

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51

***The Influence of Gender Equitable Attitudes on Sexual Behavior Among Unmarried Adolescents in Rural Tanzania: A Longitudinal Study***

Kate Rogers<sup>1§</sup>, Meghna Ranganathan<sup>2</sup>, Lusajo Kajula<sup>3</sup>, R Lorraine Collins<sup>1</sup>, Jennifer A. Livingston<sup>4</sup>, Tia Palermo,<sup>5</sup> On Behalf of the Tanzania Adolescent Cash Plus Evaluation Team

<sup>1</sup> Department of Community Health and Health Behavior, University at Buffalo, SUNY, 330 Kimball Tower, Buffalo, NY, USA

<sup>2</sup> London School of Hygiene and Tropical Medicine, 15-17 Tavistock Place, London, WC1H 9SH United Kingdom

<sup>3</sup> Independent Consultant, 141 25 Dar es Salaam, Tanzania and UNICEF Office of Research-Innocenti

<sup>4</sup> School of Nursing, University at Buffalo, SUNY, 301 D Wende Hall, Buffalo, NY, USA

<sup>5</sup> Department of Epidemiology and Environmental Health, University at Buffalo, SUNY, 270 Farber Hall, Buffalo, NY, USA

**<sup>§</sup>Corresponding author**

Kate Rogers, MPH  
University at Buffalo  
School of Public Health and Health Professions  
Department of Community Health and Health Behavior  
330 Kimball Tower  
Buffalo, NY, 14212, USA  
Krogers3@buffalo.edu  
Tel: +1 716-983-6314

Email addresses of authors:  
KR: krogers3@buffalo.edu  
MR: Meghna.Ranganathan@lshtm.ac.uk  
LK: sajokm@gmail.com  
RLC: lcollins@buffalo.edu  
JL: jal7@buffalo.edu  
TP: tiapaler@buffalo.edu

1 **Abstract**

2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20

Patriarchal systems in Africa can perpetuate inequitable gender norms and power differentials that disadvantage women. This study aimed to examine the influence of community and individual gender equitable attitudes on adolescents' sexual health and risk behavior in rural Tanzania, and whether the association of those attitudes differs between males and females. We conducted logistic regression using longitudinal data from a cluster randomized controlled trial in rural Tanzania to examine the association of gender equitable attitudes with the sexual risk behavior of 2017 adolescent males and females. High community-level gender equitable attitudes were significantly associated with higher odds of HIV testing (OR = 1.31, 95% CI [1.00-1.72]) and lower odds of age-disparate partnerships (OR = 0.52, 95% CI [0.30-0.88]) for the pooled male and female sample. High individual-level (but not community) gender equitable attitudes were associated with increased condom (OR = 2.07, 95% CI [1.07-4.00]) and contraceptive use (OR = 2.08, 95% CI [1.04-4.13]) for girls. Among sexually debuted adolescents, no significant associations were found between community or individual high gender equitable attitudes and transactional sex, early sexual debut, HIV testing, concurrent sexual partners, or number of sexual partners. We found evidence of effect modification by sex for community-level attitudes and age disparate sex ( $p = 0.005$ ) and individual-level attitudes and condom use ( $p = 0.051$ ). Efforts to incorporate gender transformative programming for whole communities may increase gender equitable attitudes.

21 **Plain Language Statement**

22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35

Gender norms that center men and disadvantage women create gender inequality, which can lead to risky sexual behavior. This study examined how both community and individual attitudes toward gender norms influenced risky sexual behavior in adolescents, and whether that influence was different between males and females. We found that higher gender equitable attitudes were linked to increased odds of HIV testing in the last 12 months, and decreased odds of engaging in a sexual relationship with a much older partner. Individual high gender equitable attitudes among girls were also linked to higher odds of them using condoms and contraceptives. Gender equitable attitudes did not seem to influence early sexual debut, engagement in transactional sex, having multiple sexual partners at the same time, or the number of sexual partners a participant had in the last 12 months. Based on these findings, programming designed to increase gender equitable attitudes might be helpful in increasing HIV testing and condom and contraceptive use, but it needs to involve the entire community, not just individual boys and girls.

36 *Keywords:* adolescents, sexual risk behavior, sexual and reproductive health, transactional sex, gender norms,  
37 Tanzania

38  
39 **Word Count: 8827**

40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52

**Background**

*Gender Norms vs. Gender Attitudes*

Social norms are defined as a shared understanding of how an individual and others around them should behave. Gender norms are a subset of social norms, reflecting a shared understanding of how women, compared with men, are expected to behave (Pulerwitz et al., 2019). Due to deeply entrenched hierarchical and patriarchal systems in much of the world, men’s rights, wants, and needs are often privileged over women’s, and the masculine ideology valued over the feminine. Gender defines roles (e.g., men as the financial supporter of the family and women the domestic laborers), dictates socialization (e.g., men are allowed to be promiscuous with their sexuality while women are expected to remain chaste), and affects power dynamics between men and women. Inequitable norms perpetuate power differentials that disadvantage women, leaving them especially vulnerable to such issues as sexual exploitation and gender-based violence (Cislaghi & Heise, 2020). When a woman’s autonomy is restricted and her value situated squarely in the domestic realm of childbearing and rearing, she is left with little recourse to negotiate for her own needs, safety, and well-being (Lokot et al., 2021). This is then generationally reinforced as children internalize how to “do” gender from their parents, solidifying gender norms across cultures and generations (Davis & Greenstein, 2009).

Community gender norms are generally reflected in individual gender attitudes (Kågesten et al., 2016). However, the relationship between norms and attitudes toward them is much more complicated. Gender norms are broadly defined as the social understanding of how women are expected to behave in comparison with men (Pulerwitz et al., 2019). They govern a complex system of social rules with the expectation that each gender will perform specific roles and socialize with one another in specific ways. Gender norms uphold and reinforce inequitable power dynamics that tend to privilege men and disadvantage women (Cislaghi & Heise, 2020). They are reproduced and reinforced through social institutions such as schools, religious organizations, and work places. This reproduction influences community beliefs and drives the acceptance of such norms, delivering sanctions to those who deviate from them (Wingood & DiClemente, 2002). Thus, individual attitudes, beliefs and actions are shaped by the understanding of what is and is not acceptable within the larger community. Gender attitudes are an individual’s personal opinion about a norm. They can either be aligned with or in opposition to an accepted social norm (Cislaghi & Heise, 2020). Personal attitudes fall into two categories: 1) concordant norms, in which an individual’s attitude is aligned with the accepted norm and the individual understands that both the behavior itself and acting out the behavior are approved by others in their social group; 2) discordant norms, in which an individual’s attitude is not aligned with the accepted norm. In this case, the individual understands either that the behavior is good, but that acting out the behavior will result in social sanctioning, or that the behavior is bad, but acting it out will gain approval from his/her social group (Cislaghi & Heise, 2020).

Peers and other community members can have significant influence on adolescent normative behavior (Reyes et al., 2016). Social acceptance and rejection by their peers and/or romantic partners hold significant weight among adolescents (Crone & Dahl, 2012) - for example, if an adolescent’s peer group supports risky sexual behavior (e.g., concurrent sexual partners for boys), the adolescent is likely to do the same, whether he or she agrees with the norm or not. Conversely, prosocial behavior is also influenced by peers, so if an adolescent’s peer group is using condoms, an adolescent in that group will likely engage in that practice as well (Andrews et al., 2021; Foshee et al., 2013). Adolescence is the time when worldviews become solidified, particularly those surrounding gender norms (Reyes et al., 2016), as adolescents learn how to “do” gender from influential adults (e.g., their parents) and their peers. Since adolescence is also a time of flexibility in motivations and values (Crone & Dahl, 2012), it can be a particularly integral time to intervene and provide education that might change attitudes toward gender and reduce sexual risk behaviors (Coker et al., 2020).

*Sexual Risk Behavior & Sexual and Reproductive Health*

Gender norms that center heteronormative, masculine ideologies above all else can lead to gender inequality, which is a structural driver of sexual risk behavior and intimate partner violence (IPV). Inequality can result from disparity between men and women regarding the distribution of resources, educational opportunities, or access to positions of power and decision-making (Kågesten et al., 2016). In parts of Africa, as in other parts of the world, where many cultures subscribe to strict gender hierarchies and patriarchal norms, there are socio-

1 cultural beliefs that put adolescent girls and young women (AGYW) at increased risk for IPV victimization and sexual  
2 exploitation. As boys age into adolescence, their sexual concurrency is encouraged – the more sexual partners a  
3 boy has, the more masculine he is perceived (Ninsiima et al., 2018). Boys and men are considered to “need” sex  
4 more than women and girls, and boys have been found to have increased risky sexual behavior due to influence  
5 from peers to engage in such behaviors (Govender et al., 2019). It is expected that women give sex to men when  
6 they want it, and it is acceptable to punish women with violence when they do not comply (Wado et al., 2021).  
7 Multiple sexual partners for boys are rewarded, and this reinforcement of proving one’s manhood through  
8 aggressive masculine norms can lead to coercive sexual behavior that puts AGYW at risk of sexual violence (Smith et  
9 al., 2022). Adolescent girls, however, are expected to remain chaste until they are married and are considered to  
10 be responsible for any arousal their sexuality might cause men to experience (Ninsiima et al., 2018). Condom use is  
11 also thought to indicate promiscuity, particularly on the part of the woman, so negotiating for safe sexual practices  
12 is difficult (Ranganathan et al., 2017), even when AGYW are able to do so (which they often do not, due to  
13 disparate power dynamics between men and women in sexual relationships (Ninsiima et al., 2018)). This can leave  
14 both adolescent boys and girls at increased risk of HIV and other STIs (Foss et al., 2007).

15 Gender inequality impacts the sexual and reproductive health (SRH) of AGYW in both the short- and long-  
16 term. Since girls do not receive education surrounding SRH, there is a critical dearth of understanding surrounding  
17 menstruation, fertility, and child-bearing (Bandiera et al., 2020). AGYW are often married at a very young age,  
18 sometimes to older men, often to prevent them from having sex before marriage or to boost the family’s assets  
19 through a bride price (Seff et al., 2021). This places a woman’s value solely in producing and caring for children,  
20 situating her in the realm of domestic labor and eliminating or reducing the chance for education and economic  
21 independence (Lokot et al., 2021). Additionally, young adolescent girls’ reproductive tracts are under-developed,  
22 leaving them at increased risk of HIV and other sexually transmitted infections (STIs), as well as risky or complicated  
23 childbirth (Lokot et al., 2021). Additionally, child marriage results in coerced sexual debut, with the adolescent girl  
24 forced to have sex by her husband (Decker et al., 2015). This lays the groundwork for future non-consensual and  
25 coercive sex, reinforced by the gender norm that a woman must give her husband sex and that it is acceptable to  
26 punish her with physical violence for withholding it (Wado et al., 2021).

27 When women and girls lack recourse for economic independence, they are at higher risk for sexual  
28 exploitation and practices such as transactional sex. Transactional sex is defined as “non-marital, non-commercial  
29 sexual relationships, motivated by the implicit assumption that sex will be exchanged for material support or  
30 benefits” (Wamoyi, Heise, et al., 2019, p. 2). Importantly, transactional sex is not sex work. Rather, it lacks up front  
31 negotiations of expectations from participants, and operates on the vaguely implicit assumption of exchange based  
32 on traditional gender roles: the man provides financial or material support, and the woman will reciprocate that  
33 support with sexual or domestic labor (Wamoyi, Ranganathan, et al., 2019). There may or may not be a level of  
34 romantic attachment and one or both members of the partnership may be married or carrying on other  
35 extracurricular relationships. Motivation for transactional sex exists on a continuum ranging from extreme  
36 deprivation to increasing social status through clothing and other gifts that increase social capital (Stoebenau et al.,  
37 2016).

38 While transactional sex is not inherently risky, and many AGYW identify a sense of agency in choosing their  
39 partner (Ranganathan et al., 2017), there is strong evidence to suggest that agency is short lived (Stoebenau et al.,  
40 2016). Once the material goods have been received, men expect women to provide the sexual services implied at  
41 the onset of the relationship. When the sexual portion of the relationship is engaged, AGYW have little to no  
42 recourse to negotiate what they want – condom use, birth control, when and whether to have sex. Since  
43 transactional sex relationships are often age disparate (with the man at least five years older than the woman),  
44 transactional sex can leave AGYW vulnerable to the exploitation of men who are more powerful economically and  
45 have more control sexually (Ranganathan et al., 2020). AGYW then are at risk of coercive sex, rape, and other forms  
46 of intimate partner violence, and vulnerable to unwanted pregnancy, sexually transmitted infection, and/or HIV  
47 (Dunkle et al., 2004).

## 48 **Research Gaps**

49 Current literature regarding sexual health and risk behavior for adolescents has recently recognized the  
50 need for interventions outside of individual-level risk-factors, acknowledging structural determinants as major  
51 drivers of gender inequity (George et al., 2020). Varga (2003) qualitatively examined gender roles and sexual health  
52

1 among adolescents at the individual-level in South Africa. Her research found that adolescents' behavior was  
2 governed by their beliefs around what was considered "appropriate social conduct" (Varga, 2003, p. 163). In other  
3 words, their behavior was influenced by what the community around them considered to be normal. Gender norms  
4 reinforced negative sexual negotiation dynamics and double standards. This ultimately left all adolescents, but  
5 particularly girls, vulnerable to early pregnancy and other reproductive and sexual health repercussions, as well as  
6 the negative consequences that accompany teen parenthood (e.g., derailing professional aspirations). Stephenson  
7 (2009) noted that while much was known about individual-level behavior and sexual risk factors, little was  
8 understood about how community-level attitudes influenced the same. His study utilized community  
9 environmental characteristics as a proxy for community norms, and used multi-level modeling to examine the  
10 association between community factors (e.g., educational attainment, employment levels, knowledge of HIV and  
11 availability of health resources) and adolescent sexual behavior in Burkina Faso, Ghana, and Zambia. Findings  
12 indicated great variance across countries in terms of factors that influence sexual risk behavior, but consistently  
13 found that there were disparate expectations of marriage and fidelity between genders and that education had a  
14 protective effect against risky sexual behaviors. In a cluster randomized trial, Pettifor and colleagues (2018)  
15 examined the effects a community mobilization intervention in South Africa on individual-level gender equitable  
16 attitudes. They found that the intervention supported a reduction in negative gender norms among men, but did  
17 not find significant change in attitudes toward norms that reduced sexual risk behaviors. In India, Andrew and  
18 colleagues (2022) designed a program to improve AGYW's education, delay marriage, and promote well-being.  
19 They used a cluster randomized controlled trial to compare the outcomes between two groups: one that targeted  
20 only adolescent girls, and one that engaged community norm influencers in addition to adolescent girls. The group  
21 that included the norm influencers saw improvements in the mental health and overall well-being of the adolescent  
22 girls, most likely due to the promotion of more progressive norms and a reduction in the manner of sanctioning  
23 that the girls had previously experienced when they deviated from traditional norms. The study concluded that  
24 changing the attitudes of community norm influencers was necessary for achieving well-being among women.

25 While each of the aforementioned studies examined gender norms and adolescent sexual risk behavior,  
26 none have examined the association of those behaviors with clustered community-level attitudes toward gender  
27 norms. Only Andrew and colleagues (2022) incorporated community norm enforcers (community members who  
28 have the greatest influence on setting and reinforcing norms, e.g., community leaders) as part of their intervention.  
29 Thus, the body of knowledge surrounding the influence of community and peer gender norms on individual  
30 behavior has considerable gaps. This is partly because much of the behavior (e.g., sexual activity or violence  
31 between partners) is difficult to observe and therefore measure, and there is social desirability bias in reporting  
32 both the behaviors and attitudes toward them. It is also due to a lack of studies that attempt to quantitatively  
33 capture gender attitudes at the community level and examine the association between those attitudes and sexual  
34 behaviors, and study designs that only collect data from one level of the community (e.g., only adolescents or only  
35 parents).

36 The current study aims to build on the research literature by incorporating the recommended use of both  
37 community- and individual-level attitudes (Cislaghi et al., 2022) toward gender, and examining the association of  
38 those attitudes with a host of sexual health outcomes for both adolescent boys and girls, instead of girls alone. In  
39 order to understand how community-level attitudes might be associated with individual behaviors, we utilized  
40 gender-equitable attitude scores from the Gender Equitable Men Scale (Pulerwitz & Barker, 2008), clustered at the  
41 community-level. We examined the influence of those clustered community gender equitable attitudes on the  
42 following individual sexual risk behaviors: transactional sex, early sexual debut, HIV testing, contraceptive uptake,  
43 condom use, concurrent sexual partners (concurrency), number of sexual partners, and age-disparate partnerships.  
44 We sought to answer two research questions: (1) What is the association between community gender equitable  
45 attitudes, individual gender equitable attitudes, and individual sexual risk behaviors? (2) Is there a difference in the  
46 aforementioned association between male and female adolescents?

#### 47 48 ***Theoretical framework***

49 This paper is framed within Bronfenbrenner's (1979) social-ecological model, a multi-level framework that  
50 considers the complex and concurrent influence of individual, relational, community, and societal factors on one  
51 another (Bronfenbrenner, 1979). Each level has the potential to simultaneously influence other levels  
52 (Bronfenbrenner, 1979), as follows –

- 1 **Societal:** Societal factors that can influence health, such as laws or policies, as well as social and cultural norms.
- 2 **Community:** Any communal spaces where people engage in social connection, such as religious institutions,
- 3 schools, workplaces, and neighborhoods. Community factors such as school culture and leadership can influence
- 4 social norms.
- 5 **Relationship:** Any person in an individual’s close social circle, such as family members, close friends, or peers, who
- 6 might influence their attitudes and behavior (positively or negatively).
- 7 **Individual:** Biological, psychosocial, and demographic characteristics, such as socio-economic status, health,
- 8 education, and age. (CDC, 2022b)

9 Gender equity cannot be achieved without involving all levels of the social ecological model. Simply  
 10 educating an individual or group of individuals (e.g., adolescent girls) in isolation from the community will not drive  
 11 lasting change (Wingood & DiClemente, 2002). Social norms dictate that individuals need to behave in accordance  
 12 with the accepted norms of their communities, or they risk being sanctioned (Cislaghi & Heise, 2020). In a  
 13 community that subscribes to patriarchal gender attitudes and upholds strict gender roles aligned with those  
 14 attitudes, there is generally a de-centering and devaluing of women, especially in relation to men (Wado et al.,  
 15 2021), leaving women without the social capital to affect change. Hence, addressing only the individual or  
 16 relationship level is ineffective. Alternatively, only changing policies, without community leaders or influencers on  
 17 the ground working to educate individuals and shift attitudes, would also not be effective. In order to create  
 18 effective normative change, it is critical to involve all levels of the social ecological model (Pulerwitz et al., 2019;  
 19 Wingood & DiClemente, 2002).

20  
 21 **Methods**

22 Study Design and Participants

23 This study used secondary data from the Ujana Salama (or “Safe Youth” in Swahili) multi-year cluster  
 24 randomized controlled trial. The trial was conducted in two government administrative areas in mainland Tanzania,  
 25 one in Iringa and one in Mbeya. These areas covered four districts/councils (Mufindi and Mafinga in Iringa region;  
 26 Rungwe and Busokelo in Mbeya region). The trial layered an adolescent-focused intervention for health and  
 27 livelihoods training onto an existing government-run social protection program, the Productive Social Safety Net  
 28 (PSSN) program, that provided bimonthly cash transfers and livelihood programming to eligible households in  
 29 Tanzania. As such, prior to selection, households in the study were already receiving cash benefits. The trial  
 30 intended to measure impacts of the Ujana Salama pilot on youth well-being, violence reduction, and safe  
 31 transitions to adulthood. The study included 130 villages, all of which were participating in the PSSN, and were then  
 32 randomized (1:1) to the treatment or control arms of the Ujana Salama pilot.

33 Eligible participants for the Ujana Salama pilot and evaluation were 14-19 years old at baseline in 2017 and  
 34 living in households already participating in PSSN. We used 2015 PSSN-beneficiary listings to identify participants  
 35 before recruitment began. Forty-five percent of potential respondents on those lists were found to be ineligible  
 36 because they were outside of the eligible age range ( $n = 745$ ), no longer lived in a PSSN-beneficiary household ( $n =$   
 37  $1724$ ), or the household refused to/did not consent ( $n = 491$ ). One hundred and thirty villages across both districts  
 38 were publicly randomized in July of 2017 to an intervention or control arm at a ratio of 1:1. Next, the study team  
 39 aimed to interview all adolescents in the eligible age range in PSSN households in the study district, regardless of  
 40 program take-up status. A total of 2458 participants were interviewed at baseline (Control  $n = 1272$ ; Intervention  $n$   
 41  $= 1186$ ). The current study was an observational study because we did not examine program impacts, but rather we  
 42 leveraged the data to understand the aforementioned research questions. However, more information on the  
 43 overall trial study design and sampling is provided in *Appendix E*.

44 Ethical approval for the original study was obtained from the National Institute for Medical Research and  
 45 the Tanzania Commission for Science and Technology. The trial was registered retrospectively in the Pan-African  
 46 Clinical Trials Registry (trial PACTR201804003008116) on January 25, 2018. The study was found to be exempt from  
 47 human research study by the Internal Review Board at the University at Buffalo in January of 2022.

48  
 49 Data Collection & Procedures

50 The Ujana Salama pilot aimed to address multisectoral risk factors, including economic, health, and social  
 51 factors, to a safe and healthy transition to adulthood. It was implemented by the Tanzania Social Action Fund  
 52 (TASAF), a government agency, with technical assistance from the United Nations Children’s Fund (UNICEF) and the

1 Tanzania Commission for AIDS (TACAIDS). The intervention was comprised of: 1) 12 weeks of livelihoods (e.g.,  
2 vocational and entrepreneurial training) and life skills (including HIV and sexual and reproductive health) training; 2)  
3 mentoring and a productive (cash) grant in the amount of 80 USD; and, 3) linkages to strengthened, adolescent-  
4 friendly SRH services in government, primary care facilities in study areas. A community-based approach was used  
5 in order to simulate real-world recruitment (as opposed to recruitment in a clinic or school, which might not have  
6 captured youth who were not enrolled in school or did not seek health care). More information on the intervention  
7 activities can be found elsewhere, but they are not the focus of the current study (Prencipe et al., 2022; Tanzania  
8 Cash Plus Evaluation Team, 2020).

9 Baseline data from youth, household, and community surveys were collected in 2017. Follow-up data was  
10 collected as follows: Wave 2 (2018), Wave 3 (2019), and Wave 4 (2021). After baseline (2017,  $n = 2458$ ), this  
11 sample was followed-up again in 2018 and 2019, with re-interview rates of 86% and 89%, respectively (UNICEF,  
12 2020, 2021). Wave 3 data were collected nine months after mentoring activities had ended, roughly 2 months after  
13 final grant receipt, and 12 months after the intensive face-to-face training period. Topics of youth surveys included  
14 livelihoods skills and knowledge, economic activities, sexual debut, pregnancy, marriage, school attendance,  
15 aspirations, gender attitudes, psychosocial well-being, violence victimization and perpetration, sexual exploitation,  
16 and health and sexual risk-taking behaviors. Household surveys were administered to the main PSSN beneficiary  
17 (generally a female) or the household head and included topics related to dwelling characteristics, household  
18 composition, and education, health, age, time use, and marital status of household members.

19 Written informed consent was obtained from participants 18 years or older, or married participants (at any  
20 age). For unmarried participants under 18 years, assent was obtained from the adolescents and informed consent  
21 was obtained from a parent. Our sub-sample for analysis included unmarried youth at Waves 2 and 3, who were  
22 16-21 years old ( $n = 2017$ ). Additional analyses related to sexual behavior outcomes were run on a subset of these  
23 participants who were unmarried and who had sexually debuted ( $n = 619$ ). Waves 2 and 3 were chosen for this  
24 analysis because the youth were older than at baseline, meaning that more participants were likely to have sexually  
25 debuted, (only 17% reported ever having had sexual intercourse at baseline), but young enough for the majority to  
26 be unmarried. We used two waves of data for the analysis to enable us to analyze the data longitudinally,  
27 examining the association between gender norms at Wave 2 on behaviors at Wave 3.

28  
29 Measures

30 *Independent variables*

31 The Gender Equitable Men Scale (GEM Scale) was used to measure individual attitudes toward gender  
32 norms among individuals in participating villages (Pulerwitz & Barker, 2008). Rooted in social constructivist theory,  
33 the scale assumes that norms are taught in childhood and reinforced and internalized throughout adolescence and  
34 adulthood through peer groups and institutions (e.g., schools). It acknowledges the root of gender as based in  
35 power relations between men and women and the interaction between them. The 24-item scale addresses four  
36 domains within the construct of gender norms: intimate partnerships, reproductive health and disease prevention,  
37 domestic and daily life, and violence (Pulerwitz & Barker, 2008). It consists of two subscales, which measure  
38 support for both equitable and inequitable norms that can reliably be used together or individually. Both scales  
39 were used for this study. Response options were 1 = agree, 2 = somewhat agree, 3 = disagree. Higher scores  
40 indicate more gender equitable attitudes. See *Appendix D* for full scale with subscales.

41 Individual GEM scores were computed from responses to 24 items on the GEM scale (1 - 3 where 1 =  
42 agree, 2 = somewhat agree, and 3 = disagree). An additive scale was created with a possible range of 24 - 72 for  
43 individuals. Tertiles were then created where individuals with scores ranging from 24 - 50 were classified as “Low”,  
44 those with scores ranging from 50.1 - 58.5 were classified as “moderate”, and those with scores of 58.6 - 72 were  
45 classified as “high”. Next, community GEM scores were created from individual GEM scores clustered (or  
46 aggregated) at the village level ( $n = 130$  villages), as recommended by Cislighi and colleagues (2022). These scores  
47 were calculated separately for Waves 1 - 3 of data collection. At each wave, the individuals’ scores were averaged  
48 by village in order to construct the community-level GEM score (possible range 44 - 63). Following Balk (1994), the  
49 community level means were calculated as non-self-clustered means, calculating the average at the village level  
50 separately for each individual in the dataset, while removing the index individual (Balk, 1994). This approach avoids  
51 the potential endogeneity issue of including individual respondents’ GEM score in the community means. Tertiles  
52 were created from these village non-self-clustered mean GEM scores, where communities with scores ranging from

1 45.2 - 51.3 were classified as “Low”, those with scores ranging from 51.4 - 53.8 were classified as “moderate”, and  
2 those with scores of 54.9 - 63.8 were classified as “high”. Next, a binary indicator for high community-level GEM  
3 scores was created combining the low and medium scores (= 0) and together these are referred to in the tables and  
4 results as “Low GEM Score” versus high scores (= 1). Internal reliability of the scale was assessed using Cronbach’s  
5 alpha. The alpha coefficient for the 24 items was 0.84, suggesting high internal consistency.

#### 6 7 *Primary Outcome Variables (among all participants)*

8 Transactional sex was constructed as a binary variable, where 0 indicated no participation in transactional  
9 sex and 1 indicated participation in transactional sex. This variable was constructed using previously validated  
10 questions (Wamoyi et al., 2019), and based on youth self-reported answers, to create an additive transactional sex  
11 index. Questions used to construct the index included:

- 12 • Would you leave the relationship if [most recent partner] did not give you money or things that were  
13 important to you? (Affirmative responses coded as 1 and 0 otherwise.)
- 14 • Has [most recent partner] ever given you money? (Affirmative responses coded as 1 and 0 otherwise.)
- 15 • What are the three main reasons you are/were with [most recent partner]? (Affirmative responses for  
16 gifts/money/assistance were coded as 1 and 0 otherwise.)
- 17 • In the past 12 months, did you start a relationship with [most recent partner] in order to get things you  
18 needed, such as money or gifts? (Affirmative responses coded as 1 and 0 otherwise.)

19 Affirmative responses were then coded to generate an additive transactional sex scale ranging 0 to 4. A new  
20 dichotomous indicator for transactional sex was created, where an affirmative response to at least one question  
21 was coded as 1 and 0 otherwise. Affirmative response indicated participation in transactional sex. If the youth had  
22 never had sex, transactional sex was coded as 0. Early sexual debut was a binary variable, where 0 indicated normal  
23 debut and 1 indicated early debut, constructed using youth self-reported age at first sex. Early debut was defined  
24 as first having sexual intercourse at age 15 years or younger. Youth who reported sex at or before age 15 years  
25 were coded as 1 and youth who reported sex at or above age 16 years were coded as 0. If youth never had sex,  
26 early sexual debut was coded as 0. HIV test in the last 12 months was coded as a binary variable, where 0 indicated  
27 No and 1 indicated Yes, constructed based on youth self-reported answer to whether they received an HIV test in  
28 the last 12 months. In high prevalence settings, even if adolescents have not engaged in sex, they may have been  
29 infected perinatally, and thus should be aware of their status before they sexually debut, in order to protect  
30 themselves and others, and to potentially access PRoP (Kidman et al., 2020). Thus, HIV testing behavior was asked  
31 to all participants, regardless of whether they had sexually debuted.

#### 32 33 34 *Secondary Outcome Variables (among sexually debuted participants)*

35 Modern contraceptive use was a binary variable where 0 indicated No and 1 indicated Yes, constructed  
36 based on youth self-reported answer to whether they were using a modern contraceptive method. Condom use at  
37 last sex was a binary variable where 0 indicated No and 1 indicated Yes, constructed based on youth self-reported  
38 answer to whether they or their partner used a condom at last sex. Concurrency was a binary variable where 0  
39 indicated No and 1 indicated Yes, constructed based on youth self-reported answer to whether they had more than  
40 one sexual partner at the same time. Age-disparate partnership was a binary variable where 0 indicated No and 1  
41 indicated Yes, constructed based on youth self-reported answer to the age difference between them and their  
42 partner (cut point was a difference of five years or more). Number of sexual partners in the last 12 months was a  
43 continuous variable, constructed using youth self-reported number of sexual partners in the past 12 months.

#### 44 45 Data Analyses

46 Descriptive analyses were conducted on all variables of interest, including outcome variables, individual-  
47 (age, sex, educational attainment, treatment) and household-level (gender of household head) characteristics.  
48 Bivariate analyses (chi-squared tests for binary outcomes and t-test for number of sexual partners) were conducted  
49 to assess the relationship between outcome variables and community GEM scores. Primary outcomes included  
50 early sexual debut, participation in transactional sex, and HIV test in the last 12 months, among the entire sample  
51 of unmarried adolescents ( $n = 2017$ ), and then again among the sub-sample of unmarried sexually debuted  
52 participants ( $n = 619$ ). Secondary outcomes were also examined among unmarried participants who had sexually



1 debuted ( $n = 619$ ) and included condom use at last sex, modern contraceptive use, concurrency, age-disparate  
2 partnerships, and number of sexual partners in the last 12 months. Bivariate analyses were conducted on the  
3 pooled male and female sample, then stratified by sex. We also tested for selective attrition, examining differences  
4 in demographic characteristics and outcomes at baseline between those in the panel sample and those lost to  
5 follow-up, using linear regressions for continuous outcomes and linear probability models for binary outcomes. In  
6 these regressions we controlled for district of residence and adjusting standard errors for clustering at the  
7 community-level.

8 Research question 1 focused on the association between community gender equitable attitudes and  
9 individual sexual risk behaviors. Multivariate analyses were conducted to examine whether community- and  
10 individual-level gender equitable attitudes were associated with the primary outcomes of interest (transactional  
11 sex, early sexual debut, and HIV testing in the last 12 months). Since all primary outcomes were binary, logistic  
12 regressions were conducted where behaviors at Wave 3 were regressed on attitudes at Wave 2. A lag term was  
13 created using the non-self-clustered mean community high GEM score from Wave 2 in order to have temporal  
14 ordering, whereby the main predictor of interest was measured prior to the outcome we hypothesized that it  
15 influenced. A lag term was also created at the individual level, using the individual high GEM score from Wave 2. In  
16 the first set of models (referred to as Model 1), we included only community gender equitable attitudes (high v.  
17 low). In the second set of models (referred to as Model 2), we included both high community gender equitable  
18 attitudes and high individual gender equitable attitudes. Both sets of models were conducted for the entire sample,  
19 as well as the sub-sample of adolescents who had sexually debuted.

20 Next, we examined the secondary outcomes of modern contraceptive use, condom use at last sex,  
21 concurrent sexual partners, and age-disparate partnerships among respondents who reported sexual debut. Again,  
22 we ran these models first with just community-level high gender equitable attitudes and then with both  
23 community- and individual-level attitudes. We ran these models in the pooled male and female sample and then  
24 stratified by sex. For binary outcomes, we used logistic regressions where behaviors at Wave 3 were regressed on  
25 attitudes at Wave 2. Then, for number of sexual partners in the last 12 months we ran a Poisson regression, where  
26 number of partners at Wave 3 was regressed on attitudes at Wave 2.

27 Research question 2 sought to understand whether there was a difference in the aforementioned  
28 associations between male and female adolescents. To answer this question, we ran the aforementioned analyses,  
29 including for primary and secondary outcomes, stratified by sex. As in the above summarized analyses, we ran  
30 logistic regressions for binary outcomes and Poisson for the one count variable (number of sexual partners). For  
31 any outcomes that were statistically significant in one group (e.g., pooled, female, male) but not another, we then  
32 formally tested for effect modification using an interaction between high gender attitudes and female. For these  
33 interaction models, we used linear ordinary least squares (OLS) regressions due to issues with interpreting  
34 interaction terms in nonlinear models such as logistic (Norton et al., 2004). A statistically significant coefficient on  
35 the interaction term would indicate effect modification (i.e., the relationship between community attitudes and the  
36 outcome of interest is moderated by sex).

37 Controls for all models included age, sex, educational attainment, whether the participant had received the  
38 intervention (treatment), and whether the head of household was female. Although we did not examine  
39 intervention impacts in this study, treatment was considered a confounder because the intervention was found to  
40 affect both gender attitudes and HIV testing; as such, we controlled for it in our analyses. Variance of inflation  
41 factor (VIF) tests were conducted to assess multicollinearity between individual and community level GEM scores.  
42 VIF was  $<10$ , indicating multicollinearity was not an issue, and thus individual and community GEM scores were  
43 included in the same model (Model 2). Robust standard errors were calculated to account for clustering at the  
44 village level. Model fit was assessed using AIC and BIC, with Model 1 indicating better fit for the majority of  
45 outcomes. All analyses were conducted using Stata Version 16.1 (College Station, TX). As a sensitivity analysis to  
46 account for testing multiple hypotheses, we implemented the Benjamini-Hochberg (B-H) procedure to control the  
47 false discovery rate (FDR). Assuming an FDR of 10%, none of our outcomes met the critical threshold for statistical  
48 significance after applying the B-H procedure. (See *Appendix F* for full B-H procedure results.)

49 **Results**

50 **Participant characteristics**

1 The mean age of participants was 18.1 years ( $SD = 1.87$ ), with females comprising 43% of the sample.  
2 Bivariate analyses revealed that among all adolescents in communities with low gender equitable attitudes, 47.1%  
3 had completed Form IV (secondary school) or were still in secondary school, compared to 55.8% in communities  
4 with high gender equitable attitudes ( $p < 0.001$ ). There was a nearly six percentage point difference for HIV testing  
5 in the last 12 months between communities with high gender equitable attitudes and those with low gender  
6 equitable attitudes, with adolescents from high gender equitable attitude communities more likely to have been  
7 HIV tested ( $p = 0.024$ ). More than twenty-five percent of girls from communities with high gender equitable  
8 attitudes reported participating in transactional sex, while just 7.9% of boys from those same communities  
9 reported participation in transactional sex. See *Table 1* for participant characteristics; see *Appendix A* for  
10 characteristics stratified by sex. In our analysis of selective attrition (*Appendix G*), we found differences only in  
11 educational attainment (at baseline, 60.3% of the panel sample had completed Form IV or was still attending school  
12 v. 53.3% of the sample lost to follow-up;  $p = 0.024$ ) and number of sexual partners in the last 12 months (the panel  
13 sample had on average 1.17 partners v. 1.0 among those lost to follow-up;  $p = 0.023$ ) between the those lost to  
14 follow up and those in the panel sample. Overall, we conclude selective attrition is not a large problem in this  
15 sample.

16  
17  
18 **[Insert Table 1 approximately here]**  
19

20 Results for Full Sample (males and females)

21 Logistic regression analyses of pooled male and female adolescents ( $n = 2017$ ) suggest that there was  
22 marginally significant association between lagged high community gender equitable attitudes and HIV testing in the  
23 last 12 months ( $p < .10$ ). In both Models 1 and 2, adolescents from those communities had approximately 30%  
24 increased odds of being tested (for Model 1,  $OR = 1.29$ , 95% CI [0.99 – 1.69] and Model 2,  $OR = 1.31$ , 95% CI [1.00 –  
25 1.72]) as compared to adolescents in communities with medium/low gender equitable attitudes. Other  
26 characteristics positively associated with HIV testing included female sex and female head of household. There was  
27 no association between individual-level attitudes and HIV testing. There were also no significant associations  
28 between lagged community- or individual-level gender equitable attitudes for the primary outcomes of  
29 transactional sex or early sexual debut.

30 Among sexually debuted adolescent males and females ( $n = 619$ ), both models showed that high gender  
31 equitable attitudes were protective against age-disparate partnerships, with adolescents from communities with  
32 high gender equitable attitudes having 48% decreased odds of participating in an age-disparate partnership (Model  
33 1,  $OR = 0.52$ , 95% CI [0.30-0.88] and Model 2,  $OR = 0.52$ , 95% CI [0.30-0.93]). The sexually debuted sub-group did  
34 not see any associations, however, between community- or individual-level gender equitable attitudes and the  
35 primary outcomes of transactional sex, early sexual debut, or HIV testing in the last 12 months. Nor were there  
36 associations found for the secondary outcomes of modern contraceptive use, condom use at last sex, concurrency,  
37 or number of sexual partners in the last 12 months. See *Table 2* for primary outcome results and *Table 3* for  
38 secondary outcome results.

39  
40 **[Insert Table 2 and Table 3 approximately here]**  
41

42 Results for Female Sample

43 We now turn to results stratified by sex. Among all females ( $n = 865$ ), there was a significant association  
44 between community-gender equitable attitudes and HIV testing in Model 2. Results showed that girls from high  
45 gender equitable communities had nearly 50% increased odds of being HIV tested in the last 12 months ( $OR = 1.48$ ,  
46 95% CI [1.00-2.19]) compared to those in communities with low/medium gender equitable attitudes. As in the  
47 pooled sample, having a female head of household was also positively associated with HIV testing among females.  
48 There was no association between community- and individual-level gender equitable attitudes and the primary  
49 outcomes of transactional sex or early sexual debut in either model.

50 Among females who had sexually debuted ( $n = 281$ ), both models showed significant association between  
51 high community gender equitable attitudes and age-disparate partnerships. Girls from communities with high  
52 gender equitable attitudes had 51% decreased odds of participating in an age-disparate partnership in Model 1 ( $OR$

1 = 0.49, 95% CI [0.28-0.84]), and 49% decreased odds of the same in Model 2 (OR = 0.51, 95% CI [0.28-0.91]). In  
2 Model 2, high individual gender equitable attitudes were significantly associated with both condom use at last sex  
3 (OR = 2.07, 95% CI [1.07-4.00]) and contraceptive use (OR = 2.08, 95% CI [1.04-4.13]), with girls who held high  
4 gender equitable attitudes having more than two-fold increased odds of using both. Neither model showed an  
5 association between high community-level gender equitable attitudes and the primary outcomes of transactional  
6 sex, early sexual debut, and HIV testing in the last 12 months, or the secondary outcomes of modern contraceptive  
7 use, condom use at last sex, concurrency, and number of sexual partners in the last 12 months. See *Appendix B* for  
8 full results stratified by sex.

9  
10 Results for Male Sample

11 For males in the full sample ( $n = 1152$ ), gender equitable attitudes for both the community and combined  
12 community and individual models were not significantly associated with the primary outcomes of transactional sex,  
13 early sexual debut, or HIV testing in the last 12 months. Among males who had sexually debuted ( $n = 338$ ), neither  
14 model found association between community- or individual-level gender equitable attitudes and transactional sex,  
15 early sexual debut, HIV testing in the last 12 months, modern contraceptive use, condom use at last sex,  
16 concurrency, number of sexual partners in the last 12 months, or age-disparate relationships. See *Appendix B* for  
17 full results stratified by sex.

18  
19 Tests for Effect Modification

20 In our interacted models that tested whether sex moderates the relationship between community  
21 attitudes and outcomes of interest, we found evidence of effect modification by sex for community-level attitudes  
22 and age disparate sex ( $p = 0.005$ ) and individual-level attitudes and condom use ( $p = 0.051$ ). Further, we found  
23 evidence of effect modification by sex at the 10 percent level for individual-level attitudes and contraceptive use ( $p$   
24 = 0.104) and HIV testing ( $p = 0.075$ ). See *Appendix C* for full results.

25  
26 Discussion

27 This study examined the association between gender equitable attitudes at both the community and  
28 individual levels, and a number of sexual risk behaviors among male and female adolescents in rural Tanzania. We  
29 found that community gender equitable attitudes were most significantly associated with HIV testing and age-  
30 disparate relationships: in the pooled sample, adolescents from communities with high gender equitable attitudes  
31 had higher odds of HIV testing in the last 12 months and reduced odds of age-disparate partnerships (both driven  
32 by females). Moreover, high individual gender equitable attitudes were associated with higher odds of  
33 contraceptive uptake and condom use among girls (but not boys). Among sexually debuted adolescents, no  
34 significant associations were found between community or individual high gender equitable attitudes and  
35 transactional sex, early sexual debut, HIV testing, concurrent sexual partners, or number of sexual partners. No  
36 significant associations were found for males for any of the primary or secondary outcomes in the sex-stratified  
37 analysis.

38  
39 Community-level Attitudes

40 Our finding that higher community-level gender equitable attitudes were associated with increased odds of  
41 HIV testing suggests that communities with high gender equitable attitudes may experience less stigma around HIV  
42 health-seeking behavior, and may better prioritize access to, and awareness of, HIV testing. However, when  
43 examining separately by sex, results were only significant among females, not males. Women typically seek HIV  
44 testing (and other related care) more often than men (MacPherson et al., 2014). Masculine norms of not wanting  
45 to appear weak either prevent men from seeking care altogether, or they seek it at far later stages of disease  
46 progression than women (MacPherson et al., 2014). Thus, our findings suggest that there are still barriers to care-  
47 seeking for men, even in communities with high gender equitable attitudes, and that more needs to be done to  
48 dismantle norms that prevent men from accessing HIV care.

49 Adolescents from communities with high gender equitable attitudes had nearly half the odds of  
50 participating in an age-disparate partnership; however, as with HIV testing, this association appears to be driven by  
51 females, as it was not significant in the male-only analysis (less than one percent of males participated in age-  
52 disparate relationships, so this finding is likely due to low prevalence of those relationships among the male

1 sample). Age-disparate relationships with older male sexual partners put AGYW at increased risk for HIV  
2 (Ranganathan et al., 2020); indeed, AGYW have nearly twice the rates of HIV than adolescent boys (MacPherson et  
3 al., 2014). A driver of these age disparate relationships is often the financial security or material goods those  
4 partners can provide (Ranganathan et al., 2016), largely due to normative gender roles where women need to be  
5 provided for by men. This reflects women’s economic vulnerability and restricted opportunities to meet basic  
6 needs on their own, which in turn can lead to engagement in transactional sex, often with older male partners.  
7 Seventy-eight percent of all sexually debuted girls reported engagement in transactional sex, while just 31% of boys  
8 reported the same. Although these findings cannot be directly linked to gender inequitable attitudes with our  
9 current data, our study further contributes to the body of evidence suggesting that the gender and economic  
10 disparities experienced by women in Tanzania perpetuates practices that can put them at higher risk for sexually  
11 transmitted infections, HIV, and gender-based violence. Importantly though, while adolescent girls had much  
12 higher odds of participating in transactional sex and being involved in age-disparate partnerships than their boy  
13 counterparts, girls from communities with high gender equitable attitudes had significantly lower odds of age-  
14 disparate relationships as compared to girls in communities with medium/low gender equitable attitudes. This  
15 suggests that gender equity can influence risk behaviors for transactional sex and illustrates a possible mechanism  
16 of intervention through gender transformative education. Notably, recent research has found that adolescent boys  
17 and young men are more likely to reject transactional sex than older men, which may also be an avenue for  
18 intervention (Howard-Merrill et al., 2022). However, these adolescent and younger men also frequently do not  
19 have the means to provide the necessary goods in a transactional relationship, putting them at a structural  
20 disadvantage (Howard-Merrill et al., 2022), possibly skewing their view on the practice.

#### 21 22 Individual-level Attitudes

23 The female-only analysis indicated an association between high individual gender equitable attitudes and  
24 increased odds of both condom and contraceptive use for AGYW. This finding suggests that gender equitable  
25 attitudes may help to overcome barriers to condom and contraceptive use for AGYW. Disparate power dynamics  
26 driven by patriarchal gender norms in sexual relationships and/or a lack of sexual and reproductive health  
27 education for girls may mean that girls are not comfortable negotiating, or unaware of how to negotiate,  
28 contraceptive or condom use with their partners (Chandra-Mouli et al., 2014; MacPherson et al., 2014). Because  
29 the stigma around sex is still more for adolescent girls than boys in Tanzania, increasing gender equitable attitudes  
30 toward reproductive health and sexual behaviors (e.g., de-stigmatizing condom use as a sign of a woman’s  
31 infidelity) may help to increase AGYW’s ability to negotiate terms of sex with their partners (Ninsiima et al., 2018).

32 Boys living in households with a female head of household had lower odds of contraceptive use, perhaps  
33 suggesting higher rates of poverty and, subsequently, lower access to health services in households with a female  
34 head. Alternatively, this finding could reflect that conversations about safe sex practices are not occurring between  
35 parents and children, particularly when they are not of the same sex (Mbachu et al., 2020), or that these  
36 conversations do not provide accurate information when they do occur (Kajula et al., 2014). Despite evidence that  
37 discussions about sexual risk behavior can delay sexual debut and increase condom use in adolescents (Bastien et  
38 al., 2011), gender norms that make sex a taboo topic often contribute to conversations rooted in fear (e.g.,  
39 informing their children that sex leads to disease) or morality (e.g., unilaterally labeling sex as bad) (Bastien et al.,  
40 2011; Kajula et al., 2014). Thus, while parental involvement in discussing safe sex practices might play a larger role  
41 in preventing risky sexual behavior, whether this role positively or negatively influences sexual risk taking is largely  
42 dependent on parental knowledge of safe sex practices and comfort discussing them.

43 In line with previous findings that used this study data (Ranganathan et al., 2022), education appeared to  
44 have a protective effect on both transactional sex and early sexual debut for both sexes. Adolescence is indeed a  
45 time when gender norms are solidified, and peers begin to have stronger influence than family members (Foshee et  
46 al., 2013; Reyes et al., 2016). Higher levels of community education have also been associated with reduced sexual  
47 risk taking (Stephenson, 2009). Thus, remaining in or completing secondary school may mean that adolescents are  
48 exposed to peers with more equitable gender attitudes. Particularly for girls, remaining in school means that they  
49 are less likely to marry young because education presents options for adolescent girls outside of the domestic  
50 sphere, which can lead to economic empowerment and a better understanding of how to negotiate sexual  
51 interactions (Lokot et al., 2021). While these findings again cannot be directly connected to gender equitable

1 attitudes, sustained schooling, SRH education, and gender transformative programming can all contribute to  
2 gender equity by empowering girls and giving them viable alternatives to risky practices like transactional sex.

3 While education was protective for the primary outcomes of transactional sex and early sexual debut, and  
4 the secondary outcomes of number of sexual partners in the last year, concurrent sexual partners, and age-  
5 disparate partnerships, this was not the case for HIV testing. Both boys and girls who had completed or were still  
6 attending secondary school had significantly lower odds of receiving HIV testing than their out-of-school peers. This  
7 is possibly due to the fact that education was protective against these risky sexual behaviors, and that in-school  
8 adolescents had later sexual debuts and lower odds of concurrent and age disparate-partnerships. As such, it would  
9 follow that they would also have lower need for HIV testing. While this finding is consistent with evidence linking  
10 increased education with lower rates of HIV and risky sexual behavior among school-aged adolescents (Glynn et al.,  
11 2004), the body of evidence for education, HIV, and risky sexual practices overall is inconsistent, indicating further  
12 research is needed in this area.

### 13 Future Recommendations

14 Our findings demonstrate that adolescents are susceptible to the influence of perceived norms, particularly  
15 from a prosocial perspective (Andrews et al., 2021; Foshee et al., 2013) (e.g., higher equitable norms are associated  
16 with the prosocial behaviors of using condoms and getting HIV tested). They underscore why adolescence is a  
17 critical time to intervene around sexual risk behavior, especially when it comes to the intersection of sexual  
18 behavior and gender norms. Previous literature surrounding gender norms and SRH has examined outcomes only  
19 among female participants (Jewkes et al., 2015; Keith et al., 2022), and/or observed associations between  
20 individual-level attitudes or community factors and sexual risk behavior (Pettifor et al., 2018; Stephenson, 2009;  
21 Varga, 2003). Our study contributes to the literature by utilizing clustered community-level attitudes as well as  
22 individual-level attitudes and examining their association with individual behaviors of both male and female  
23 adolescents. Our research suggests the possibility that incorporating community attitudes, and examining  
24 outcomes for boys as well as girls, may be important to achieving greater gender equity than focusing on girls  
25 alone. Gender transformative work then, should strive to involve all levels of the community, from adolescents and  
26 their care givers, to community leaders and policy makers (Wingood & DiClemente, 2002).

27 Interventions that focus on HIV risk behaviors through the promotion of gender equality (such as Stepping  
28 Stones in South Africa, which places particular focus on risk behaviors in men and boys) may be helpful in further  
29 reducing the stigma that masculine norms place on HIV testing and care (Jewkes et al., 2008; MacPherson et al.,  
30 2014). Combining sexual education with gender norms behavioral change communication could further increase  
31 knowledge, awareness, and use of condoms and contraception for females (Bandiera et al., 2020), and may help to  
32 increase HIV prevention knowledge among all adolescents (Jewkes et al., 2008). Considering how caregivers of  
33 adolescents might supplement this knowledge, and subsequently support a normative shift in educating their  
34 children about sexual risk, is also important when designing programs for adolescent sexual health (Agbemenu et  
35 al., 2016; Kajula et al., 2014; Mbachu et al., 2020). Lastly, previous research has found that when women are less  
36 dependent on men for financial security, they find it less necessary to participate in age-disparate and transactional  
37 sex (Wamoyi et al., 2020). Programs such as Empowerment and Livelihood for Adolescents that focus on bodily  
38 agency, economic empowerment, SRH knowledge, and awareness of sexual risk factors specific to AGYW may be  
39 helpful in empowering AGYW and enabling them to make choices driven by aspirations rather than adherence to  
40 normative behaviors (Bandiera et al., 2020).

### 41 Limitations

42 Our study had some limitations. First, the data relied on self-reporting of topics that are not typically  
43 publicly discussed and have strong social norms attached to them; thus, there may be social desirability bias in  
44 participant responses. While we used non-self-clustered means (Balk, 1994) and clustering of attitudes toward  
45 difficult-to-observe behaviors (Cislaghi et al., 2022) to measure community norms, the community-level attitudes  
46 reflected only those of adolescents, not the entire community. Because of this, other potential drivers of attitudes  
47 and norms (e.g., the influence of non-adolescent community members, parents, or religious leaders) may not have  
48 been adequately captured in our measures. Our sample was also drawn from extremely poor households, which  
49 may partially explain the high rates of engagement in transactional sex among sexually debuted girls. Therefore,  
50 our results may not generalize to adolescents and youth across the socioeconomic distribution. Lastly, when  
51  
52

1 married adolescents were removed from the sexually debuted sample, particularly for AGYW, the sample size  
2 decreased (girls,  $n = 281$  and boys,  $n = 338$ ). Sex-stratified results should thus be interpreted cautiously, as such  
3 low-powered data may not have been able to detect a significant relationship among the variables of interest, even  
4 if a relationship does exist. Additional research with larger samples would help to further illuminate the relationship  
5 between gender norms and sexual health and risk behaviors.

## 6 7 **Conclusion**

8 Our findings highlight the importance of incorporating gender equitable attitudes when discussing sexual  
9 risk behavior and sexual and reproductive health among adolescents. This research further contributes to the  
10 evidence that a focus on gender equity can have protective effects on a number of sexual risk behaviors (Dworkin  
11 et al., 2013), including age-disparate partnerships, condom and contraceptive use, and HIV testing. It highlights the  
12 importance of keeping both girls and boys in school and underscores the need for gender transformative  
13 programming among whole communities, including boys and men, not just girls and women. Such programming  
14 could address gender inequity and improve the health and well-being of adolescents in low-and middle-income  
15 countries as they transition to adulthood.

## 16 17 18 **Acknowledgements**

19 This study conducts secondary data analysis of the Ujana Salama Adolescent Cash Plus Pilot study. The pilot  
20 study was retrospectively registered with the Pan African Clinical Trial Registry (PACTR) as  
21 PACTR201804003008116. The authors would like to acknowledge the support of the TASAF and TACAIDS, in  
22 particular Ladislaus Mwamanga (TASAF), Amadeus Kamagenge (TASAF), and Fariji Mishael (TASAF) for the  
23 implementation of this evaluation. In addition, the UNICEF personnel instrumental to the initial planning stages of  
24 this pilot and study include: Alison Jenkins, Beatrice Targa, Patricia Lim Ah Ken, Victoria Chuwa, Naomi Neijhoft and  
25 Tulanoga Matwimbi. We would also like to acknowledge the hard-working field teams of EDI Global, who  
26 conducted the data collection for this study to the highest professional standards. The findings, interpretations and  
27 conclusions expressed in this paper are those of the authors and are not necessarily the position of UNICEF or the  
28 Government of the United Republic of Tanzania.

29 Members of the Evaluation Team include: University at Buffalo: Tia Palermo (co–principal investigator),  
30 Sarah Quinones; UNICEF Office of Research: Lusajo Kajula, Jacobus de Hoop, Leah Prencipe, Valeria Groppo, Nyasha  
31 Tirivayi, and Jennifer Waidler; EDI Global: Johanna Choumert Nkolo (co–principal investigator), Respichius Mitti  
32 (co–principal investigator), Marie Mallet, and Bhoke Munanka; TASAF: Paul Luchemba and Tumpe Mnyawami  
33 Lukongo; TACAIDS: Aroldia Mulokozi; UNICEF Tanzania: Ulrike Gilbert, Paul Quarles van Ufford, Rikke Le Kirkegaard,  
34 Frank Eetaama, Jennifer Matafu, Diego Angemi, Luisa Natali.

## 35 36 **Funding**

37 No funding was received for the analysis and drafting of this manuscript. Funding for the original pilot and  
38 evaluation has been provided by Oak Foundation (#OCAY-16-73) and UNICEF. Additional funding for the evaluation  
39 (2017-2019) was provided by the UK’s Department of International Development (DFID 203529-102) and the  
40 Swedish Development Cooperation Agency (Sida G41102), both through a grant to UNICEF Office of Research—  
41 Innocenti supporting the Transfer Project. Additional funding for program implementation activities (2018-2020)  
42 was provided by Irish Aid (Irish Aid IA-TAN/2019/064). The funders had no role in analysis or interpretation of data.

## 43 44 **Competing Interests**

45 The authors have declared that no competing interests exist.

## 46 47 **Author Contributions Statement**

### 48 **Kate Rogers**

- 49 • *Roles:* Conceptualization, formal analysis, methodology, visualization, and writing (original draft)
- 50 • *Affiliation:* Department of Community Health and Health Behavior, University at Buffalo, SUNY, Buffalo, NY,  
51 USA
- 52 • <https://orcid.org/0000-0002-1378-062X>

1 **Meghna Ranganathan**

- 2 • *Roles:* Writing (review and editing)
- 3 • *Affiliation:* London School of Hygiene and Tropical Medicine, Faculty of Public Health and Policy and
- 4 Department of Global Health and Development, London, UK
- 5 • <https://orcid.org/0000-0001-5827-343X>

6 **Lusajo Kajula**

- 7 • *Roles:* Writing (review and editing)
- 8 • *Affiliation:* Independent Consultant, Dar es Salaam, Tanzania and UNICEF Office of Research-Innocenti
- 9 • <https://orcid.org/0000-0001-8375-0701>

10 **R Lorraine Collins**

- 11 • *Roles:* Supervision, writing (review and editing)
- 12 • *Affiliation:* Department of Community Health and Health Behavior, University at Buffalo, SUNY, Buffalo, NY,
- 13 USA
- 14 • <https://orcid.org/0000-0002-3342-4788>

15 **Jennifer A. Livingston**

- 16 • *Roles:* Writing (review and editing)
- 17 • *Affiliation:* School of Nursing, University at Buffalo, SUNY, Buffalo, NY, USA
- 18 • <https://orcid.org/0000-0002-2251-1253>

19 **Tia Palermo**

- 20 • *Roles:* Formal analysis, methodology, supervision, writing (review and editing)
- 21 • *Affiliation:* Department of Epidemiology and Environmental Health, University at Buffalo, SUNY, Buffalo, NY,
- 22 USA
- 23 • <https://orcid.org/0000-0003-0419-2049>

24

25 **References**

- 26 Agbemenu, K., Terry, M. A., Hannan, M., Kitutu, J., & Doswell, W. (2016). Attitudes and beliefs of African  
27 immigrant mothers living in the US towards providing comprehensive sex education to daughters  
28 aged 12–17 years: A pilot study. *Journal of Immigrant and Minority Health, 18*(5), 1053-1059.
- 29 Andrew, A., Krutikova, S., Smarrelli, G., & Verma, H. (2022). Gender norms, violence and adolescent girls'  
30 trajectories: evidence from a field experiment in India.
- 31 Andrews, J. L., Ahmed, S. P., & Blakemore, S.-J. (2021). Navigating the social environment in  
32 adolescence: The role of social brain development. *Biological Psychiatry, 89*(2), 109-118.
- 33 Balk, D. (1994). Individual and community aspects of women's status and fertility in rural Bangladesh.  
34 *Population studies, 48*(1), 21-45.
- 35 Bandiera, O., Buehren, N., Burgess, R., Goldstein, M., Gulesci, S., Rasul, I., & Sulaiman, M. (2020).  
36 Women's Empowerment in Action: Evidence from a Randomized Control Trial in Africa [Article].  
37 *American Economic Journal-Applied Economics, 12*(1), 210-259.  
38 <https://doi.org/10.1257/app.20170416>
- 39 Bastien, S., Kajula, L. J., & Muhwezi, W. W. (2011). A review of studies of parent-child communication  
40 about sexuality and HIV/AIDS in sub-Saharan Africa. *Reproductive health, 8*(1), 1-17.
- 41 Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*.  
42 Harvard university press.
- 43 CDC. (2022b). The Social Ecological Model: A Framework for Prevention.  
44 <https://www.cdc.gov/violenceprevention/about/social-ecologicalmodel.html>
- 45 Chandra-Mouli, V., McCarraher, D. R., Phillips, S. J., Williamson, N. E., & Hainsworth, G. (2014).  
46 Contraception for adolescents in low and middle income countries: needs, barriers, and access.  
47 *Reproductive health, 11*(1), 1-8.
- 48 Cislaghi, B., & Heise, L. (2020). Gender norms and social norms: differences, similarities and why they  
49 matter in prevention science. *Sociology of health & illness, 42*(2), 407-422.

- 1 Cislaghi, B., Weber, A. M., Shakya, H. B., Abdalla, S., Bhatia, A., Domingue, B. W., Mejía-Guevara, I., Stark,  
2 L., Seff, I., & Richter, L. M. (2022). Innovative methods to analyse the impact of gender norms on  
3 adolescent health using global health survey data. *Social Science & Medicine*, *293*, 114652.
- 4 Coker, A. L., Bush, H. M., Clear, E. R., Brancato, C. J., & McCauley, H. L. (2020). Bystander program  
5 effectiveness to reduce violence and violence acceptance within sexual minority male and female  
6 high school students using a cluster RCT. *Prevention science*, *21*(3), 434-444.
- 7 Crone, E. A., & Dahl, R. E. (2012). Understanding adolescence as a period of social–affective engagement  
8 and goal flexibility. *Nature reviews neuroscience*, *13*(9), 636-650.
- 9 Davis, S. N., & Greenstein, T. N. (2009). Gender ideology: Components, predictors, and consequences.  
10 *Annual review of Sociology*, *35*, 87-105.
- 11 Decker, M. R., Latimore, A. D., Yasutake, S., Haviland, M., Ahmed, S., Blum, R. W., Sonenstein, F., &  
12 Astone, N. M. (2015). Gender-based violence against adolescent and young adult women in low-  
13 and middle-income countries. *Journal of Adolescent Health*, *56*(2), 188-196.
- 14 Dunkle, K. L., Jewkes, R. K., Brown, H. C., Gray, G. E., McIntyre, J. A., & Harlow, S. D. (2004).  
15 Transactional sex among women in Soweto, South Africa: prevalence, risk factors and association  
16 with HIV infection. *Social Science & Medicine*, *59*(8), 1581-1592.
- 17 Dworkin, S. L., Treves-Kagan, S., & Lippman, S. A. (2013). Gender-transformative interventions to reduce  
18 HIV risks and violence with heterosexually-active men: a review of the global evidence. *AIDS and  
19 behavior*, *17*(9), 2845-2863.
- 20 Foshee, V. A., Benefield, T. S., Reyes, H. L. M., Ennett, S. T., Faris, R., Chang, L.-Y., Hussong, A., &  
21 Suchindran, C. M. (2013). The peer context and the development of the perpetration of  
22 adolescent dating violence. *Journal of Youth and Adolescence*, *42*(4), 471-486.
- 23 Foss, A. M., Hossain, M., Vickerman, P. T., & Watts, C. H. (2007). A systematic review of published  
24 evidence on intervention impact on condom use in sub-Saharan Africa and Asia. *Sexually  
25 Transmitted Infections*, *83*(7), 510-516.
- 26 George, A. S., Amin, A., de Abreu Lopes, C. M., & Ravindran, T. S. (2020). Structural determinants of  
27 gender inequality: why they matter for adolescent girls' sexual and reproductive health. *bmj*,  
28 *368*.
- 29 Glynn, J. R., Caraël, M., Buvé, A., Anagonou, S., Zekeng, L., Kahindo, M., Musonda, R., & Cities, S. G. o. H.  
30 o. H. E. i. A. (2004). Does increased general schooling protect against HIV infection? A study in  
31 four African cities. *Tropical medicine & international health*, *9*(1), 4-14.
- 32 Govender, K., Cowden, R. G., Asante, K. O., George, G., & Reardon, C. (2019). Sexual risk behavior: A  
33 multi-system model of risk and protective factors in South African adolescents. *Prevention  
34 science*, *20*(7), 1054-1065.
- 35 Howard-Merrill, L., Wamoyi, J., Nyato, D., Kyegombe, N., Heise, L., & Buller, A. M. (2022). 'I trap her with  
36 a CD, then tomorrow find her with a big old man who bought her a smart phone'. Constructions  
37 of masculinities and transactional sex: a qualitative study from North-Western Tanzania. *Culture,  
38 health & sexuality*, *24*(2), 254-267.
- 39 Jewkes, R., Flood, M., & Lang, J. (2015). From work with men and boys to changes of social norms and  
40 reduction of inequities in gender relations: a conceptual shift in prevention of violence against  
41 women and girls. *The Lancet*, *385*(9977), 1580-1589.
- 42 Jewkes, R., Nduna, M., Levin, J., Jama, N., Dunkle, K., Puren, A., & Duvvury, N. (2008). Impact of stepping  
43 stones on incidence of HIV and HSV-2 and sexual behaviour in rural South Africa: cluster  
44 randomised controlled trial. *bmj*, *337*.
- 45 Kågesten, A., Gibbs, S., Blum, R. W., Moreau, C., Chandra-Mouli, V., Herbert, A., & Amin, A. (2016).  
46 Understanding factors that shape gender attitudes in early adolescence globally: A mixed-  
47 methods systematic review. *PloS one*, *11*(6), e0157805.



- 1 Kajula, L. J., Sheon, N., De Vries, H., Kaaya, S. F., & Aarø, L. E. (2014). Dynamics of parent–adolescent  
2 communication on sexual health and HIV/AIDS in Tanzania. *AIDS and behavior*, *18*(1), 69-74.
- 3 Keith, T., Hyslop, F., & Richmond, R. (2022). A systematic review of interventions to reduce gender-based  
4 violence among women and girls in sub-saharan africa. *Trauma, Violence, & Abuse*,  
5 15248380211068136.
- 6 Kidman, R., Waidler, J., & Palermo, T. (2020). Uptake of HIV testing among adolescents and associated  
7 adolescent-friendly services [Article]. *BMC health services research*, *20*(1), 881.  
8 <https://doi.org/10.1186/s12913-020-05731-3>
- 9 Lokot, M., Sulaiman, M., Bhatia, A., Horanieh, N., & Cislighi, B. (2021). Conceptualizing “agency” within  
10 child marriage: Implications for research and practice. *Child Abuse & Neglect*, *117*, 105086.
- 11 MacPherson, E. E., Richards, E., Namakhoma, I., & Theobald, S. (2014). Gender equity and sexual and  
12 reproductive health in Eastern and Southern Africa: a critical overview of the literature. *Global  
13 health action*, *7*(1), 23717.
- 14 Mbachu, C. O., Agu, I. C., Eze, I., Agu, C., Ezenwaka, U., Ezumah, N., & Onwujekwe, O. (2020). Exploring  
15 issues in caregivers and parent communication of sexual and reproductive health matters with  
16 adolescents in Ebonyi state, Nigeria. *BMC public health*, *20*(1), 1-10.
- 17 Ninsiima, A. B., Leye, E., Michielsen, K., Kemigisha, E., Nyakato, V. N., & Coene, G. (2018). “Girls have  
18 more challenges; they need to be locked up”: a qualitative study of gender norms and the  
19 sexuality of young adolescents in Uganda. *International journal of environmental research and  
20 public health*, *15*(2), 193.
- 21 Norton, E. C., Wang, H., & Ai, C. (2004). Computing interaction effects and standard errors in logit and  
22 probit models. *The Stata Journal*, *4*(2), 154-167.
- 23 Pettifor, A., Lippman, S. A., Gottert, A., Suchindran, C. M., Selin, A., Peacock, D., Maman, S., Rebombo,  
24 D., Twine, R., & Gómez-Olivé, F. X. (2018). Community mobilization to modify harmful gender  
25 norms and reduce HIV risk: results from a community cluster randomized trial in South Africa.  
26 *Journal of the International AIDS Society*, *21*(7), e25134.
- 27 Prencipe, L., Houweling, T. A., van Lenthe, F. J., Kajula, L., Palermo, T., & on Behalf of the Tanzania  
28 Adolescent Cash Plus Evaluation Team. (2022). Effects of Adolescent-Focused Integrated Social  
29 Protection on depression: A Pragmatic Cluster-Randomized Controlled Trial of Tanzania’s Cash  
30 Plus Intervention. *American journal of epidemiology*, *191*(9), 1601-1613.
- 31 Pulerwitz, J., & Barker, G. (2008). Measuring attitudes toward gender norms among young men in Brazil:  
32 development and psychometric evaluation of the GEM scale. *Men and masculinities*, *10*(3), 322-  
33 338.
- 34 Pulerwitz, J., Blum, R., Cislighi, B., Costenbader, E., Harper, C., Heise, L., Kohli, A., & Lundgren, R. (2019).  
35 Proposing a conceptual framework to address social norms that influence adolescent sexual and  
36 reproductive health. *Journal of Adolescent Health*, *64*(4), S7-S9.
- 37 Ranganathan, M., Heise, L., Pettifor, A., Silverwood, R. J., Selin, A., MacPhail, C., Delany-Moretlwe, S.,  
38 Kahn, K., Gómez-Olivé, F. X., & Hughes, J. P. (2016). Transactional sex among young women in  
39 rural South Africa: prevalence, mediators and association with HIV infection. *Journal of the  
40 International AIDS Society*, *19*(1), 20749.
- 41 Ranganathan, M., Kilburn, K., Stoner, M. C., Hughes, J. P., MacPhail, C., Gomez-Olive, F. X., Wagner, R. G.,  
42 Kahn, K., Agyei, Y., & Pettifor, A. (2020). The mediating role of partner selection in the association  
43 between transactional sex and HIV incidence among young women. *Journal of acquired immune  
44 deficiency syndromes (1999)*, *83*(2), 103.
- 45 Ranganathan, M., MacPhail, C., Pettifor, A., Kahn, K., Khoza, N., Twine, R., Watts, C., & Heise, L. (2017).  
46 Young women’s perceptions of transactional sex and sexual agency: a qualitative study in the  
47 context of rural South Africa. *BMC public health*, *17*(1), 1-16.

- 1 Ranganathan, M., Quinones, S., Palermo, T., Gilbert, U., Kajula, L., Team, T. C. P. E., Palermo, T.,  
2 Quinones, S., Kajula, L., & de Hoop, J. (2022). Transactional sex among adolescent girls and young  
3 women enrolled in a cash plus intervention in rural Tanzania: a mixed-methods study. *Journal of*  
4 *the International AIDS Society*, 25(12), e26038.
- 5 Reyes, H. L. M., Foshee, V. A., Niolon, P. H., Reidy, D. E., & Hall, J. E. (2016). Gender role attitudes and  
6 male adolescent dating violence perpetration: Normative beliefs as moderators. *Journal of Youth*  
7 *and Adolescence*, 45(2), 350-360.
- 8 Seff, I., Steiner, J. J., & Stark, L. (2021). Early sexual debut: A multi-country, sex-stratified analysis in sub-  
9 Saharan Africa. *Global public health*, 16(7), 1046-1056.
- 10 Smith, L., Jacob, L., López-Sánchez, G. F., Grabovac, I., Yang, L., Pizzol, D., Sigman, A., McDermott, D., &  
11 Koyanagi, A. (2022). A multicountry study of the violence-related risk factors for early sexual  
12 debut and risky sexual behavior in adolescents. *Journal of Interpersonal Violence*, 37(3-4),  
13 NP1275-NP1297.
- 14 Stephenson, R. (2009). Community influences on young people's sexual behavior in 3 African countries.  
15 *American journal of public health*, 99(1), 102-109.
- 16 Stoebenau, K., Heise, L., Wamoyi, J., & Bobrova, N. (2016). Revisiting the understanding of “transactional  
17 sex” in sub-Saharan Africa: A review and synthesis of the literature. *Social Science & Medicine*,  
18 168, 186-197.
- 19 Tanzania Cash Plus Evaluation Team. (2020). *A Cash Plus Model for Safe Transitions to a Healthy and*  
20 *Productive Adulthood: Midline Report*. UNICEF Office of Research - Innocenti.
- 21 UNICEF. (2020). *A Cash Plus Model for Safe Transitions to a Healthy and Productive Adulthood: Midline*  
22 *Report*.
- 23 UNICEF. (2021). *A Cash Plus Model for Safe Transitions to a Healthy and Productive Adulthood Round 3*  
24 *Report*.
- 25 Varga, C. A. (2003). How gender roles influence sexual and reproductive health among South African  
26 adolescents. *Studies in family planning*, 34(3), 160-172.
- 27 Wado, Y. D., Mutua, M. K., Mohiddin, A., Ijadunola, M. Y., Faye, C., Coll, C. V. N., Barros, A. J. D., &  
28 Kabiru, C. W. (2021). Intimate partner violence against adolescents and young women in sub-  
29 Saharan Africa: who is most vulnerable? *Reprod Health*, 18(Suppl 1), 119.  
30 <https://doi.org/10.1186/s12978-021-01077-z>
- 31 Wamoyi, J., Balvanz, P., Atkins, K., Gichane, M., Majani, E., Pettifor, A., & Maman, S. (2020).  
32 Conceptualization of Empowerment and Pathways Through Which Cash Transfers Work to  
33 Empower Young Women to Reduce HIV Risk: A Qualitative Study in Tanzania. *AIDS Behav*, 24(11),  
34 3024-3032. <https://doi.org/10.1007/s10461-020-02850-0>
- 35 Wamoyi, J., Heise, L., Meiksin, R., Kyegombe, N., Nyato, D., & Buller, A. M. (2019). Is transactional sex  
36 exploitative? A social norms perspective, with implications for interventions with adolescent girls  
37 and young women in Tanzania. *PloS one*, 14(4), e0214366.
- 38 Wamoyi, J., Ranganathan, M., Kyegombe, N., & Stoebenau, K. (2019). Improving the measurement of  
39 transactional sex in Sub-Saharan Africa: a critical review. *Journal of acquired immune deficiency*  
40 *syndromes (1999)*, 80(4), 367.
- 41 Wingood, G., & DiClemente, R. (2002). The theory of gender and power. *Emerging theories in health*  
42 *promotion practice and research: Strategies for improving public health*. San Francisco: Jossey-  
43 Bass, 313-345.
- 44