few weeks have you found everything bad getting on top of you?	0.500	0.211	0.289
New-4	Over the past few weeks, have you been feeling isolated?	0.500	0.211	0.289
PHQ-9-1	Little interest or pleasure in doing things	0.357	0.105	0.252
PHQ-9-7	Trouble following with care daily activities like cooking	0.357	0.105	0.252
GHQ-D-7	Over the past few weeks have you found yourself with thoughts of ending your life from time to time?	0.429	0.211	0.218
New-2	Over the past few weeks, have you gone mad because of a lot of stress?	0.357	0.158	0.199
PHQ-9-9	Thought that you would be better off dead or of hurting yourself in some way	0.214	0.053	0.162
PHQ-9-5	Poor appetite or overeating	0.286	0.158	0.128
PHQ-9-8	Walking or talking so slowly that other people could have noticed. Or the opposite – moving a lot so that you have been walking more than usual?	0.286	0.158	0.128
GHQ-C-4	Over the past few weeks, have you been satisfied with how you have been doing your tasks?	0.143	0.053	0.090
New-1	Over the past few weeks, have you tried to end your life?	0.214	0.158	0.056

[a] Gradient score > 0.05 and mental health non-case endorsement proportion of < 25%.

Table 5: Excluded mental health survey items, based on gradient scoring procedure.

Item	English translation	Case endorsemt. proportion	Non-case endorsemt. proportion	Item gradient score	Reason for exclusion
GHQ-A-7	Over the past few weeks, have you been feeling unusually hot or cold for a short period of time?	0.714	0.263	0.451	Non-case endorsement >25%
GHQ-C-2	Over the past few weeks, have you been doing your work more slowly than how you are supposed to do?	0.714	0.263	0.451	Non-case endorsement >25%
GHQ-12-9	Over the past few weeks have you been feeling unhappy or depressed?	0.643	0.263	0.380	Non-case endorsement >25%
GHQ-B-1	Over the past few weeks have you lost sleep because of a lot of worries?	0.786	0.421	0.365	Non-case endorsement >25%
New-8	Over the past few weeks, have you been angry?	0.857	0.526	0.331	Non-case endorsement >25%
New-3	Over the past few weeks have you had any psychological problems?	0.571	0.263	0.308	Non-case endorsement >25%
New-5	Over the past few weeks have you had emotional problems?	0.571	0.263	0.308	Non-case endorsement >25%
GHQ-B-3	Over the past few weeks, do you feel like you have problems all of the time?	0.643	0.368	0.274	Non-case endorsement >25%
GHQ-B-7	Over the past few weeks have you been feeling nervous in your life?	0.571	0.316	0.256	Non-case endorsement >25%
GHQ-A-2	Over the past few weeks, have you felt you needed something for soothing your thoughts?	0.714	0.474	0.241	Non-case endorsement >25%
GHQ-A-1	Over the past few weeks have you been in good health and feeling complete (totally without anything wrong with you)?	0.500	0.263	0.237	Non-case endorsement >25%
GHQ-B-4	Over the past few weeks, have you been feeling angry (have temper or annoyed) and you cannot be patient anymore?	0.500	0.263	0.237	Non-case endorsement >25%
GHQ-A-4	Over the past few weeks have you been feeling unwell?	0.786	0.579	0.207	Non-case endorsement >25%
GHQ-C-5	Over the past few weeks have you felt that you are playing a very important role in issues of life?	0.071	0.053	0.019	Gradient score <0.05
GHQ-C-1	Over the past few weeks, have you been able to make yourself busy?	0.214	0.211	0.004	Gradient score <0.05
GHQ-12-12	Over the past few weeks, in general have you been happy despite what you are going through?	0.286	0.316	-0.030	Gradient score <0.05
GHQ-C-3	Over the past few weeks have you felt that you have been doing things well generally?	0.071	0.105	-0.034	Gradient score <0.05
GHQ-C-7	Over the past few weeks have you been able to enjoy your normal activities?	0.000	0.158	-0.158	Gradient score <0.05
GHQ-C-6	Over the past few weeks have you felt capable of making decisions about things in your life?	0.000	0.211	-0.211	Gradient score <0.05

3.3 Identification of caregiver mental health predictors

3.3.1 Family functioning

Quantitative results. Survey scores and interview ratings related to the domain of family functioning were compared by mental health case status. Interview mean scores, ranging from 0-100, were generated using the ratings from the interview family functioning domain as well as the individual subdomains: structure/organization/roles, emotional climate, and problem solving. Survey mean scores for family functioning items were generated and broken down by both positive-valence and negative-valence items; refer to Table 1 on page 13 for survey scoring information.

Mean scores and standard deviations are presented in Table 6. Across the interview ratings for family functioning, the mental health non-cases showed mean scores above 78, reflecting scores within the Most Functional range (81-100) or at the very top of the Somewhat Functional range (61-80). In contrast, family functioning interview mean scores for mental health cases fell within the range of 50-60, at the top of the Somewhat Dysfunctional range. Survey mean scores emerged as consistent with the interview scoring; mental health non-cases had higher mean scores for positive family functioning items and lower mean scores for negative family functioning items than did the mental health cases. Mental health non-cases also scored higher on the overall new family functioning items than did the mental health cases, which was anticipated due to a high score on the overall scale representing high family functioning.

Cohen's *d* effect size statistics were generated to compare means of mental health cases and non-cases on interview ratings and survey scores to evaluate the magnitude of the observed differences. This provides an indication of the size of the association of each family functioning domain or subdomain with mental health case status. Results are also summarized in Table 6. Effect sizes were found to be large for all measures of family functioning, reflecting that family functioning was better across domains among individuals without emotional problems than among those with emotional problems. Directionality of effect sizes were as anticipated; positive effect sizes reflected higher overall scores for mental health non-cases across all measures, except for the expected negative effect size value for negative-valence family functioning items. The data included in these calculations is summarized by individual in Appendix D.

Table 6: Mean scores and standard deviations of family functioning variables by case status (n = 33).

Variable	Non-cases (n = 19)	Cases (n = 14)	Effect size
Interview rating mean scores (SD)			
Family functioning domain	83.53 (18.82)	53.93 (18.53)	1.58
Structure/organization/roles subdomain	79.47 (20.41)	54.29 (16.04)	1.35
Emotional climate subdomain	80.53 (18.10)	50.00 (20.75)	1.59
Problem solving subdomain	82.63 (17.90)	55.71 (21.38)	1.38
Survey mean scores (SD)			
New family functioning items: all	8.14 (0.70)	6.29 (1.56)	1.62
New family functioning items: positive valence	7.92 (0.77)	5.89 (1.80)	1.56
New family functioning items: negative valence	2.32 (0.88)	3.74 (1.40)	-1.26

Qualitative results. Qualitative analysis of interview transcripts was conducted to identify ways in which aspects of family functioning such as structure, roles,

emotional climate, and joint problem solving are perceived to influence individual mental health of caregivers. The findings of this analysis supported the link between mental health outcomes of caregivers and aspects of the family environment, as suggested by the quantitative data. In particular, individuals experiencing emotional problems (mental health cases) described significant family-level problems resulting from dissatisfaction with division of roles and responsibilities within the family. This dissatisfaction was frequently connected to ways in which family members did or did not provide for family needs. Referring to division of household responsibilities, one caregiver reported a heavy sense of burden caused by the many duties she was expected to perform in the family and the related lack of felt support:

> "It reaches a point where I feel overwhelmed now that they leave all the things to me, I feel not comfortable in my heart." (Female, case, 30 years old)

Another caregiver reported a lack of unity in her family as a source of stress and emotional isolation from other family members when faced with a problem:

> "I don't know even what to say there because our family, everyone is always in their own way. Everyone is different. […] When you have a problem, it's you alone and your problem." (Female, case, 28 years old)

Many individuals without mental health problems also reported that concern over their role in providing for the family affects their individual emotional health. However, these individuals described both intrinsic coping mechanisms, such as daily personal planning and goal-setting, as well as extrinsic coping strategies, such as reliance on family and other support structures. These coping strategies seemed to

prevent the individual's negative mental health outcomes from escalating and persisting. Regarding the pressure of responsibilities for provision in the household, a caregiver described how she handled these pressures through problem-solving:

> "You must think about it because if you don't think about it, there is nothing you will do. I must sit down and think how I will do it so that I succeed. It must be in the thoughts." (Female, non-case, 37 years old)

Alternatively, some caregivers without emotional problems reported that their positive family environment served as a buffer between stresses of life outside the home and individual mental health. One caregiver mentioned that spending quality time with his family protects against stress:

> "In the evening I come home and be together with the family and stress reduces a little bit. When you go and walk outside there, you will be over stressed." (Male, non-case, 54 years old)

Another caregiver said that fulfillment of his responsibility to provide for his family and its impact on overall family functioning positively affected his mental health:

> "My biggest role is to see the way they will eat and survive […] after seeing all that, even if I walk in town, I am so happy because back at home all is well." (Male, non-case, 63 years old)

3.3.2 Couple relationship

Quantitative results. Survey scores and interview ratings related to the domain of couple functioning were compared by mental health case status. Interview mean scores, ranging from 0-100, were generated using the ratings from the interview couple functioning domain as well as the individual subdomains: communication and problem

solving, conflict resolution, co-parenting, and emotional closeness. Mean scores for survey measures of overall couple relationship, couple conflict resolution, and joint parenting were also generated; refer to Table 1 on page 13 for survey scoring information on each measure.

Mean scores and standard deviations are presented in Table 7. Across the couple functioning domain and subdomains of the interview, the mental health non-cases had mean scores between 70 and 80, reflecting scores within the higher end of the Somewhat Functional range (61-80). In contrast, couple functioning interview mean scores for mental health cases fell within the range of high 30s to just above 40, reflecting scores at the higher end of the Critically Dysfunctional range (21-40) or at the very lowest end of the Somewhat Dysfunctional range (41-60). Survey mean scores for overall couple functioning were also consistent with the interview scores; mental health non-cases had higher mean scores for satisfaction and cohesion with their partner, as well as on the positive-valence newly-developed couple functioning items. Mental health cases scored higher on negative-valence newly-developed couple functioning items, consistent with the theoretical construct of poor overall couple functioning.

Couple conflict resolution survey scores for both mental health cases and non-cases were overall at the lower end of the possible range. This implies generally low endorsement of negative conflict resolution tactics by both individuals with and without

emotional problems, despite some substantial differences in scores between mental health case status groups as evidenced by the varied effect sizes.

Survey mean scores for the joint parenting items showed some differences between mental health case status groups as well; however, the items on these scales were relatively highly endorsed, with mean scores at the middle to higher end of the possible range. This suggests that joint parenting survey items were endorsed relatively frequently by individuals with and without emotional problems.

Cohen's *d* effect sizes related to couple relationship domains are also summarized in Table 7. Effect sizes were large for the vast majority of couple functioning measures and in the expected directions. That is, across domains of couples functioning, individuals without emotional problems had scores indicative of better couple relationship functioning than individuals with emotional problems.

The two exceptions to differences showing large effects were in self-reported couples violence and joint parenting survey items. Couple conflict items adapted from the Conflict Tactics Scale also had a large effect size for reporting partner use of violent conflict tactics, but only a small effect size for self-report of violent conflict tactics. This suggests that partner use of violent conflict tactics is more frequently reported by individuals with emotional problems than for those without emotional problems, and also that partner use of violent conflict tactics is more frequently endorsed in general than own use of these tactics. Newly-developed survey items reflecting the same conflict

tactics construct had small effect sizes in the sample, indicating only small differences of mean scores for these couple conflict items between individuals with and without emotional problems.

Items adapted from the validated joint parenting measure (Parenting Alliance Measure) showed a medium effect size between mental health cases and non-cases, suggesting that individuals without emotional problems reported somewhat higher levels of joint parenting strategies with their partner than individuals with emotional problems. Culturally-specific new joint parenting items had a very small effect size, indicating a lack of appreciable difference between mental health case status groups in reporting of joint parenting using these items.

Complete couple functioning data are summarized by individual in Appendix E, with Appendices F and G respectively containing the couple conflict resolution and joint parenting data.

Table 7: Mean scores and standard deviations of couple functioning variables by case status (n = 26).

Variable	Married non-cases (n = 15)	Married cases (n = 11)	Effect size
Interview rating mean scores (SD)			
Couple functioning domain	78.53 (29.27)	39.73 (23.14)	1.50
Communication/time together subdomain	72.67 (30.11)	37.27 (22.40)	1.36
Conflict resolution subdomain	76.67 (28.95)	37.27 (22.40)	1.55
Co-parenting subdomain	75.33 (27.24)	40.91 (27.37)	1.30
Emotional closeness subdomain	74.00 (28.49)	37.27 (22.40)	1.46
Survey: couple relationship mean scores (SD)			
DAS dyadic satisfaction items*	4.00 (1.10)	2.49 (1.17)	1.33
DAS dyadic cohesion items*	3.95 (1.22)	2.20 (1.44)	1.32
New couple relationship items: all	4.13 (0.59)	2.67 (0.96)	1.94

New couple relationship items: positive valence	4.01 (0.87)	2.41 (1.43)	1.41
New couple relationship items: negative valence	0.81 (0.55)	2.09 (1.06)	-1.60
Survey: couple conflict resolution mean scores (SD)			
CTS frequency of violent acts: all*	1.86 (0.89)	2.80 (1.49)	-0.80
CTS frequency of violent acts: self*	2.00 (0.89)	2.59 (1.70)	-0.46
CTS frequency of violent acts: partner*	1.73 (1.16)	3.02 (1.64)	-0.93
New marital conflict items: all	0.67 (1.82)	1.60 (2.08)	-0.48
New marital conflict items: self	0.41 (1.59)	1.11 (2.48)	-0.35
New marital conflict items: partner	0.93 (2.35)	2.08 (2.85)	-0.45
Survey: couple co-parenting mean scores (SD)			
PAM items*	3.13 (0.65)	2.60 (0.77)	0.76
New joint parenting items	2.91 (0.72)	2.73 (0.98)	0.22

* DAS = Dyadic Adjustment Scale [52], CTS = Conflict Tactics Scale [54], PAM = Parenting Alliance Measure [53]

Qualitative results. A search of the qualitative data was performed to identify ways in which aspects of couple relationship such as communication, conflict resolution, joint parenting, and emotional closeness influence individual mental health of caregivers. Areas of overlap between codes for the couple relationship domain and its respective subdomains and codes for individual emotional health were identified and searched for themes common to the identified quotations. Most of the caregivers who discussed the connection between couple relationship factors and mental health were individuals experiencing emotional problems; those without emotional problems tended not to mention positive or negative influences of couple relationship factors on their mental health. Related, there was no evidence in the qualitative data of positive couple relationship aspects, such as positive conflict tactics, linked to positive individual mental health outcomes.

Among individuals with emotional problems, couple conflict resolution emerged as a salient influence on mental health, including both the use of violence and conflict related to lack of fulfillment of roles, particularly related to needs of the family. When the effect of conflict resolution on emotional health was reported, it was primarily with reference to the female caregiver's emotional health, and frequently referenced the effect on emotional health of the male caregiver's violent conflict tactics. One caregiver reported being frequently disturbed by her husband's ongoing verbal abuse:

> "Everyday it [is] just abusive language that doesn't have meaning, he scares me and I don't have peace, and I am a mother[.] I can't leave my children to wander." (Female, case, 32 years old)

Another caregiver mentioned that conflict resolution was poor between her and her husband, who habitually beat her when they argued with each other:

> "Even now if I start [to quarrel] he can beat me […] I am the one who bows low and I do have self-control." (Female, case, 28 years old)

Consistent with low self-reported violence in the survey, no participants mentioned their own violent conflict tactics during the interview. Despite the lack of self-report, conflict resolution still emerged as a salient subdomain that negatively affects individual mental health due to reporting on partner use of violence.

The large effect size of the co-parenting interview scores implies that co-parenting is also a salient domain affecting individual mental health in the sample, a finding which is supported in the qualitative data. The primary theme that emerged in the interviews was fulfillment of caregiving roles for the child; specifically,

dissatisfaction with a partner's fulfillment of parenting duties was an important commonality. One caregiver commented on her husband's lack of contribution to parenting their children and his negative presence in the family relationships. When asked what she would like to change in her marital relationship, she responded:

> "I would like…if my husband can change, if he can be responsible at home and he should not make us feel sad most of the time." (Female, case, 28 years old)

Another caregiver mentioned her distress over lack of provision for her children's needs, and that her husband's anger was incited when he was told about these needs, implying a lack of joint parenting in terms of role fulfillment:

> "Because when we meet in the evening you will find that child is saying he want[s] a pen, sometimes he saw a child with something at school like a book, he wants that one too […] In that situation, you are stranded on what to do. The father then comes up with his own anger instead of looking into how [these children's] demands can be contained […] he starts talking badly, he just talks […] I lack peace." (Female, case, 28 years old)

3.3.3 Caregiver-child dyadic relationship

Quantitative results. Survey scores and interview ratings related to the caregiver-child relationship domain were compared by mental health case status. Interview mean scores, ranging from 0-100, were generated using the ratings from the interview caregiver-child domain as well as the individual subdomains: communication and time together, emotional closeness, discipline strategies, and consistency of effort to provide for needs and promote safety. Mean scores from adapted caregiver-child

relationship items as well as newly-developed caregiver-child relationship items were generated; refer to Table 1 on page 13 for survey scoring information.

Mean scores and standard deviations are presented in Table 8. Across the interview caregiver-child relationship domain and subdomains, the mental health non-cases showed mean scores either at the very top of the Somewhat Functional range (61-80) or at the very bottom of the Most Functional range (81-100). Caregiver-child relationship interview mean scores for mental health cases fell largely within the top half of the Somewhat Functional range (71-80). Relatively low endorsement was seen across both mental health case status groups for negative caregiver-child relationship aspects, including hostility, indifference, and rejection items from the Parental Acceptance-Rejection Questionnaire (PARQ) measure as well as the newly-developed items with negative valences; slightly higher scores for these negative subscales were found in individuals with emotional problems than in individuals without emotional problems. For positive relationship aspects found in survey mean scores, including the PARQ warmth subscale as well as new positive-valence items, a moderate amount of endorsement was seen in both mental health case status groups. Individuals without emotional problems had somewhat higher survey mean scores for these positive relationship aspects. Mean scores for parent-child communication survey items were identical between mental health case status groups.

Cohen's *d* effect size statistics are also summarized in Table 8. Negative effect size values for negative-valence caregiver-child relationship scales were anticipated due to reverse scoring of these items; this included the adapted subscales for hostility, indifference, and rejection, as well as the new, culturally-adapted items with negative valences.

The medium interview score effect size for overall caregiver-child relationship suggests that caregiver-child relationship functioning is moderately better in individuals without emotional problems than in individuals with emotional problems. The interview subdomain scores for communication, emotional closeness, and discipline all had small effect sizes, indicating little difference in these areas between individuals with and without emotional problems; the subdomain for consistency of effort to provide showed no appreciable difference between mental health case status groups.

Effect sizes for survey items adapted from the Parental Acceptance-Rejection Questionnaire showed variable results. The rejection subscale showed a large negative effect size, suggesting that parental rejection of their children was more commonly reported by individuals with emotional problems than individuals without emotional problems. With medium effect sizes, the warmth and hostility subscales moderately discriminated between individuals with and without emotional problems. Finally, the indifference subscale had a small effect size, suggesting that parental indifference toward the child was not significantly related with presence of caregiver emotional

problems. For new caregiver-child relationship items, both positive- and negative-valence items showed medium effect sizes, corroborating the influence of overall caregiver-child relationship on individual mental health seen in the interview scores. Items adapted from the Parent-Adolescent Communication Scale showed no appreciable effect size, suggesting no difference in parent-child communication between individuals with and without emotional problems.

Caregiver-child relationship data are summarized by individual in Appendix H.

Table 8: Mean scores and standard deviations of caregiver-child relationship variables by case status (n = 33).

Variable	Non-cases (n = 19)	Cases (n = 14)	Effect size
Interview rating mean scores (SD)			
Caregiver-child relationship domain	83.68 (24.31)	71.62 (22.49)	0.51
Caregiver-child relationship: communication/time together subdomain	81.58 (22.43)	71.54 (25.12)	0.43
Caregiver-child relationship: emotional closeness subdomain	81.58 (22.43)	71.43 (25.12)	0.43
Caregiver-child relationship: discipline strategies subdomain	78.42 (26.09)	70.00 (23.09)	0.34
Caregiver-child relationship: consistency of effort subdomain	81.58 (25.22)	77.69 (17.39)	0.17
Survey: caregiver-child relationship mean scores (SD)			
PARQ warmth items	2.58 (0.24)	2.41 (0.34)	0.62
PARQ hostility items	0.53 (0.42)	0.78 (0.53)	-0.54
PARQ indifference/neglect items	0.32 (0.28)	0.47 (0.34)	-0.48
PARQ rejection items	0.53 (0.35)	0.89 (0.54)	-0.82
New caregiver-child relationship items: positive valence	2.71 (0.26)	2.51 (0.29)	0.73
New caregiver-child relationship items: negative valence	0.57 (0.27)	0.99 (0.83)	-0.74
Survey: caregiver-child communication mean score (SD)			
PACS items	1.86 (0.21)	1.86 (0.22)	0.01

Qualitative results. An analysis of qualitative data was performed to identify influences of aspects of the caregiver-child relationship on individual mental health,

searching for areas of overlap between codes for the caregiver-child relationship domain and subdomains and codes for individual emotional health and then identifying common themes in the relevant quotations. Findings were consistent with the relatively low effect sizes seen in the survey responses. There was relatively little detailed information from the interview data regarding association between this dyadic relationship and caregiver mental health outcomes. The strongest theme in the interviews was individual stress stemming from perception of ability to provide for children's needs. Despite only small appreciable differences between individuals with and without emotional problems in terms of reporting on this topic, concern regarding provision was highly endorsed during interviews by many participants. Out of 15 interviews in which participants linked their relationship with their child to their mental health, 13 suggested that this link was largely a result of the caregiver's perception of how well they could provide for the child's needs. One caregiver expressed his distress over his inability to pay the children's school fees:

> "Sometimes I get frustrated from the other tenants in the plot when I can't even afford my children['s] school fee but I am still young […] yes, if I can get a way that children can go to school without problems of school [fees] I can be really happy." (Male, case, 28 years old)

Another caregiver commented on her children's reaction to her financial circumstances as being particularly troubling to her:

> "It is hard because when I come back to home, children start crying for me expecting that I have brought them something good […] sometimes you find out

> that children are sick, and I just realize that it is hard […] it is really hard for my life." (Female, case, 28 years old)

One caregiver noted that her ability to function well in her role as a parent in the household positively affected her mental health. When asked why she felt good about her parenting, she mentioned:

> "I feel [good] because I feel that it is my home I am making and I am preparing a good life for my children." (Female, non-case, 40 years old)

Two participants also noted links between emotional closeness with a child and individual mental health outcomes. One caregiver observed that her husband's rejection of the child had become a stressor in her life:

> "So sometimes we have problems with this child, the father looks at her as if he doesn't want her around […] So when this child misbehaves, it is my responsibility not his, to make sure that the child behaves […] so it makes me to be hard, because I don't want someone to keep bothering my child as if my parents are dead […] so it makes me to struggle." (Female, case, 28 years old)

The other caregiver reported her own emotional closeness and time together with the child as positively associated with her mental health:

> "If she sees me thinking, she tells me that we should open a certain book. I love her because she encourages me even when we don't have anything or have it." (Female, non-case, 40 years old)

With the exception of this caregiver, no other participant in the sample linked their perception of their communication quality with their child as being associated with their own mental health; this supports the findings from the quantitative data.

3.3.4 Religiosity

Quantitative results. Mean survey scores for the nine locally-developed items related to the caregiver's religiosity were compared by mental health case status; refer to Table 1 on page 13 for survey scoring information. Mean scores and standard deviations are presented in Table 9. Mean scores for both mental health case status groups were relatively high according to the range of the scale, and individuals without emotional problems reported slightly higher scores on average than individuals with emotional problems. This is consistent with the Cohen's *d* effect size statistic value of 0.61 (Table 9). The effect size is on the lower end of the medium effect size convention, which suggests that level of religiosity may be somewhat associated with presence of emotional problems. Religiosity data are summarized by individual in Appendix I.

Table 9: Mean score and standard deviation of religiosity variable by case status (n = 32*).

Variable	Non-cases (n = 19)	Cases (n = 13*)	Effect size
Survey mean score (SD)			
New religiosity items	8.46 (0.84)	7.85 (1.19)	0.61

* Sample size reduced from total by 1; one caregiver screened out of part of the survey due to suicidality referral

Qualitative results. Interview data were analyzed to identify ways in which religiosity influences individual mental health outcomes. Areas of overlap between codes for religiosity and codes for individual emotional health were identified, and these quotations were searched for common themes arising from the overlap of the two codes.

The relatively high religiosity scores for both mental health cases and non-cases supported findings from the qualitative data, as all participants reported religious activity or religious faith at least once during their interviews. Participants frequently referenced importance of religious faith, prayer, or religious network support in their lives, and no participants described any negative impact of religiosity on their mental health or lives in general. In line with the moderate effect size, only individuals without emotional problems, and none with emotional problems, reported reliance on God or on their religious communities as having a positive effect on their mental health, implying a difference in use of religiosity between mental health case status groups. One caregiver mentioned her faith in God as helping her resolve problems in her life:

> "When there is a problem, me personally, it reaches sometime that I have to let go, and trust in God […] so I rely on God and He shows me the way." (Female, non-case, 52 years old)

Another caregiver reported that the social support and encouragement provided to her by a religious group acted as a buffer against negative mental health outcomes:

> "I think about [problems] but I pray. I pray and love going to meetings like seminars and I ask questions and they normally say that I should not think too much about it. God gave me the children and helped to educate them and God will help them to get employed. When I attend the seminars, I feel that the thoughts are over." (Female, non-case, 40 years old)

A caregiver also reported that faith in God and participation in church were not only beneficial in terms of his own emotional health, but also increased family unity:

> "What we love doing together is going to church…we love God so much…He protects us, he keeps us safe…and he keeps our family together…church is

> something very good…because when I had an issue with the mother or with my child, then the pastor prays for me or the preachings I am going to get will touch me and I will have to release what I had in my heart." (Male, non-case, 42 years old)

Despite no participants with emotional problems linking reliance on God or on religious communities with positive mental health outcomes, some more generally related their ability to cope with family-level stressors back to their faith. One caregiver said that he was grateful to God because of his perceived emotional peace:

> "I thank God because I have peace also and the peace of mind although challenges are there but peace is important." (Male, case, 48 years old)

Another caregiver stated that she resigned her severe life stresses to God as a way of coping with them:

> "My life is really painful, I just leave my life to God." (Female, case, 32 years old)

4. Discussion

4.1 Aim 1: Validation of mental health survey items

In this study, we aimed to identify a subset of items from a much larger item set that would discriminate between individuals with mental health problems and individuals without mental health problems in the Kenyan context. We identified mental health cases and non-cases by creating a binary mental health variable based on the emotional health rating from the semi-structured interview, then compared endorsement of each individual mental health survey item between the mental health case status groups. Results of the gradient scoring process yielded a 28-item subset of the original 48 that had gradient scores above 0.05 and mental health non-case endorsement less than 25%. These items included all 9 adapted items of the Patient Health Questionnaire 9-item scale (PHQ-9), all 7 adapted items of the General Health Questionnaire (GHQ) subscale measuring depressive symptoms, 7 additional adapted items from other GHQ subscales, and 5 new items developed for the local context.

First, consistent with previous findings, the 9 items adapted from the PHQ-9 scale were all found to discriminate between participants with and without mental health problems based on gradient scores and rates of mental health non-case endorsement. This is consistent with multiple studies that have been performed to validate the PHQ-9 for identifying depression in sub-Saharan Africa, including Kenya [19, 64-66]. Although the PHQ-9 has been shown to adequately identify depression in

multiple sub-Saharan African subpopulations, validation studies vary with respect to rigor of the choice of gold standard diagnosis as well as to the method of adaptation of the items. One study specifically mentioned that a lack of qualitative data informing adaptation of the measure was a limitation to their findings [66], while others contained little to no detail on adaptation of the measure outside of translation and back-translation [19, 64, 65]. In addition, all 7 items of the GHQ subscale for depressive symptomology as well as 7 items from other subscales were found to discriminate between individuals with and without mental health problems in the study. Though fewer studies to date have validated the GHQ scales than the PHQ-9 scale in sub-Saharan Africa, previous literature has shown moderate success of the GHQ in predicting mental health problems in the setting [67-70]. Similar to the PHQ-9 literature, little cultural adaptation information is given in the studies outside of the translation and back-translation process.

The adaptation process used for measures in this study improved on the process of establishing measure validity in the setting: In addition to the translation and back-translation process found in much of the validation literature of the GHQ and PHQ-9, this study included a significant qualitative research component to ensure salience of included aspects of mental health in the setting, and also included a rigorous cognitive interviewing process for each item, which ensured acceptability and comprehensibility in the Kenyan context. This allowed for the inclusion of items that had cultural relevance

while retaining the meaning of the underlying construct. For example, one of the best-performing items in the validation procedure came from the GHQ somatic symptomology subscale and adapted in the study to refer to a common Kenyan flatbread staple: "Over the past few weeks, do you feel like your head has been pressed like a chapati?" This item exemplifies the way in which this study uniquely contextualized the items to maximize comprehensibility in the setting.

Five out of the eight new, culturally-developed survey items were also found to discriminate between individuals with and without emotional problems. These items addressed isolation, frustration, and reactions to stress; for example, one of these five items asked, "Over the past few weeks have you been feeling frustrated?" These survey items were developed based on the qualitative research process to address salient areas that were not specifically covered in items from the adapted GHQ and PHQ-9 measures.

Ultimately, survey items shown to discriminate between individuals with and without mental health problems included items from adapted measures as well as newly-developed items. This suggests that integration of culturally-adapted measures with established measures may improve measurement of mental health in the setting, and could be preferable to exclusive use of previously validated measures [71].

The subsets of individual mental health survey items that were not found to be valid in the sample according to the gradient scoring procedure had commonalities consistent with existing measure adaptation and validation literature [9, 11, 72]. First, all

six of the items with gradient scores below the 0.05 cutoff had positive valences, meaning that the questions were phrased in a positive manner to the participant (e.g. "Over the past few weeks, have you been able to enjoy your normal activities?"). Four of these worst-performing six items were endorsed by a higher proportion of non-cases than cases, implying that valence of the item may have influenced the answer choices of participants in the sample. The other two items had very low positive gradient scores of 0.019 and 0.004, meaning that there was almost no difference in endorsement of these items between individuals with and without emotional problems. It should also be noted that, while negative in value, the magnitude of the gradient scores of two of the positive-valence items was > 0.05, indicating that these items numerically distinguished between mental health cases and mental health non-cases, though in the opposite direction from what was theoretically anticipated. However, these items did not show content equivalence with the original GHQ items; the expected outcome of these items was that they would be more highly endorsed by mental health non-cases than by mental health cases. Given that content equivalence is also a criterion for determination of item validity in the setting, these items were not considered valid for the purposes of the study [8, 9].

Despite the fact that each item passed through three cognitive interviews before inclusion in the survey, the performance of positive-valence items in the sample showed that positive valence of the question frequently reversed the anticipated responses of

individuals with and without emotional problems in the sample. This finding counters the expected item performance determined by the cognitive interviewing process, though it should be noted that questions were asked in isolation during cognitive interviewing instead of being combined with other survey items; it is therefore possible that positive- and negative-valence item combination within the survey may have resulted in some opposite-direction answers from participants due to confusion, leading to the negative gradient scores. However, the pattern of positive-valence items with negative gradient scores also corroborates findings of previous research in mental health measure validation, which have shown that phrasing and structure of questions can affect comprehension and ultimately affect answer patterns of respondents, especially when culturally adapting a measure [9, 11]. Specifically, one previous study conducted in Ghana to test multiple measures of postnatal common mental disorders showed that some positively-worded items were found not to discriminate between cases and non-cases, suggesting that valence of the question may affect an item's ability to discriminate between individuals with and without mental health problems in the setting [72].

Additionally, some of the items that were not found to discriminate between mental health case status groups were highly endorsed by both individuals with and without emotional problems; these items were excluded due to their high endorsement by mental health non-cases, i.e. individuals without emotional problems. While the items' ability to discriminate between groups was poor, these items likely reflect a

generally high level of stress in the setting, which causes overall high endorsement of items with stems such as the following: "Over the past few weeks have you lost sleep because of a lot of worries?". These items therefore may not have differentiated between common stress due to life circumstances and clinically significant symptoms associated with these stressors in the setting; however, the items that were validated according to the procedure would have been able to differentiate between these two areas by informing on clinically significant symptoms of stress in the population.

4.2 Aim 2: Relationships between family-level factors and caregiver mental health

The second aim of this study was to examine the ways in which caregivers' family functioning and relationships may be associated with their mental health, either positively or negatively. Though there was a small sample size, three data sources were triangulated to gain as full a picture as possible of the family environments of participants: scores from adapted and new survey measures, family functioning and relationship ratings based on interview data, and qualitative data from each participant's interview transcripts.

Overall family functioning and couple functioning domains across both survey and interview scores were found to be strongly associated with caregiver mental health outcomes according to the large effect sizes. This is consistent with Bronfenbrenner's ecological systems theory, which posits that an immediate environment, or microsystem, surrounding an individual affects the individual's growth and functioning [27]. By

breaking down the overall findings for family functioning and couples functioning, we see patterns related to the multiple aspects of these relationships that drive these overall associations. Families of individuals without emotional problems, compared to those of individuals with emotional problems, were found to have more consistent structure and delegation of responsibilities, a more positive emotional climate in the home, and more structured and successful problem-solving strategies as a family unit. The qualitative data particularly emphasized that level of satisfaction with organization of roles and responsibilities in the home differentiated between those with and without emotional problems. Individuals with emotional problems far more frequently mentioned dissatisfaction with either their own ability to provide for family needs, which was related to their perceived relationship with their children, or with their partner's participation in provision for the family's needs.

At the couple level, some interesting patterns emerged in terms of which subdomains, or specific aspects of couple relationships, emerged as most strongly related to mental health across the different types of measures. Couple conflict resolution was shown across measures to be a salient influence on individual mental health, despite low endorsement of personal use of violence during conflict resolution in both the quantitative and qualitative data. However, findings also showed more willingness to report on abusive partner behavior in a conflict situation within the

couple relationship, corroborating the findings of the importance of conflict resolution tactics to individual mental health.

Previous studies have shown that 39% of ever-married Kenyan women and 9% of ever-married Kenyan men have experienced physical or sexual violence perpetrated by a spouse within their lifetimes; however, the low self-report is not surprising given the sensitive nature of the data and the relative unacceptability of intimate partner violence (IPV) in Kenyan culture, which may lead to a lack of willingness to disclose [25, 73]. In addition, previous research has shown that perceived privacy and safety of the individual in the data collection setting may reduce willingness to disclose sensitive and/or socially unacceptable issues such as marital violence, although every effort was made to provide a secluded data collection location for all participants in the study [73-75]. Overall, the likelihood of self-report on any violent conflict tactics within the couple relationship should be considered in future research on family and couple functioning, particularly in terms of whether questions are asked about own use or partner use of violent conflict tactics.

Themes across data types also led to the emergence of co-parenting as a factor influencing individual mental health outcomes. In particular, the qualitative data showed that a pragmatic theme of working together as parents to meet the needs of children in the family was central to the construct of co-parenting, with much more infrequent mentions of other elements of joint parenting such as showing warmth

toward the children. During interviews, participants frequently mentioned satisfaction or dissatisfaction with the extent to which they and their partner jointly cared for their children. Despite a medium effect size for survey items adapted from the Parenting Alliance Measure and no appreciable effect size for newly-adapted joint parenting survey items, caregivers freely commented on their perceptions of parenting alliance during the interviews, which may imply that open-ended questioning in the semi-structured interview format better captures information on perceptions of joint parenting in the setting than could be captured in the multiple-choice survey response format. This is consistent with previous literature in sub-Saharan Africa showing that method of capturing information can affect the extent to which individuals feel comfortable discussing certain topics [74]. This has implications for future mental health research, in which mixed-methods approaches similar to this study's approach could be considered in order to best capture influences on an individual's mental health and to ensure that sensitive topics can be included.

Religiosity was also examined as a factor that may influence mental health, as previous studies show that at least 95% of Kenyans have some religious affiliation, and relevant literature has frequently suggested that religiosity in sub-Saharan Africa has a generally positive effect on coping with life stressors in the setting [25, 76-78]. Survey mean scores indicated high overall religiosity in individuals with and without emotional problems, suggesting a baseline level of intrinsic and/or extrinsic religiosity consistent

with the literature. The medium effect size indicated a moderate amount of differentiation with respect to religiosity between individuals with and without mental health problems, which may have been due to the overall high levels of religiosity in the setting. The effect size was also corroborated by the qualitative data; in the interviews, only individuals without emotional problems reported positive impact of faith or faith communities on their own mental health. This finding may indicate a difference in ways that individuals with and without emotional problems use religion to cope with emotional health stressors in the Kenyan setting.

Methodologically, this study overall demonstrated ways in which qualitative and quantitative data can be compared and simultaneously analyzed to inform on influences of various family-level factors on individual mental health outcomes of Kenyan caregivers. The study also integrated use of interviews to approximate a gold standard analogous to clinical interviews in high-resource settings. Use of quantitative data from both the survey and interview sources provided a method by which multiple measurements of the same construct could be compared.

At the domain level, the data showed a substantial amount of agreement among sources; effect sizes between case status groups across all family functioning data were large for both survey and interview scores, and overall couple functioning scores showed large effect sizes as well. A significant amount of the qualitative data corroborated these findings, as mental health non-cases tended to report more positive

impacts of these domains on mental health outcomes, whereas non-cases solely reported negative impacts of these domains on their mental health. The areas in which qualitative data implied more of a difference between mental health cases and non-cases than seen in survey scores, e.g. couple co-parenting and couple conflict resolution tactics, suggest that a semi-structured interviewing format may be ideal for collecting information on certain topics in the setting. The results obtained from this study were overall complementary to each other but uniquely informed on certain aspects of the included domains, which suggests that data collection using all three sources of information was a beneficial way of investigating the constructs in this setting.

4.3 Implications for research and practice

This study establishes two critical ways in which mental health research can be performed in a low-resource setting. First, given the lack of availability of mental health professionals in many countries including Kenya, development of screening tools that can be administered by trained volunteers or mental health paraprofessionals is crucial to understanding the burden of mental illness in these settings, providing a promising strategy that would allow for identification and referral of individuals with mental health problems to ultimately receive the care they need [1, 3, 7]. The approach taken in this study demonstrates the utility of a validation method by which items are selected based on their ability to discriminate between individuals with and without emotional problems, assessed through a modified clinical interview approach. The results of this

study showed that the PHQ-9 and the severe depression subscale of the GHQ successfully discriminated between mental health case status groups, suggesting particular utility of these measures of depressive symptomology to screen for mental health problems in the setting. The results also suggested that incorporation of culturally-developed measures into mental health screening in the setting may provide an advantage over reliance on previously validated or adapted measures.

Secondly, determination of mental health case status in this study was undertaken in a setting lacking mental health clinicians, and therefore relied upon diagnosis of mental health case status using a comprehensive interview rating system with multiple raters with expertise in the field. Previous authors have utilized modified gold standard approaches to identify presence of mental illness in multiple populations, with some studies using local informants to determine presence of mental illness [20, 23]. This study adds a rigorous interview rating process to this approach in order to determine mental health case status of each participant, capitalizing on expertise of both the US and Kenya teams. This study suggests that similar strategies, utilizing both local and academic perspectives to inform choice of gold standard, can be used to determine mental health status of members of populations in low-resource settings.

Additionally, this study shows the relevance of family-level factors to individual mental health outcomes of caregivers in the setting. Mental health interventions worldwide are typically administered at either an individual level or a community level

[79-81]. However, the results of this study provide a compelling case for the utility of family therapy and family-level interventions in mental health research and practice. The strong associations of family functioning and couple functioning on individual mental health outcomes of the caregivers provide justification for the importance of strengthening the family and couple units in addition to providing mental health counseling at an individual level, consistent with ecological systems theory of individual development [27]. Interventions targeting caregiver outcomes have also been shown to have a ripple effect on family-level outcomes [32, 48]. This suggests that interventions based on factors associated with caregiver mental health affect individuals other than the caregivers themselves, increasing overall family functioning and well-being of all family members.

4.4 Study strengths and limitations

This study had multiple strengths that contributed to its results. One of its primary areas of strength was the multiple measures involved in analysis of both mental health and predictors of mental health in the sample. By triangulating survey quantitative data, interview ratings, and interview qualitative data, detailed investigation and analysis of the contribution of various domains to individual mental health was facilitated. In this study, multiple information sources contributed to an understanding of the association of each construct with individual mental health outcomes, thereby strengthening all findings from the study. The rigorous interview

rating process provided an exemplary method of mental health case determination in a setting frequently lacking clinical expertise, and resulted in a culturally-valid method of mental health diagnosis in the absence of a mental health professional. Each participant in the study contributed a substantial amount of time and data to the study, with multiple reporters from each family adding to the comprehensiveness of the measures; in particular, the semi-structured interview used multiple reporters in order to generate accurate family functioning and mental health ratings for each family. Each measure therefore facilitated high-quality comparisons among participants and ultimately between mental health case status groups for the purposes of this study.

Some limitations of the study included the small sample size, which limited possible inferences of quantitative analysis despite otherwise strengthening findings by facilitating collection of multiple data sources for each participant. Use of a cross-sectional design for data collection also meant that causality between family-level domains and mental health outcomes could not be inferred in the sample. In addition, the self-report format of the majority of the survey and interview introduced the potential for social desirability bias into participant responses, although this was reduced by various measures designed to support responses for one construct. Finally, although each survey item used in the study individually underwent cognitive interviewing and the mental health items were evaluated for criterion validity, the survey items for the family-level variables do not yet have established criterion validity.

4.5 Implications for further research

This study demonstrated the importance of using both adapted and locally-developed items in assessing mental health in a population, as well as examining family functioning domains in the study of mental health. Larger studies in this subject area promise to add to the field by facilitating more extensive quantitative validation of mental health screening measures in the setting. An increased sample size would also allow for more rigorous statistical testing that could further explore the relationships found in this study. For example, related studies of the same family functioning constructs could be conducted to identify predictors of individual mental health in the setting and could investigate more complex relationships between family-level influences and mental health.

Future studies in the area could also explore ways in which gender moderates associations between family-level predictors and individual mental health outcomes. Additionally, future research could consider how social desirability bias factors into responses given during both quantitative and qualitative data collection. Given the low self-report of marital violence in the sample, researchers should consider whether solely accounting for partner report, as opposed to self-report, may be a more effective way of capturing information on sensitive topics such as intimate partner violence in the setting.

5. Conclusion

Given the increasing burden of mental illness worldwide, there is an urgent need for research in both screening measures for mental health as well as methodology to identify influences on individual mental health in cultural contexts; this is especially the case in countries such as Kenya that lack mental health professionals and resources [1]. This study highlights ways to address both needs in the Kenyan setting. The findings of this study suggest utility of both adapted and locally-developed mental health screening items and suggest that integration of both types of items into future mental health instruments can provide a more complete picture of how mental health is experienced and expressed locally. This process of validation is crucial, as items found to be locally valid can be used by lay mental health workers as screening instruments in settings lacking mental health professionals to provide clinical diagnoses. In addition, findings showed strong evidence across all data sources of associations between family functioning and couple functioning with individual mental health, suggesting that an understanding of the roles played by these factors in individual mental health should be considered important when developing future mental health interventions and treatment. Given the increasing burden of mental and substance use disorders in Kenya and worldwide, future culturally-sensitive research in individual mental health and the

influence of contextually-important factors such as family functioning will be necessary to meaningfully address mental health issues in policy and practice.

Appendix A

Sample cognitive interviewing sheet used for development of survey items

<table>
<tr><td colspan="2">ITEM:</td></tr>
<tr><td colspan="2">Original English Item:</td></tr>
<tr><td colspan="2">Swahili Translation V1:</td></tr>
<tr><td>1. Why did you say (ANSWER)?</td><td>2. Are the words used understandable?</td></tr>
<tr><td>3. Will people be able to answer honestly?</td><td>4. Are the answer choices meaningful?</td></tr>
<tr><td>5. Is it culturally appropriate?</td><td>6. Does this question relate to the larger issue of family functioning?</td></tr>
<tr><td colspan="2">7. If someone says they feel or behave this way, what do they do?</td></tr>
<tr><td colspan="2">Checking:
1. ☐ If “x” write new Swahili Translation 5. ☐
2. ☐ If “x” write new Swahili Translation 6. ☐
3. ☐ If “x” write new Swahili Translation 7. ☐
4. ☐ If “x” write new Swahili Translation</td></tr>
<tr><td colspan="2">Swahili Translation V2:</td></tr>
<tr><td colspan="2">English V2:</td></tr>
<tr><td colspan="2">Notes on new version (was it good? Why or why not?)</td></tr>
</table>

Appendix B

CAREGIVER COVER SHEET

Household ID (from field card):

Participant ID (from field card):

Relationship to Target Child (e.g., mother, father, grandmother):

Interviewer Name: _____

Interview Date: _____

Time Started: _____

Time Ended: _____

Recorder Number: _____

Caregiver Interview

Interviewer Comments

Elezea Madhumuni: Ningependa kujifunza kuhusu jinsi familia yako inahusiana na kila mmoja na jinsi wewe huhisi kuhusu vitu katika familia yako.

Introduce Purpose: I would like to learn about how your family interacts with each other and how you feel about things in your family.

Review the Household Roster (on field card)

Hebu tupitie hii karatasi nyingine (kadi ya uwanja) ili nijue nani yuko kwa familia yako. (Soma kwa sauti pamoja haraka)

Let us review this other paper (field card) so that I can know who is in your family.

Read the field card out loud together and have the participant confirm the details for each person in the family. If there are any inconsistencies, STOP and consult your supervisor immediately. If all details are correct, please sign the box on the field card that corresponds to you (the interviewer) and the participant (either mom or dad). Here is an example:

	Enumerator	**Interviewer**	Obs. Activity Administrator
Caregiver 1		SIGN HERE	
Caregiver 2		SIGN HERE	
Target Child			

Mtoto ambaye tutaongea kuhusu ni _____[jina la mtoto].
The child we will be talking about is _____ [child's name].

KWA MAHOJIANO ILIYOBAKIA, IKIWA MSHIRIKI ATAONGEA KUHUSU MTOTO MWINGINE KWA FAMILIA, TAFADHALI REJEA KWAO UKITUMIA HERUFI YA KWANZA YA JINA.

FOR THE REMAINDER OF THE INTERVIEW, IF THE PARTICIPANT TALKS ABOUT ANOTHER CHILD IN THE FAMILY, PLEASE REFER TO THEM BY THEIR INITIALS.

1. Kawaida Ya Familia/ Majukumu na Uwajibikaji.
Family Routines / Roles and Responsibilities.

Interviewer Comments

Ningependa kujua kuhusu kawaida ya familia na yale mnayofanya pamoja.

a. Ni nini kwa ujumla ni kawaida yako ya kila siku, kwako wewe mwenyewe na watu wengine wa familia yako?
b. Je ni mambo gani mnayofanya kwa Pamoja kama familia kila siku (kwa mfano wakati wa kula)? Ni nani katika familia anahusika?
c. Je, ni mambo gani mnayofanya kwa Pamoja kama familia nje ya nyumbani (kwa mfano kwenda kanisa au kuhudhuria sherehe)? Ni mara ngapi? Ni nani katika familia anhusika?

ikiwa kuna mtu wa familia abaye ni mara nyingi hayupo, jua ni mara ngapi hayuko
If there is a member who is often absent, find out how often they are gone.

I would like to know about your family's routines and what you do together.

a. What is your general daily routine, for yourself and the other members of your family?
b. What are things that the family does together daily (e.g., meal times)? Who is involved in the family?
c. What are other things away from home that your family does together (For example going to church or attending a celebration)? How often? Who is involved in the family?

2. Kutosheka na Majukumu na Uwajibikaji.

Satisfaction with Roles and Responsibilities.

Interviewer Comments

Umeniambia kila kitu ambacho mtu kwa familia yako hufanya. Ningependa kujua zaidi kuhusu majukumu na uwajibikaji katika familia yako.

A. Wewe unahisi jinsi gani kuhusu vile majukumu imegawanywa katika familia yako (kwa watu wazima na watoto)?

B. Tafadhali nieleze sababu unahisi (e.g., kukasirika, furaha, huzuni)

Uliza Zaidi;

a. Tafadhali eleza ikiwa wewe, mke/mume wako na watoto wako mnafanya kazi nzuri au mbaya kwa kutimiza wajibu wenu kwa familia.
b. Ni shida gani unapata kwa sababu ya watu kutotimiza wajibu wao?
c. Ni nani kiongozi wa familia yenu? Je, anatimiza wajibu wake vyema? (Uliza Zaidi upate mifano)
d. MABADILIKO: Ni nini ungependa iwe tofauti kuhusu wajibu na majukumu?

You have told me what each person in your family does. I want to know more about roles and responsibilities in your family.

A. How do you feel about the way responsibilities are divided in your family (both adults and children)?

B. Please tell me the reasons you feel (e.g., angry, happy, sad)

Probes:

a. Please explain whether you, your spouse, and your children are doing a good job or bad job filling your roles in the family.
b. What problems do you have when people do notfulfilling their responsibilities?
c. Who is the leader in your family? Is he/she fulfilling their roles well?(probe for examples)
d. CHANGE: What do you wish was different about the roles/responsibilities?

3. Hisia za Karibu za Familia na Umoja.
Family Emotional Closeness and Unity.

Interviewer Comments

Yafuatayo ningependa kujua jinsi familia yako inahisi kuhusu kila mmoja. Fikiria kuhusu kila mtu katika nyumbani uhusiana na watu wazima na watoto.

a. Ni hisia za karibu/ upendo kiasi gani iko katika familia yako? *(Uliza Zaidi upate mifano- hebu tueleze baadhi ya vitu ambavyo vinaonyesha kiasi cha upendo/ hisia za karibu kwa familia yako.*
b. Ni jinsi gani umoja/pamoja iko katika familia yako? *(Uliza Zaidi upate mifano- hebu tueleze baadhi ya vitu kwa familia yako ambayo inaonyesha kuwa kuna umoja au hakuna.*

Next I would like to know how your family feels about each other. Think about how everyone in the household relates, adults and children.

a. How much emotional closeness/ love is there in your family? *(Probe for examples - can you explain some of the things that shows that there is love/ emotional closeness in your family.*
b. How unified/together is your family? *(Probe for examples – can you explain some of the things that shows that there is unity or not.?*

4. Kufanya Maamuzi/ Utatuzi Wa Matatizo.
Decision Making / Problem-Solving.

Interviewer Comments

Yafuatayo, ningependa kujua kuhusu vile familia yako hufanya uamuzi.

a. **Ni uamuzi gani ambayo familia yako ilifanya hivi karibuni?** (Kwa mfano, wakati unahitajika kuamua jinsi utakavyotumia pesa au kushughulikia jambo mbaya iliyotokea?)
b. Ni jinsi gani familia yako ilifanya uamuzi? Tafadhali nieleze hadithi yote.
- Uliza zaidi (ikiwa inahitajika): Nani alihusika? Ni nini mlisema kwa kila mmoja? Nani alifanya uamuzi wa mwisho?
- Je, ilikuwa njia nzuri au mbaya kufanya uamuzi? Kwa nini?

c. Je, ni kawaida ya familia yako kufanya uamuzi hivyo?
- Ikiwa LA, niambie njia gani familia yako huwa inafanya uamuzi. (Pata mifano)

d. Ni katika hali gani ambayo watoto wako au watu wengine katika familia wanahusishwa kufanya uamuzi au utatuzi wa matatizo? Tafadhali nipe mfano jinsi ambavyo wangehusika.

Next, I would like to know about how your family makes decisions.

a. What is a decision that your family had to make recently? (For example, when you need to decide how to spend money or handle something bad that has happened?)
b. How did your family make that decision? Please tell me the whole story.
- Probes (if needed): Who was involved? What did you say to each other? Who made the final decision?
- Was it a good or bad way to make decision? Why?

c. Is this the normal way your family makes decisions?
- If NO, tell me how your family normally makes decisions. (get example)

d. In what situations are your children or other family members included in decision making or problem-solving? Please give me an example of how they would be involved.

5. Kusuluhisha Migogoro.
Conflict Resolution.

Ningependa kujua jinsi familia yako hushughulikia kutoelewana. Wakati mwingine migogoro ni tu kati ya mume na mke. Wakati mwingine migogoro inahusisha watoto, au vile vile watu wengine katika familia. Nitakuuliza kwanza kuhusu migogoro ambayo inahusisha watu mbalimbali katika nyumba yako – sio tu wewe na mke/ mume wako. Kama umeoa/kuoleka, kisha nitakuuliza kuhusu kutoelewana inayohusisha wewe na mke /mume wako pekee.

I would like to know how your family handles disagreements. Sometimes conflicts are just between a husband and wife. Sometimes conflicts involve the children or other family members as well. I will first ask about conflicts that involve multiple members of your household – not just you and your spouse. If you are married, then I will ask about disagreements involving only you and your spouse.

Interviewer Comments

5A. Migogoro katika familia kwa ujumla.
Broader Family Conflict.

Interviewer Comments

Kwanza, ningependa kujua kuhusu migogoro ambayo inahusisha watu mbalimbali katika nyumba yako – sio tu wewe na mchumba wako.

a. Je, ni mfano gani maalum ya migogoro au kutoelewana ya hivi maajuzi inayohusisha watoto wako na/au watu wengine wa familia? Tafadhali nieleze kwa undani.
    - Uliza Zaidi (ikiwa inahitajika): Nani alihusika? Ni nini mlisema kwa kila mmoja? Ulihisi namna gani?
b. Je hii ni njia ya kawaida ya familia inatenda wakati wa migogoro?
    - Ikiwa LA: niambie jinsi familia kwa kawaida inashughulikia kutoelewana.. (pata mfano)
c. Je, wanafamilia hujiunga dhidi ya wengine? Tafadhali eleza.
d. Je ni nini familia yako hutokubaliana kuhusu mara nyingi?
e. Ni mara ngapi mnakuwa na kutokubaliana na migogoro kwa familia?
f. **Wakati mwingine familia huvurugana wakati wa migogoro. Je, hii inafanyika katika familia yako? Ni mara ngapi?** Ikiwa NDIO, waulize wapeane mifano maalum. (Jua ni aina gani ya vurugu, ni mara ngapi na kali kiwango gani.)

First, I would like to know about conflicts that involve multiple members of your household – not just you and your spouse.

a. What is a specific example of a recent conflict or disagreement involving your children and/or other family members? Please tell me the whole story.
    - Probes (if needed): Who was involved? What did you say to each other? How did you feel?
b. Is this the normal way your family acts during conflict?
    - If NO: tell me how your family normally handles disagreements. (get example)
c. Do family members team up against each other? Please explain.
d. What does your family disagree on most often?
e. How frequently do you have family disagreements or conflicts?
f. **Sometimes families become violent during conflicts. Does this happen in your family? How often?** If YES, ask them to give specific examples. (Find out what type of violence, how often, and how severe.)

5B. Migogoro ya wanandoa.
Couples Conflict.

Interviewer Comments

Wanandoa wote wana kutoelewana; Ningependa kujua jinsi mnavyo-shughulikia migogoro baina yako na mpenzi wako.

a. Unaweza kunipa mfano maalum ya mgogoro au kutoelewana ya hivi karibuni na mke/mume wako? Tafadhali nieleze kwa undani?
   - Uliza Zaidi (ikiwa inahitajika): Ni jambo gani mlijadiliana kuhusu? Alafu…….. Ulihisi namna gani?

b. Je hii ni njia ya kawaida nyinyi wawili kushughulikia kutokubaliana? (pata mfano)
   - Ikiwa LA: niambie jinsi wewe na mchumba wako mnashughulikia kutokubaliana. (Pata mfano)

c. Ni jambo gani inaleta kutoelewana kati yenu wawili mara nyingi?

d. Kutokubaliana au migogoro huwa inafanyika mara ngapi kwa wiki/ mwezi?

e. Wakati mwingine wanandoa huvurugana wakati wa migogoro. Je, hii inafanyika katika uhusiano wenu? Ikiwa NDIO, eleza Zaidi. (Jua ni aina gani ya vurugu, ni mara ngapi na kali kiwango gani.)

f. Je magombano yenu imewahifanyika mbele ya watoto? Ikiwa NDIO, wao hufanya nini?

g. Je, wewe na watoto wako mumewahi zungumza kuhusu magombano mliyokuwa nayo na mke/mume wako? Ikiwa NDIO, nipe mfano ya yale mazungumzo.

All couples have disagreements; I would like to know how you handle conflict between you and your partner.

a. Can you give me a specific example of a recent conflict or disagreement with your spouse? Please tell me in details.
   - Probes (if needed): What did you discuss about? Next……. How did you feel?

b. Is this the normal way you both act during conflict? (Give examples)
   - If NO: tell me how you and your spouse normally handle disagreements. (get example)

c. What is the issue that causes disagreement between the two of you most often?

d. Your disagreements or conflicts happen how frequently in a week or month?

e. Sometimes couples become violent during conflicts. Does this happen in your relationship? If YES, explain more. (Find out what type of violence, how often, and how severe.)

f. Do your quarrels ever happen in front of the children? If YES, how do they react?

g. Do you and your children ever talk about quarrels that you have with your spouse? If YES, give me an example of one of those conversations.

6. Hisia za Karibu za Wanandoa/Umoja.
Couples Emotional Closeness / Unity.

Interviewer Comments

Ningependa kujifunza kuhusu jinsi wewe na mke / mume wako mnahisi kuhusu kila mmoja. Ninaongea kuhusu mambo kama upendo, uaminifu, na jinsi mlio pamoja/umoja mliyo nayo.

a. Je mambo haya yako vipi katika uhusiano wenu?
b. Kwa nini unahisi hivi? Taja baadhi ya vitu ambavyo zinaonyesha kuwa kuna upendo/ umoja/uaminifu au la?
c. Uhusiano wenu kitanda uko vipi?

I would like to learn about how you and your partner feel about each other. I am talking about things like love, trust, and how together/unified you are.

a. How are these things in your relationship?
b. Why do you feel this way? Tell me some things that show whether there is love/unity/trust or not?
c. How is your sexual relationship?

7. Kuidhika na Uhusiano wa Wanandoa.
Overall Couples Relationship.

a. Kwa ujumla, ni nini umuhimu katika sehemu ya uhusiano wenu?
b. Ni nini kibaya katika sehemu ya uhusiano wenu?
c. MABADILIKO: Kwa ujumla, ni nini ungependa iwe tofauti kati ya uhusiano wenu?

a. Overall, what are the positive aspects of your relationship?
b. What are the negative aspects of your relationship?
c. CHANGE: Overall, what would you like to be different between your relationship?

8. Uhusiano wa Mzazi na Mtoto.
Parent-Child Relationships.

Tutajadiliana sasa kuhusu mmoja wa watoto wako uliyemchagua kuhusika katika utafiti huu: Mtoto anaitwa _____. Hiyo ni kweli?

We will now discuss one of your children whom you chose to participate in this research: The child's name is _____. Is that right?

Interviewer Comments

8A. Maelezo ya mtoto.
Child Description

Interviewer Comments

a. Ningependa unieleze kuhusu (jina la mtoto). Unieleze juu ya hisia zake, tabia, na mambo yale anafanya mara kwa mara.
b. Tafadhali unieleze kuhusu hisia za mtoto wako na kama anahisi kusumbuliwa na mawazo mengi au huzuni kama anafikiria sana ama kama anayo hisia zingine mbaya.
    i. Aina ya dalili?
    ii. Ni mara ngapi? Ni uchungu kiwago gani? Ilianza lini?
    iii. Ni Jinsi gani dalili hizi zinaathiri maisha ya mtoto wako?
c. Tafadhali unieleze kuhusu tabia ya mtoto wako kwa ujumla. Fikiria kuhusu tabia ambazo watu wanaweza kufikiria ni tabia "mbaya", kama kupigana, kutumia pombe au madawa ama kuvunja sheria.
    i. Aina ya dalili?
    ii. Ni mara ngapi? Ni uchungu kiwago gani? Ilianza lini?
    iii. Ni Jinsi gani dalili hizi zinaathiri maisha ya mtoto wako?
d. Je mtoto wako yuko vipi kwa mambo ya kawaida maishani, kama kazi ya kila siku, kushirikiana , kufanya vyema kwa shule na kufurahia vitu? (Uliza Zaidi kuhusu sehemu zingine).

a. I'd like you to tell me about (name of child). Tell me briefly about their feelings, behaviour, and what they regularly do.
b. Please tell me about your child's mood and whether they feel a lot of stress or sadness, or whether they think too much or have other bad feelings.
    i. What are your concerns?
    ii. How often? How severe? When did they start?
    iii. How do these symptoms impact the child's life?
c. Please tell me about your child's behaviour overall. Think about behaviours that people may consider "bad" behaviour, like fighting, using alcohol or drugs, or breaking rules or the law.
    i. What are your concerns?
    ii. How often? How severe? When did they start?
    iii. How do these symptoms impact the child's life?
d. How is your child in the normal things in life, like daily work, getting along with other people, performing well in school, and enjoying things? (Probe about the different areas).

8B. Uhusiano wa mtoto na mlezi.
Child/Caregiver Relationship.

Interviewer Comments

Ningependa kukuuliza kuhusu uhusiano kati yako na mtoto wako.

a. Je, wewe unahisi vipi kuhusu huyu mtoto?
b. Ni wakati gani mko pamoja na mtoto wako?
c. Ni mambo gani huwa mnaogea na mtoto wako?
d. Ni lini mara ya mwisho mtoto huyu alikuwa na shida au hasira? ulifanya nini? Nieleze Ni nini kilifanyika. Na baadaye ……..
e. Ni lini mara ya mwisho mtoto huyu alikosa kutii au kuwa msumbufu? Ulimrekebisha vipi? Nieleze Kwa urefu kilichofanyika.
f. Hii ndio huwa njia ya kurekebisha? Ikiwa LA, huwa kwa kawaida humrekebisha vipi?
   Uliza Zaidi kwa maelezo maalum jinsi anavyo rekebisha mtoto na kwa kiasi gani:
   i. Unamrekebisha kivipi?
      i. Ikiwa kimwili: mara ngapi, uchungu kiasi gani, sehemu gani ya mwili?
      ii. Ikiwa matusi: Wewe husema nini?kwa sauti kiasi gani? Kwa muda gani?
   ii. Ni mara ngapi… (uliza zaidi kuhusu mbinu zingine za kurekebisha zinazotumika)
g. Ukimlinganisha mtoto huyu na watoto wengine katika familia, uko karibu kwa uhusiano au sio karibu?

I would like to ask about your relationship between you and your child.

a. How do you feel towards/about this child?
b. When do you spend time with this child?
c. What things do you talk about with your child?
d. When was the last time this child had a problem or was upset? What did you do? Tell me what happened. Next …….
e. When was the last time this child was disobedient / stubborn? How did you discipline him/her? Tell me in details what happened.
f. Is this how you usually discipline him/her? If NO, how do you usually discipline? Probe for specific details on how they enact the discipline and the severity:
   i. How do you do it?
      i. If Physical: How many times, how hard, where on the body?
      ii. If verbal: What do you say? How loudly? How long?
   ii. How often do you…(probe about the different types of discipline they use)
g. Compared with other children in the family, are you closer or less close to this child?

8C. Uhusiano wa mtoto na walezi wengine.
Child's relationship with other caregiver(s).

Interviewer Comments

a. Je, ni jinsi gani mtoto huyu anahusiana na [mlezi] mwingine?
   i. Uhusiano wao ni karibu kiasi gani? Tafadhali nipe mfano kueleza.
   ii. Ni wakati gani wako pamoja? Wanazungumzia nini? Tafadhali nipe mfano kueleza.
   iii. Je mlezi huyu anampenda huyu mtoto kama watoto wengine? Ikiwa ni la, kwa nini?
b. Jinsi gani mlezi mwenzako anamrekebisha mtoto?
   i. Uliza maelezo zaidi jinsi anavyo mrekebisha mtoto na kwa kiasi gani:
      i. Anamrekebisha kivipi? (mara ngapi, uchungu kiasi gani, sehemu gani ya mwili, kelele kiasi gani, na anasema nini?)
      ii. Ni mara ngapi... (hii inaweza kuwa kama mara ngapi kwa wiki badala ya majibu ya jumla; uliza zaidi kuhusu marekebisho tofauti zinazotumika)
      iii. Je kuna njia zingine zinazotumika za kurekebisha?
   ii. Je, huwa wanaadhibu mtoto kwa sababu nzuri au wakati mwingine wanakuwa wakali kwa mtoto bila sababu?

a. How does this child relate to their other [caregiver]?
   i. How close are they? Please give me an example to explain.
   ii. When do they spend time together? What do they talk about? Please give me an example to explain.
   iii. Does that parent like this child as much as the other children? If no, why?
b. How does the child's other parent discipline the child?
   i. Probe for specific details on how they enact the discipline and the severity:
      i. How do they do it? (how many times, how hard, where on the body, how loudly do you shout, what do you say?)
      ii. How often do they…(This should be something like times per week rather than general answers; probe about the different types of discipline they use)
      iii. Are there other ways of discipline used?
   ii. Do they punish the child for good reasons or do they sometimes treat the child harshly for no reason?

8D. Je mtoto huyu anahusiano gani na watoto wenzake au watu wengine nyumbani?
How does this child relate to their siblings or other people in the house?

a. Uliza Zaidi: Kuna mtu yeyote aliye na mgogoro naye? Kuna yeyote anayembagua mtoto huyu? Kuna yeyote anaye mnyanyasa mtoto huyu? **FANYA HII IWE FUPI

a. Probes: Is there anyone they have a lot of conflict with? Does anyone discriminate against this child? Does anyone abuse this child? **KEEP THIS BRIEF

8E. Uzazi wa pamoja (Kuhusiana na majukumu ya wanandoa).
Joint Parenting (related to couples functioning).

a. Je, wewe unafikiria mke/mume wako ni mlezi mzuri? Kwa nini au kwa nini sio? Tafadhali nipe mfano maalum.
b. Je, nyinyi hufanya kazi kwa pamoja jinsi gani kama wazazi? (kujali watoto, kupea watoto nidhamu, kuwa na wakati na watoto)
c. Mnakubaliana na maswala ya uzazi? Tafadhali eleza baadhi ya vitu mnakubaliana au hamkubaliani kuhusu.

a. Do you think your spouse is a good parent? Why or why not? Please give me a specific example.
b. How do you work together as parents? (Caring for children, Disciplining children, Spending time with children)
c. Do you agree on parenting issues? Please explain some examples of things you do or do not agree on.

9. Ukifikiria familia yako kwa ujumla, ni vitu gani ungependa ibadilike?
Thinking about your family overall, what are the things you want change?

Interviewer Comments

10. Hisia za Mlezi/ Afya ya Kitabia.

Caregiver Psychological / Behavioral Health.

Interviewer Comments

Asante kwa kunieleza kuhusu familia na mtoto wako. Ningependa sasa kujua vile wewe unafanya.

10A. Tafadhali unieleze kuhusu hisia zako na iwapo unahisi kusumbuliwa na mawazo mengi ama huzuni kama unafikiria sana ama kama unayo hisia mbaya.

a. Ni nini wasiwasi yako?
b. Tafadhali nieleze jinsi unahisi na unachofanya wakati una shida hizi.
c. Ni mara ngapi? Ni chungu kiwango gani? Ilianza lini?
d. Hii imeathiri vipi ama afya afya yako?

10B. Tafadhali unieleze kuhusu tabia yako kwa ujumla. Fikiria kuhusu tabia ambazo watu wanaweza kufikiria ni tabia "mbaya", kama kupigana, kutumia pombe au madawa ama kuvunja sheria.

a. Ni nini wasiwasi yako?
b. Tafadhali nieleze jinsi unahisi na unachofanya wakati una shida hizi.
c. Ni mara ngapi? Ni chungu kiwango gani? Ilianza lini?
d. Hii imeathiri vipi maisha ama afya yako?

10C. Wakati mwingine shida za hisia, mawazo ama tabia hufanya iwe vingumu mtu kufanya vitu ambavyo anapaswa kufanya kama kawaida kwa maisha yake, kama kazi za kila siku, kushirikiana na watu na kufurahia vitu. Tafadhali niambie jinsi unafikiria unafanya vyema katika sehemu hizi za maisha.

Thank you for telling me about your family and child. I would now like to know how you are doing.

10A. Please tell me about your mood and whether you feel a lot of stress or sadness, or whether you think too much or have other bad feelings.

a. What are your concerns?
b. Please tell me how you feel and what you do when you have these problems.
c. How often? How severe? When did they start?
d. How has this affected your life or health?

10B. Please tell me about your behavior overall. Think about behaviors that people may consider "bad" behavior, like fighting, using alcohol or drugs, or breaking rules or the law.

a. What are your concerns? (Please tell me exactly what the behaviors are.)
b. Please tell me how you feel and what you do when you have these problems.
c. How often? How severe? When did they start?
d. How has this affected your life or health?

10C. Sometimes problems with emotions, thoughts, or behaviours make it more difficult for someone to do the normal things in life, like daily work, getting along with other people, and enjoying things. Please tell me how well you think you are doing in these areas of life.

Observations (REQUIRED)

Interviewer Comments

How did the participant look? (dress, hygiene)

How did the participant seem to feel during the interview? Please explain.

How free did this person seem to you during the interview? Please explain.

What did you observe about the participant's body language?

What did you observe about the participant's tone of voice or other ways of answering the questions?

How did you, as the interviewer, feel during the interview?

Home/Situation Environment
Observations of the situation relevant to your clinical assessment (e.g. the house is messy; people come by to buy home brewed alcohol; etc.).

Services/Referrals

Did you make any referrals for urgent needs for the family? (PLEASE DISCUSS WITH RESEARCH ASSISTANT)

Did the participant ask about any services? Please describe.

Did you talk to the participant about any available services? Please describe.

Appendix C

Semi-Structured Interview Rating Form

Household ID:

Domain			Rating
A	Family Functioning	GARF Score (1-100)	
		Score Description (MF, SF, SD, CD, MD)	
B	Couples Relationship	GARF Score (1-100)	
		Score Description (MF, SF, SD, CD, MD)	
		Presence of Abuse (Yes, No)	
C	Caregiver-Child Relationship (Male Caregiver):	GARF Score (1-100)	
		Score Description (MF, SF, SD, CD, MD)	
		Presence of Abuse (Yes, No)	
D	Caregiver-Child Relationship (Female Caregiver):	GARF Score (1-100)	
		Score Description (MF, SF, SD, CD, MD)	
		Presence of Abuse (Yes, No)	
E	Mental Health: Male Caregiver		
		Emotional Health Rating (1-4)	
		Behavioral Health Rating (1-4)	
		Daily Functioning Rating (1-4)	
		Clinically Sig Problem? (Y/N)	
F	Mental Health: Female Caregiver		
		Emotional Health Rating (1-4)	
		Behavioral Health Rating (1-4)	
		Daily Functioning Rating (1-4)	
		Clinically Sig Problem? (Y/N)	
G	Child Mental Health		
		Emotional Health Rating (1-4)	
		Behavioral Health Rating (1-4)	
		Daily Functioning Rating (1-4)	
		Clinically Sig Problem? (Y/N)	
H	Family Therapy	Need family therapy? (Y/N)	

Appendix D

Table 10: Comparison of family functioning interview and survey scores, by case status (n = 33).

			Interview domain and subdomain scores				Survey average scores		
Household ID	Person ID	Interview mental health case status	Family functioning: overall	Structure, organization, roles	Emotional climate	Problem solving	New family functioning: overall	New family functioning: positive	New family functioning: negative
6076	1	noncase	96	90	90	90	7.73	7.48	2.67
7015	0	noncase	96	90	90	90	8.39	8.11	1.94
7015	1	noncase	96	90	90	90	8.74	8.39	1.39
6076	0	noncase	96	90	90	90	7.77	7.39	2.28
6051	1	noncase	95	90	90	90	8.56	8.32	1.62
6024	1	noncase	94	90	90	90	7.66	8.07	4.33
7010	1	noncase	93	90	90	90	8.16	8.02	2.50
7012	1	noncase	93	90	90	90	8.37	7.82	1.28
7010	0	noncase	93	90	90	90	8.76	8.75	2.22
7012	0	noncase	93	90	90	90	8.85	8.75	1.89
7013	1	noncase	90	90	90	90	8.27	8.07	2.22
6014	1	noncase	90	90	90	90	8.58	8.93	3.28
7013	0	noncase	90	90	90	90	8.44	7.98	1.44
6078	0	noncase	86	90	90	90	8.37	7.91	1.50
7014	1	noncase	78	70	70	90	8.54	8.18	1.53
7014	0	noncase	78	70	70	90	8.35	8.09	2.00
6020	0	noncase	50	50	50	50	7.48	7.18	2.78
7001	0	noncase	45	30	50	50	7.82	7.82	3.17
6019	0	noncase	35	30	30	30	5.77	5.32	4.06
6078	1	case	86	90	90	90	8.65	8.18	1.22
6079	1	case	82	70	90	90	8.15	7.41	1.06
6004	1	case	78	70	70	70	6.30	5.70	3.18
6023	1	case	65	70	50	70	5.57	5.05	4.00
7005	0	case	60	50	50	70	8.42	8.43	2.61
7005	1	case	60	50	50	70	5.58	5.45	5.11
6020	1	case	50	50	50	50	7.60	8.05	4.50
6022	1	case	48	50	50	30	6.74	6.57	3.83
7001	1	case	45	30	50	50	5.77	5.32	4.11
6049	1	case	43	50	30	50	4.90	4.75	5.72
6049	0	case	43	50	30	50	4.73	3.55	3.39
6019	1	case	35	30	30	30	4.03	3.20	4.94
6021	1	case	30	50	30	30	4.21	3.55	5.17

Appendix E

Table 11: Comparison of couple functioning survey and interview scores, by case status (n = 26).

			Interview domain and subdomain scores					Survey average scores				
Household ID	Person ID	Interview mental health case status	Couple relationship: overall	Communication	Conflict resolution	Co -parenting	Emotional closeness	DAS dyadic satisfaction	DAS dyadic cohesion	New couple relationship overall	New couple relationship: positive	New couple relationship: negative
7015	0	noncase	96	90	90	90	90	5.00	5.00	4.73	5.00	0.54
7015	1	noncase	96	90	90	90	90	5.00	5.00	4.69	5.00	0.62
6076	1	noncase	95	90	90	90	90	4.88	5.00	5.00	5.00	0.00
7010	0	noncase	95	90	90	90	90	3.63	3.00	3.62	3.17	1.00
6076	0	noncase	95	90	90	90	90	5.00	5.00	4.81	4.58	0.00
7012	1	noncase	94	90	90	90	90	3.25	5.00	4.04	4.00	1.00
6078	0	noncase	94	90	90	90	90	4.13	3.20	4.42	4.50	0.69
7012	0	noncase	94	90	90	90	90	5.00	5.00	3.92	3.50	0.77
7013	1	noncase	93	90	90	90	90	4.50	3.00	3.73	3.50	1.15
7013	0	noncase	93	90	90	90	90	5.00	5.00	4.27	4.58	1.08
7014	1	noncase	78	70	90	70	70	4.50	3.20	4.31	3.75	0.23
7014	0	noncase	78	70	90	70	70	3.50	4.80	4.50	5.00	0.69
6020	0	noncase	52	30	50	70	50	1.88	3.40	3.27	2.58	1.23
7001	0	noncase	15	10	10	10	10	2.50	2.00	3.38	2.50	0.92
6019	0	noncase	10	10	10	10	10	2.25	1.60	3.19	3.50	2.23
6078	1	case	94	90	90	90	90	3.50	4.40	4.23	4.33	0.92
7005	0	case	52	50	50	50	50	3.75	3.20	3.65	2.33	0.23
6020	1	case	52	30	50	70	50	2.50	3.40	2.46	3.50	3.38
7005	1	case	52	50	50	50	50	2.13	1.20	2.92	2.58	1.85
6022	1	case	40	50	30	50	30	2.38	3.40	2.58	3.25	2.92
6049	1	case	36	30	30	50	30	2.63	1.20	2.62	0.83	0.92
6049	0	case	36	30	30	50	30	3.13	2.20	2.92	3.50	2.69
6021	1	case	25	30	30	10	30	2.13	2.60	2.96	2.92	2.08
6021	0	case	25	30	30	10	30	4.13	2.60	3.04	3.00	1.77
7001	1	case	15	10	10	10	10	1.00	0.00	1.08	0.25	3.15
6019	1	case	10	10	10	10	10	0.13	0.00	0.96	0.00	3.08

Appendix F

Table 12: Comparison of couple conflict resolution survey scores, by case status (n = 26).

Household ID	Person ID	SSI mental health case status	Survey mean scores					
			CTS: household average	CTS: self	CTS: partner	New marital conflict: household average	New marital conflict: self	New marital conflict: partner
7013	1	noncase	0.90	0.95	0.85	0.08	0.00	0.17
7014	1	noncase	1.00	0.75	1.25	0.00	0.00	0.00
7015	1	noncase	1.20	1.20	1.20	0.00	0.00	0.00
6078	0	noncase	1.30	1.60	1.00	0.00	0.00	0.00
6019	0	noncase	1.35	1.70	1.00	0.08	0.00	0.17
6076	0	noncase	1.50	2.00	1.00	0.00	0.00	0.00
7015	0	noncase	1.55	3.00	0.10	0.00	0.00	0.00
7012	0	noncase	1.55	2.00	1.10	0.00	0.00	0.00
7014	0	noncase	1.65	1.70	1.60	0.00	0.00	0.00
6076	1	noncase	2.00	2.00	2.00	0.00	0.00	0.00
7013	0	noncase	2.00	2.00	2.00	0.00	0.00	0.00
7012	1	noncase	2.13	2.00	2.25	0.00	0.00	0.00
7001	0	noncase	2.25	2.25	2.25	0.08	0.00	0.17
7010	0	noncase	3.38	2.35	4.40	3.33	0.00	6.67
6020	0	noncase	4.22	4.50	3.95	6.46	6.17	6.75
6078	1	case	0.65	0.60	0.70	0.00	0.00	0.00
7005	0	case	1.50	1.00	2.00	0.00	0.00	0.00
6021	0	case	1.63	1.00	2.25	0.00	0.00	0.00
6049	0	case	1.63	2.00	1.25	0.21	0.00	0.42
6022	1	case	1.70	2.10	1.30	0.08	0.00	0.17
6021	1	case	2.42	1.85	3.00	0.21	0.00	0.42
6019	1	case	3.47	1.70	5.25	2.67	0.00	5.33
7005	1	case	4.28	4.80	3.75	6.42	6.08	6.75
7001	1	case	4.35	3.25	5.45	3.33	0.00	6.67
6020	1	case	4.40	4.80	4.00	3.08	6.17	0.00
6049	1	case	4.82	5.40	4.25	1.58	0.00	3.17

Appendix G

Table 13: Comparison of joint parenting survey scores, by case status (n = 26).

Household ID	Person ID	Interview mental health case status	Survey mean scores	
			PAM items	New joint parenting items
7015	1	noncase	4.00	3.83
6076	0	noncase	3.80	2.83
7010	0	noncase	3.70	4.00
7014	1	noncase	3.40	2.83
6020	0	noncase	3.35	2.67
7013	1	noncase	3.25	2.67
7012	0	noncase	3.15	4.00
6076	1	noncase	3.10	3.00
7014	0	noncase	3.05	3.00
7012	1	noncase	3.00	3.00
6078	0	noncase	3.00	2.67
7015	0	noncase	3.00	2.67
7001	0	noncase	3.00	2.83
6019	0	noncase	3.00	2.67
7013	0	noncase	1.10	1.00
7005	0	case	3.80	3.50
7005	1	case	3.25	3.67
6078	1	case	3.15	2.83
6022	1	case	3.00	3.00
6049	0	case	3.00	3.00
6021	1	case	2.80	2.83
6049	1	case	2.30	3.33
6021	0	case	2.30	2.00
6020	1	case	2.00	2.33
7001	1	case	1.85	3.33

Appendix H

Table 14: Comparison of caregiver-child relationship survey and interview scores, by case status (n = 33).

			Interview domain and subdomain scores					Survey mean scores						
Household ID	Person ID	Interview mental health case status	Cg-Child relationship: overall	Communication	Emotional closeness	Discipline strategies	Consistency of effort	PARQ: warmth	PARQ: hostility	PARQ: indifference/ neglect	PARQ: rejection	New items: positive	New items: negative	PACS items
6076	1	noncase	97	90	90	90	90	2.70	0.27	0.20	0.70	0.70	2.89	2.21
7015	0	noncase	97	90	90	90	90	2.85	0.33	0.20	0.30	0.30	3.00	1.96
7012	1	noncase	95	90	90	90	90	2.30	0.47	0.60	0.70	0.60	2.58	1.71
6078	0	noncase	95	90	90	90	90	2.80	0.27	0.00	0.30	0.30	2.84	1.79
7015	1	noncase	95	90	90	90	90	2.65	0.13	0.00	0.60	0.30	3.00	1.88
6076	0	noncase	95	90	90	90	90	2.70	1.00	0.20	0.50	0.20	2.95	1.92
6051	1	noncase	95	90	90	90	90	2.60	0.60	0.13	0.30	0.50	2.79	1.63
7010	0	noncase	94	90	90	90	90	2.50	0.40	0.20	0.40	0.70	2.26	1.79
6024	1	noncase	94	90	90	90	90	2.50	1.60	0.80	1.00	0.80	2.63	1.58
7013	1	noncase	93	90	90	90	90	2.75	0.13	0.13	0.30	0.30	2.89	1.92
6014	1	noncase	91	90	90	90	90	2.55	1.47	0.60	1.50	0.80	2.68	2.17
7010	1	noncase	90	90	90	90	90	2.80	0.53	0.40	0.10	0.70	2.42	2.04
7014	1	noncase	90	90	90	90	90	2.75	0.33	0.00	0.30	0.60	2.89	2.04
7012	0	noncase	90	90	90	90	90	2.10	0.33	0.67	0.30	0.30	2.63	1.83
7013	0	noncase	90	90	90	90	90	1.95	0.33	0.73	0.30	1.20	2.58	1.71
7014	0	noncase	85	90	90	50	90	2.70	0.20	0.00	0.30	0.30	2.84	1.79
6020	0	noncase	70	70	70	70	90	2.80	0.33	0.20	0.30	0.50	2.58	1.58
6019	0	noncase	22	30	30	10	10	2.50	0.47	0.33	1.00	0.80	2.89	1.58
7001	0	noncase	12	10	10	10	10	2.60	0.80	0.73	0.90	0.90	2.05	2.21
6004	1	case	96	90	90	90	90	2.70	0.27	0.40	1.30	0.90	2.79	1.75
6078	1	case	94	90	90	90	90	2.80	0.47	0.00	0.30	0.30	2.95	1.79
6079	1	case	92	90	90	90	90	2.45	0.20	0.20	0.40	0.30	2.58	1.71
7001	1	case	90	90	90	90	90	2.35	1.00	0.87	1.40	2.70	2.11	1.96
7005	1	case	90	90	90	90	90	2.40	1.07	0.47	0.70	0.70	2.32	2.17
6049	1	case	86	90	90	90	90	2.40	0.20	0.20	0.20	0.40	2.37	2.29
6022	1	case	73	90	70	30	90	1.80	0.93	0.87	0.80	1.10	2.47	1.67
6049	0	case	67	70	70	70	70	1.95	0.07	0.60	0.60	0.60	2.26	1.63
6023	1	case	65	70	70	50	90	2.50	0.67	0.13	0.90	0.70	2.74	1.75
6020	1	case	64	70	70	70	70	2.90	1.47	0.67	1.20	1.20	2.74	1.67
7005	0	case	45	30	50	70	50	2.30	0.80	0.53	0.90	0.60	2.17	1.75
6021	0	case	41	30	30	50	50	2.60	0.67	0.13	0.60	0.30	2.42	2.25
6021	1	case	28	30	10	30	50	1.85	1.93	1.20	2.30	2.90	2.21	1.83

Appendix I

Table 15: Religiosity survey scores, by case status (n = 32*).

Household ID	Person ID	Interview mental health case status	Survey mean score: Religiosity items
7015	0	noncase	9.44
7001	0	noncase	9.44
6076	0	noncase	9.22
7010	1	noncase	9.22
7012	1	noncase	9.00
7010	0	noncase	9.00
7012	0	noncase	9.00
7013	0	noncase	9.00
6076	1	noncase	8.89
6014	1	noncase	8.78
6051	1	noncase	8.67
6078	0	noncase	8.11
7014	1	noncase	8.11
6020	0	noncase	8.11
7015	1	noncase	8.00
7013	1	noncase	7.78
7014	0	noncase	7.56
6024	1	noncase	6.78
6019	0	noncase	6.63
7001	1	case	9.89
6049	1	case	9.22
6079	1	case	9.00
6049	0	case	9.00
6020	1	case	8.22
7005	0	case	8.11
6021	0	case	8.00
6078	1	case	7.89
6023	1	case	7.33
6019	1	case	7.33
7005	1	case	7.22
6004	1	case	6.67
6021	1	case	6.33

* Sample size reduced from total by 1; one caregiver screened out of part of the survey due to a suicidality referral

References

1. Tomlinson, M. and C. Lund, *Why does mental health not get the attention it deserves? An application of the Shiffman and Smith framework.* PLoS Med, 2012. **9**(2): p. e1001178.

2. GBD 2015 Disease and Injury Incidence and Prevalence Collaborators, *Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015.* Lancet, 2016. **388**(10053): p. 1545-1602.

3. Charlson, F.J., et al., *Mental and substance use disorders in Sub-Saharan Africa: predictions of epidemiological changes and mental health workforce requirements for the next 40 years.* PLoS One, 2014. **9**(10): p. e110208.

4. Jenkins, R., et al., *Mental Health and the Development Agenda in Sub-Saharan Africa.* Psychiatric Services, 2010. **61**(3): p. 229-234.

5. Kenya National Commission on Human Rights, *Silenced Minds: the systemic neglect of the mental health system in Kenya*. 2011, Kenya National Commission on Human Rights: Nairobi, Kenya.

6. Stein, D.J. and J. Illes, *Beyond Scientism and Skepticism: An Integrative Approach to Global Mental Health.* Front Psychiatry, 2015. **6**: p. 166.

7. Liu, G., et al., *Mental health training for health workers in Africa: a systematic review.* The Lancet Psychiatry, 2016. **3**(1): p. 65-76.

8. Patel, V., et al., *Global mental health: principles and practice*. 2014, Oxford University Press,: New York. p. 1 online resource.

9. Kohrt, B.A., et al., *Validation of cross-cultural child mental health and psychosocial research instruments: adapting the Depression Self-Rating Scale and Child PTSD Symptom Scale in Nepal.* BMC Psychiatry, 2011. **11**(1): p. 127.

10. Ali, G.C., G. Ryan, and M.J. De Silva, *Validated Screening Tools for Common Mental Disorders in Low and Middle Income Countries: A Systematic Review.* PLoS One, 2016. **11**(6): p. e0156939.

11. Kohrt, B.A., et al., *Detection of depression in low resource settings: validation of the Patient Health Questionnaire (PHQ-9) and cultural concepts of distress in Nepal.* BMC Psychiatry, 2016. **16**: p. 58.

12. Tsai, A.C., et al., *Reliability and validity of instruments for assessing perinatal depression in African settings: systematic review and meta-analysis.* PLoS One, 2013. **8**(12): p. e82521.

13. Stewart, R.C., et al., *Validation of a Chichewa version of the self-reporting questionnaire (SRQ) as a brief screening measure for maternal depressive disorder in Malawi, Africa.* J Affect Disord, 2009. **112**(1-3): p. 126-34.

14. Stewart, R.C., et al., *Validation of screening tools for antenatal depression in Malawi--a comparison of the Edinburgh Postnatal Depression Scale and Self Reporting Questionnaire.* J Affect Disord, 2013. **150**(3): p. 1041-7.

15. Spies, G., et al., *Validity of the Kessler 10 (K-10) in detecting DSM-IV defined mood and anxiety disorders among pregnant women.* Arch Womens Ment Health, 2009. **12**(2): p. 69-74.

16. Pence, B.W., et al., *Validity of an interviewer-administered patient health questionnaire-9 to screen for depression in HIV-infected patients in Cameroon.* J Affect Disord, 2012. **143**(1-3): p. 208-13.

17. Breuer, E., et al., *The validity of the Substance Abuse and Mental Illness Symptom Screener (SAMISS) in people living with HIV/AIDS in primary HIV care in Cape Town, South Africa.* AIDS Behav, 2014. **18**(6): p. 1133-41.

18. Tesfaye, M., et al., *Detecting postnatal common mental disorders in Addis Ababa, Ethiopia: validation of the Edinburgh Postnatal Depression Scale and Kessler Scales.* J Affect Disord, 2010. **122**(1-2): p. 102-8.

19. Gelaye, B., et al., *Validity of the Patient Health Questionnaire-9 for depression screening and diagnosis in East Africa.* Psychiatry Res, 2013. **210**(2): p. 653-61.

20. Bolton, P., *Cross-cultural validity and reliability testing of a standard psychiatric assessment instrument without a gold standard.* J Nerv Ment Dis, 2001. **189**(4): p. 238-42.

21. Bolton, P., *Assessing Depression Among Survivors of the Rwandan Genocide*, in *The psychological impact of war trauma on civilians: an international perspective*, S. Krippner and T.M. McIntyre, Editors. 2003, Praeger: Westport, Conn.

22. Murray, L.K., et al., *Validation of the UCLA Child Post traumatic stress disorder-reaction index in Zambia.* Int J Ment Health Syst, 2011. **5**(1): p. 24.

23. Betancourt, T.S., et al., *Assessing local instrument reliability and validity: a field-based example from northern Uganda.* Soc Psychiatry Psychiatr Epidemiol, 2009. **44**(8): p. 685-92.

24. Betancourt, T.S., et al., *A qualitative study of mental health problems among children displaced by war in northern Uganda.* Transcult Psychiatry, 2009. **46**(2): p. 238-56.

25. Kenya National Bureau of Statistics, et al., *Kenya Demographic and Health Survey 2014*. 2015: Rockville, MD, USA.

26. Baingana, F.K., A. Alem, and R. Jenkins, *Chapter 22: Mental Health and the Abuse of Alcohol and Controlled Substances*, in *Disease and Mortality in Sub-Saharan Africa, Second Edition*, D.T. Jamison, et al., Editors. 2006, The World Bank: Washington, D.C. p. 329-350.

27. Bronfenbrenner, U., *The ecology of human development : experiments by nature and design*. 1979, Cambridge, Mass.: Harvard University Press. xv, 330 p.

28. Casale, M., et al., *Direct and Indirect Effects of Caregiver Social Support on Adolescent Psychological Outcomes in Two South African AIDS-Affected Communities.* Am J Community Psychol, 2015. **55**(3-4): p. 336-46.

29. Casale, M. and T. Crankshaw, *"They laugh when I sing": perceived effects of caregiver social support on child wellbeing among South African caregivers of children.* J Child Adolesc Ment Health, 2015. **27**(2): p. 149-55.

30. Meinck, F., et al., *Pathways From Family Disadvantage via Abusive Parenting and Caregiver Mental Health to Adolescent Health Risks in South Africa.* J Adolesc Health, 2017. **60**(1): p. 57-64.

31. Rutter, M. and D. Quinton, *Parental psychiatric disorder: effects on children.* Psychol Med, 1984. **14**(4): p. 853-80.

32. Thielman, N., et al., *Correlates of poor health among orphans and abandoned children in less wealthy countries: the importance of caregiver health.* PLoS One, 2012. **7**(6): p. e38109.

33. Casale, M., et al., *The relationship between social support and anxiety among caregivers of children in HIV-endemic South Africa.* Psychol Health Med, 2014. **19**(4): p. 490-503.

34. Casale, M., et al., *Social support as a protective factor for depression among women caring for children in HIV-endemic South Africa.* J Behav Med, 2015. **38**(1): p. 17-27.

35. Luciano, A., J. Nicholson, and E. Meara, *The economic status of parents with serious mental illness in the United States.* Psychiatr Rehabil J, 2014. **37**(3): p. 242-50.

36. Mitchell, J., et al., *Intimate partner violence, HIV, and mental health: a triple epidemic of global proportions.* Int Rev Psychiatry, 2016. **28**(5): p. 452-463.

37. Kapiga, S., et al., *Prevalence of intimate partner violence and abuse and associated factors among women enrolled into a cluster randomised trial in northwestern Tanzania.* BMC Public Health, 2017. **17**(1): p. 190.

38. Tsai, A.C., et al., *Intimate Partner Violence and Depression Symptom Severity among South African Women during Pregnancy and Postpartum: Population-Based Prospective Cohort Study.* PLoS Med, 2016. **13**(1): p. e1001943.

39. Shamu, S., et al., *High-frequency intimate partner violence during pregnancy, postnatal depression and suicidal tendencies in Harare, Zimbabwe.* Gen Hosp Psychiatry, 2016. **38**: p. 109-14.

40. Kathree, T., et al., *Perceptions of postnatal depression and health care needs in a South African sample: the "mental" in maternal health care.* BMC Womens Health, 2014. **14**: p. 140.

41. Stellenberg, E.L. and J.M. Abrahams, *Prevalence of and factors influencing postnatal depression in a rural community in South Africa.* Afr J Prim Health Care Fam Med, 2015. **7**(1): p. 874.

42. Tefera, T.B., et al., *Perinatal depression and associated factors among reproductive aged group women at Goba and Robe Town of Bale Zone, Oromia Region, South East Ethiopia.* Matern Health Neonatol Perinatol, 2015. **1**: p. 12.

43. Kaida, A., et al., *Depression during pregnancy and the postpartum among HIV-infected women on antiretroviral therapy in Uganda.* J Acquir Immune Defic Syndr, 2014. **67 Suppl 4**: p. S179-87.

44. Potterton, J., A. Stewart, and P. Cooper, *Parenting stress of caregivers of young children who are HIV Positive.* Afr J Psychiatry (Johannesbg), 2007. **10**(4): p. 210-4.

45. Guo, N., et al., *Mental health related determinants of parenting stress among urban mothers of young children--results from a birth-cohort study in Ghana and Cote d'Ivoire.* BMC Psychiatry, 2014. **14**: p. 156.

46. Oburu, P.O., *Caregiving stress and adjustment problems of Kenyan orphans raised by grandmothers.* Infant and Child Development, 2005. **14**(2): p. 199-210.

47. Oburu, P.O. and K. Palmerus, *Stress related factors among primary and part-time caregiving grandmothers of Kenyan grandchildren.* Int J Aging Hum Dev, 2005. **60**(4): p. 273-82.

48. Mejia, A., R. Calam, and M.R. Sanders, *A review of parenting programs in developing countries: opportunities and challenges for preventing emotional and behavioral difficulties in children.* Clin Child Fam Psychol Rev, 2012. **15**(2): p. 163-75.

49. UN Department of Economic and Social Affairs, *2015 Demographic Yearbook: Sixty-sixth issue*. 2016: New York.

50. Einterz, R.M., et al., *Responding to the HIV Pandemic: The Power of an Academic Medical Partnership.* Academic Medicine, 2007. **92**(8): p. 812-818.

51. Constitution and Reform Education Consortium, *Building a culture of peace in Kenya: Baseline report on conflict-mapping and profiles of 47 counties in Kenya*. 2012: Nairobi, Kenya.

52. Spanier, G.B., *Measuring Dyadic Adjustment - New Scales for Assessing Quality of Marriage and Similar Dyads.* Journal of Marriage and the Family, 1976. **38**(1): p. 15-28.

53. Abidin, R.R. and T.R. Konold, *PAM : Parenting Alliance Measure : professional manual*. 1999, Odessa, FL (P.O. Box 998, Odessa 33556): Psychological Assessment Resources. vi, 52 p.

54. Straus, M.A. and E.M. Douglas, *A short form of the Revised Conflict Tactics Scales, and typologies for severity and mutuality.* Violence Vict, 2004. **19**(5): p. 507-20.

55. Rohner, R.P. and A.b. Khāleka, *Handbook for the study of parental acceptance and rejection*. Fourth Edition ed. 2005, Storrs, CT: Rohner Research Publications. ix, 401 pages.

56. Barnes, H. and D.H. Olson, *Parent-adolescent communication scale*. 2003: Life Innovations.

57. Goldberg, D., *Manual of the general health questionnaire*. 1978: NFER Nelson.

58. Goldberg, D., *General health questionnaire (GHQ-12)*. 1992, Windsor, UK: NFER-Nelson.

59. Spitzer, R.L., K. Kroenke, and J.B. Williams, *Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study.* JAMA, 1999. **282**(18): p. 1737-44.

60. *Global Assessment of Relational Functioning scale (GARF): I. Background and rationale. Group for the Advancement of Psychiatry Committee on the Family.* Fam Process, 1996. **35**(2): p. 155-72.

61. StataCorp, *Stata Statistical Software: Release 14*. 2015, StataCorp LP: College Station, TX.

62. QSR International, *Nvivo qualitative data analysis Software*. 2014, QSR International Pty Ltd.

63. Cohen, J., *A power primer.* Psychol Bull, 1992. **112**(1): p. 155-9.

64. Bhana, A., et al., *The validity of the Patient Health Questionnaire for screening depression in chronic care patients in primary health care in South Africa.* BMC Psychiatry, 2015. **15**: p. 118.

65. Monahan, P.O., et al., *Validity/reliability of PHQ-9 and PHQ-2 depression scales among adults living with HIV/AIDS in western Kenya.* J Gen Intern Med, 2009. **24**(2): p. 189-97.

66. Cholera, R., et al., *Validity of the Patient Health Questionnaire-9 to screen for depression in a high-HIV burden primary healthcare clinic in Johannesburg, South Africa.* J Affect Disord, 2014. **167**: p. 160-6.

67. Aderibigbe, Y.A. and O. Gureje, *The validity of the 28-item General Health Questionnaire in a Nigerian antenatal clinic.* Soc Psychiatry Psychiatr Epidemiol, 1992. **27**(6): p. 280-3.

68. Gelaye, B., et al., *Psychometric properties and factor structure of the General Health Questionnaire as a screening tool for anxiety and depressive symptoms in a multi-national study of young adults.* J Affect Disord, 2015. **187**: p. 197-202.

69. Makanjuola, V.A., et al., *Validation of short screening tools for common mental disorders in Nigerian general practices.* Gen Hosp Psychiatry, 2014. **36**(3): p. 325-9.

70. Abubakar, A. and R. Fischer, *The factor structure of the 12-item General Health Questionnaire in a literate Kenyan population.* Stress Health, 2012. **28**(3): p. 248-54.

71. Weaver, L.J. and B.N. Kaiser, *Developing and Testing Locally Derived Mental Health Scales: Examples from North India and Haiti.* Field Methods, 2015. **27**(2): p. 115-130.

72. Weobong, B., et al., *The comparative validity of screening scales for postnatal common mental disorder in Kintampo, Ghana.* J Affect Disord, 2009. **113**(1-2): p. 109-17.

73. Conroy, A.A., *Gender, power, and intimate partner violence: a study on couples from rural Malawi.* J Interpers Violence, 2014. **29**(5): p. 866-88.

74. Gregson, S., et al., *Methods to reduce social desirability bias in sex surveys in low-development settings: experience in Zimbabwe.* Sex Transm Dis, 2002. **29**(10): p. 568-75.

75. Kelly, C.A., et al., *Social desirability bias in sexual behavior reporting: evidence from an interview mode experiment in rural Malawi.* Int Perspect Sex Reprod Health, 2013. **39**(1): p. 14-21.

76. Kazi, T.B. and S. Naidoo, *Does Religiosity Mediate Suicidal Tendencies? A South African Study of Muslim Tertiary Students.* J Relig Health, 2016. **55**(3): p. 1010-23.

77. Watt, M.H., et al., *Religious coping among women with obstetric fistula in Tanzania.* Glob Public Health, 2014. **9**(5): p. 516-27.

78. Mhaka-Mutepfa, M., E. Mpofu, and R. Cumming, *Impact of protective factors on resilience of grandparent carers fostering orphans and non-orphans in Zimbabwe.* J Aging Health, 2015. **27**(3): p. 454-79.

79. World Health Organization, *mhGAP Intervention Guide for Mental, Neurological and Substance Use Disorders in Non-Specialized Health Settings: Mental Health Gap Action Programme (mhGAP): Version 2.0*. 2016: Geneva.

80. Townshend, K., et al., *The effectiveness of mindful parenting programs in promoting parents' and children's wellbeing: a systematic review.* JBI Database System Rev Implement Rep, 2016. **14**(3): p. 139-80.

81. Patel, V., et al., *Chapter 1: Global Priorities for Addressing the Burden of Mental, Neurological, and Substance Use Disorders*, in *Mental, Neurological, and Substance Use Disorders: Disease Control Priorities, Third Edition (Volume 4)*, V. Patel, et al., Editors. 2016: Washington (DC).