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Do gender-equitable attitudes translate to gender-equitable chore-sharing behavior? A sex-stratified longitudinal analysis among adolescents in Kinshasa

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Abstract

Unpaid care work is disproportionately performed by women and girls, negatively impacting their ability to engage in educational, social, and economic opportunities. Despite calls to address these inequities, empirical evidence on interventions designed to shift gender attitudes is limited, especially within adolescent populations. To address this gap, we used longitudinal data to conduct difference-in-difference and logistic regression models to examine the impact of a norms-shifting intervention in Kinshasa on adolescent gender-equitable chore-sharing attitudes. As compared to controls, intervention participants were 2.3 times ($p<0.001$) more likely to hold gender-equitable attitudes towards chore-sharing at end line. Using baseline attitudes to predict end line behavior, we find that, as compared to adolescents with gender-inequitable attitudes, boys and girls who espoused equitable gender attitudes were 1.9 times ($p<0.001$) and 1.5 times ($p=0.005$), respectively, more likely to report gender-equitable chore-sharing behavior. Norms-shifting interventions should be prioritized among very young adolescents as a strategy to shift gender-inequitable attitudes. *(Afr J Reprod Health 2022; 26[12s]: 88-97).*

Keywords: Gender equity; adolescents; longitudinal analysis

Résumé

Le travail de soins non rémunéré est effectué de manière disproportionnée par les femmes et les filles, ce qui a un impact négatif sur leur capacité à s'engager dans des opportunités éducatives, sociales et économiques. Malgré les appels à remédier à ces inégalités, les preuves empiriques sur les interventions conçues pour modifier les attitudes liées au genre sont limitées, en particulier au sein des populations adolescentes. Pour combler cette lacune, nous avons utilisé des données longitudinales pour mener des modèles de différence dans la différence et de régression logistique afin d'examiner l'impact d'une intervention de changement de normes à Kinshasa sur les attitudes de partage des tâches équitables entre les sexes chez les adolescents. Par rapport aux témoins, les participants à l'intervention étaient 2,3 fois ($p<0,001$) plus susceptibles d'avoir des attitudes équitables entre les sexes envers le partage des tâches à la fin de l'étude. En utilisant les attitudes de base pour prédire le comportement final, nous constatons que, par rapport aux adolescents ayant des attitudes inéquitables entre les sexes, les garçons et les filles qui ont adopté des attitudes de genre équitables étaient 1,9 fois ($p<0,001$) et 1,5 fois ($p=0,005$), respectivement, plus susceptibles de signaler un comportement de partage des tâches équitable entre les sexes. Les interventions visant à modifier les normes devraient être prioritaires chez les très jeunes adolescents en tant que stratégie pour modifier les attitudes inéquitables entre les sexes. *(Afr J Reprod Health 2022; 26[12s]: 88-97).*

Mots-clés: L'égalité des sexes; adolescents; analyse longitudinale

Introduction

Unpaid care work—the household work and care of persons that occurs in homes—is critical to the proper functioning of global societies and economies[1,2]. It contributes to economic development, social well-being, basic living standards, and development of human capabilities[3,4]. Despite a growing recognition of the extent and importance of care work, this form of labour remains largely invisible and undervalued in the market economy[4]. It is also disproportionately performed by women. Women spend on average 3.2 times more time than men in unpaid care work (4 hours and 25 minutes per day, as compared to 1 hour and 23 minutes for men)[5]. This gender divide

in care work appears early in life, with girls between the ages of five and fourteen spending 160 million more hours every day globally on unpaid care work than boys of the same age[6,7]. In the Democratic Republic of Congo (DRC) in particular, children's gender is a primary correlate with involvement in household chores, even after controlling for a range of individual and household level characteristics[8].

The unequal gendered distribution of unpaid care and domestic work among children has serious implications for the comparative development of girls and boys. Girls who carry heavy household care burden lack time to play and develop outside the home, to participate in schooling, and to earn a livelihood[7]. Confinement to the domestic work also reduces girls' ability to build friendships and social networks, thereby reducing important sources of social capital as they grow and develop. These deprivations and missed opportunities shape girls' lives into adulthood[9], with today's girls becoming tomorrow's women in care work. This continued engagement in unpaid care work further limits women's economic opportunities and contributes to the gender wage gap[10]. In the DRC, as of December 2020, only 33.5% of indicators needed to monitor gender equity were available—such as the gender wage gap and women's engagement in unpaid care. As such, the extent of these inequities is unknown[11]. Globally, however, the principal reason given by women of working age for being outside the labour force is unpaid care work, while for men it is being in education, being sick, or disabled[5]. Women and girls' disproportionate time spent in care work and out of paid work likely also impacts boys' attitudes and development. For instance, boys may adopt a skewed sense of the value of girls' versus boys' time and grow up to play limited roles as fathers and caregivers[7], leading to the continuation of an intergenerational cycle of inequities in unpaid care work.

Despite these barriers to engagement, some men do want to participate in care work[1]. For example, 85% of men from seven middle- and higher-income countries said they would "do whatever it takes to be very involved" in the care of their newly born baby[12]. However, men who do engage in activities that are traditionally seen as 'women's work' face social stigma for going against social norms that dictate the behaviors and practices of masculinity[13]. Additional barriers to gender-equitable participation in unpaid care work range from the structural-level—such as limited access to adequate paid leave for both men and women—to individually-held beliefs that women are more competent at care work than men[1]. A common thread at each of these levels is the need to shift the gendered narratives and norms related to care work and the related behaviours and practices in which it is deemed socially acceptable for males and females to engage. Intervening on restrictive gender attitudes and norms among adolescent populations in particular is critical, as it is within this developmental period that gender norms may solidify[14,15].

As informed by a constructivist perspective, the ways in which adolescent boys and girls behave are informed by the concepts of femininity and masculinity that they adopt from the culture[16]. These gendered behaviors become more important for social acceptance as children age and enter adulthood. Gender is not, however, static, and can be viewed as a dynamic social structure[17]. In light of the modifiable nature of gender, researchers and practitioners have engaged in a series of efforts in health programming with men to transform gender relations to be more equitable[18]. These efforts are collectively referred to as gender-transformative health programs.

Recognizing the importance of adolescence as a critical juncture in one's life trajectory, and the role that unpaid care work plays in persistent gender inequities across the life course, gender transformative interventions among very young adolescents (VYAs) have been designed to examine, question, and shift rigid gender norms and power imbalances[19,20]. One such program in Kinshasa, Democratic Republic of Congo (DRC) is the Growing Up GREAT! (GUG) project[21]. This project is led by Save the Children and local implementing partners among VYAs ages 10-14 years. The multilevel intervention engages VYAs and their parents/caregivers, teachers and health providers via a series of school- and community-based sessions designed to build knowledge, health- and gender-positive attitudes and skills. The program specifically targeted attitudes surrounding gender equity in household chore-sharing among the participants. Data from the project's outcome evaluation allow for the examination of three research questions:

1. Did the GUG intervention impact adolescents' chore-sharing attitudes?
2. Does a correlation exist between gender-equitable attitudes and boys' chore-sharing behaviour? And does this relationship hold over time as adolescents develop?
3. Do gender-equitable attitudes in chore-sharing at baseline predict gender-equitable chore-sharing behaviours at end line?

The answers to these research questions will provide evidence regarding the need for norms-shifting interventions among VYAs. Given the life-long impact on missed opportunities for girls and women engaging in unpaid care work, this improved understanding of how to address these inequities in unpaid work early in life may lead to improvements in other domains of gender equity, such as education and work.

Methods

Global Early Adolescent Study

Data were obtained from the Kinshasa component of the Global Early Adolescent Study (GEAS), a multi-country longitudinal study exploring gender socialization in early adolescence and its implications for adolescent health and wellbeing[22]. Several GEAS sites included outcome evaluations of local interventions in addition to assessing secular trends in adolescent well-being. Kinshasa was one such site. For the outcome evaluation of GUG in Kinshasa, the GEAS used a quasi-experimental longitudinal design with an intervention and a control arm. The baseline survey (Wave 1) was conducted between June and November 2017 and adolescents were followed up one year later (Wave 2), approximately three months after the GUG intervention ended. In addition, two additional waves of data were collected roughly one year apart (Waves 3 and 4) with the same cohort.

Quasi-experimental design

Eligible adolescents were 10-14 years at baseline and lived in low-income neighborhoods of Kinshasa where Save the Children had an established presence. After stratification by neighborhood and school type, 80 schools (40 intervention, 40 control) were selected. In each school, 25 GUG participants were randomly selected for the intervention group after stratification by age and sex. Additionally, 25 VYAs per school were randomly selected for the control group from neighborhoods with similar characteristics as those from the intervention neighborhoods, after stratification by age and sex. A sample of out-of-school (OOS) VYAs was selected from the same neighborhoods as the school sample. The OOS intervention group included all OOS VYAs participating in GUG. The OOS control group included a random sample of adolescents stratified by sex and age as selected from a listing of households with OOS adolescents as identified by a local partnering community-based organization. Altogether 2,842 VYAs were surveyed at baseline and 2,533 were surveyed one year later and matched to baseline data. Observations with poor data quality (missing 15% of data or more or interviewer assessment of poor quality of responses) were excluded, resulting in a total sample of 2,519 VYAs with data from both Waves 1 and 2.

Data collection

The GEAS survey took on average 1h30 minutes to complete (with breaks) and was administered face-to-face by trained interviewers using tablets. The survey solicited information on young peoples' social environment (family, peers, school, and neighborhoods), their perceptions of gender norms and agency, as well as a range of health indicators. The GEAS questions were adapted to the local context and translated to the local language, Lingala. The survey included specific questions about the features of the intervention and intervention exposure.

Measures

Outcome. The dependent variable of interest in the present study is male chore-sharing behavior. This is assessed via adolescent self-report of a brother [either the female respondent's brother or the male adolescent himself] helping his sister. The exact item wording asked of girls was, "In the last month, has your brother helped with any of your chores around the house?" For boys the item was worded as follows: "In the last month, have you helped your sister with any of her chores around the house?" This item was assessed at all four waves in

the GEAS-Kinshasa study as a binary variable (1=yes, 0=no).

Exposure. The primary independent variable of interest is self-reported attitudes regarding gender-equity in household chores. The exact item asked of both boys and girls was, "Boys and girls should be equally responsible for household chores. Do you agree or disagree?" This item was assessed at all four waves in the GEAS-Kinshasa study. For primary analyses, the variable is recoded from a five-point Likert response to a binary variable, with 'agree a lot' and 'agree a little' responses coded as 1 and 'neutral,' 'disagree a little,' and 'disagree a lot' responses coded as 0.

Covariates. Demographic covariates measured at Wave 1 are included in fully adjusted models and include: adolescent age, family wealth tertile, household composition (no parents, one parent only, both parents), and school status (in-school or out-of-school).

Statistical analysis

To assess whether the intervention had an effect on adolescent gender-equitable attitudes, we used a difference-in-difference statistical approach to compare the change in attitudes from baseline (Wave 1) to end line (Wave 2) between intervention and control groups. Generalized Estimating Equation models were applied, interacting survey year with study group to evaluate differential intervention trends. An interaction term for sex was also included to examine whether intervention effects differed between boys and girls. We accounted for sample attrition between the waves by computing inverse probability weights that reflected the probably of being included in the analytic sample.

To assess the correlation between boys' and girls' gender-equitable attitudes and chore-sharing behavior, we use sex-stratified bivariate and multivariable logistic regression to assess the correlation between the outcome and exposure variables (unadjusted and adjusted estimates) at each of the four waves of data. The exposure is change in attitudes towards chore-sharing, but the outcome differs by sex in the sense that for boys it is whether they themselves helped their sister with chores and for girls it is whether her brother helped her with her chores. In this sense, a hypothesized causal pathway from girls' gender-equitable attitudes towards chore-sharing would require her to advocate for her brother(s) to help her, whereas a boy could, if he wanted to, simply decide to help his sister. As such, disaggregating the results provides not only an examination of results by sex, but also allows for a more careful examination of the chore-sharing outcome.

Finally, we used sex-stratified multivariable logistic regression to assess whether correlation existed between gender-equitable attitudes at Wave 1 and chore-sharing behavior at Wave 2. For this final analysis, we recoded the attitude variable such that it is a binary measure of adolescents who remained gender-equitable from Wave 1 to Wave 2 or whose attitudes shifted from gender-inequitable to gender-equitable between waves (coded as 1) against adolescents who remained gender-inequitable or changed from having gender-equitable to gender-inequitable attitudes between waves (coded as 0). A complete case analysis was conducted for both sets of logistic regression analyses among adolescents who: 1) were followed-up from wave 1 to wave 2; 2) had different sex or mixed sex siblings (i.e., given the outcome variable is a brother helping his sister, we dropped adolescents with no siblings or same sex siblings from the analysis); and 3) provided data on the outcome and exposure variables. The final analytic sample in logistic regression models using Wave 1 and 2 data consisted of 2,124 adolescents. The analytic sample for models run on the Wave 3 and 4 data was smaller due to loss-to-follow-up (79% of respondents were followed from Wave 1 to Wave 4). The sample size for Wave 3 analyses was 1,483, and 1,401 for Wave .. All analyses were conducted using Stata/SE 17.0[23].

Results

Descriptive statistics on the main study variables are presented in Table 1. The mean age of respondents at baseline (Wave 1) was 11.9 years (range 10-14 years). The sample was relatively evenly divided by sex, with 47.3% girls and 52.7% boys and by wealth tertile; roughly a third of adolescents fell within each tertile. A majority (57.4%) of adolescents lived with both parents. At Wave 1, a majority (61.6%) of adolescents agreed that boys and girls should be equally responsible for household chores. This proportion increased to

Table 1: Descriptive statistics

	Wave 1 (n=2,124)	**Wave 2** (n=2,124)	**Wave 3** (n=1,828)	**Wave 4** (n=775)
Age	Mean = 11.9 years (SD: 1.4; range, 10-14)	-	-	-
Sex				
Female	1,005 (47.3%)			
Male	1,119 (52.7%)			
Family Wealth Tertile				
Low	690 (32.5%)	-	-	-
Medium	720 (33.9%)	-	-	-
High	714 (33.6%)	-	-	-
Household Composition				
No parents	272 (12.8%)	-	-	-
One parent only	632 (29.8%)	-	-	-
Both parents	1,220 (57.4%)	-	-	-
Study Group				
Intervention	1,063 (50.1%)	-	-	-
Control	1,061 (49.9%)	-	-	-
Gender-Equitable Chore-Sharing Attitudes				
Equitable	1,309 (61.6%)	1,520 (71.6%)	1,230 (65.6%)	1,189 (67.0%)
Inequitable	815 (38.4%)	604 (28.4%)	646 (34.3%)	586 (33.0%)
Chore-Sharing Behavior				
Girls' report				
Received help from brother	426 (47.7%)	526 (52.3%)	341 (48.1%)	307 (46.2%)
Received no help from brother	579 (52.3%)	479 (47.7%)	368 (51.9%)	358 (53.8%)
Boys' report				
Helped sister	875 (78.6%)	896 (84.9%)	648 (83.1%)	633 (85.8%)
Did not help sister	238 (21.4%)	160 (15.1%)	132 (16.9%)	105 (14.2%)

71.6% at Wave 2. Nearly three quarters (72.7%) of adolescents stated that they helped their sister, or that their brother helped them with household chores.

Results from the difference-in-difference analyses showed a strong intervention effect on adolescents' attitudes regarding gender equity in household chore-sharing. As shown in Table 2, there was an 18 percentage-point increase in the proportion of intervention group adolescents who agreed that boys and girls should be equally responsible for household chores. This is in contrast to only a 1 percentage-point increase among controls. Thus, after controlling for baseline levels and unobserved differences between the intervention and control groups, adolescents participating in the GUG intervention were 2.3 times ($p<0.001$) more likely to endorse gender equity in chore-sharing as compared to adolescents in the control group. The interaction term for sex was not significant ($p=0.585$), indicating that the intervention was equally effective for both boys and girls in shifting attitudes.

We next present sex-stratified results from bivariate and multivariable logistic regression models examining the correlation between gender-equitable chore-sharing attitudes and chore-sharing behavior by wave. We present results across four waves to data to examine whether the association holds over time. Among girls at Wave 1, holding an attitude that boys and girls should be equally responsible for household chores was associated with 1.5 times ($p=0.001$) the odds of reporting that a brother helped with chores in the past month (Table 3). This association held across all four waves, although the association diminished slightly over time and was not statistically significant at Wave 4. The association also held in fully adjusted models (Table 4).

Among boys at Wave 1, holding a gender-equitable chore-sharing attitude was associated with 1.4 times ($p=0.033$) the odds of reporting that a boy helped his sister with chores in the past month (Table 3). These odds were higher in Waves 2 and 3 (OR=1.95, $p<0.001$ and OR=1.64, $p=0.011$, respectively), and, as with girls, did not

Table 2: Gender equitable attitudes regarding household chore-sharing. Difference-in-difference results from IPW weighted GEE models[a]

	n	Baseline	Endline	Difference (W2-W1)	Delta (difference btwn control and intervention) 95% CI	p-value
Control	1235	62.27%	63.32%	1.05%	OR 2.28 (1.81, 2.87)	**<0.001**
Intervention	1270	61.26%	78.98%	17.72%		
Sex*studygroup interaction	2505	β=0.129 (95% CI: -0.335, 0.593)				0.585
Boy						
Control	622	64.31%	63.34%	-0.96%	OR 2.14 (1.54, 2.97)	**<0.001**
Intervention	645	64.65%	78.91%	14.26%		
Girl						
Control	613	60.20%	63.30%	3.10%	OR 2.43 (1.75, 3.38)	**<0.001**
Intervention	625	57.76%	79.04%	21.28%		

[a]Analyzed based on Wave 1 – Wave 2 linked sample (n=2,505)

Table 3: Odds of chore-sharing behavior by chore-sharing attitudes. Bivariate logistic regression

		Wave 1 Girls: n=1,005 Boys: n=1,113 OR, p-value (95% CI)	**Wave 2** Girls: n=1,005 Boys: n=1,113 OR, p-value (95% CI)	**Wave 3** Girls: n=705 Boys: n=778 OR, p-value (95% CI)	**Wave 4** Girls: n=664 Boys: n=737 OR, p-value (95% CI)
Gender-equitable attitudes *(ref. gender-inequitable attitudes)*	Girls	**OR = 1.52, p=0.001** (1.18, 1.97)	**OR = 1.51, p=0.004** (1.14, 1.99)	**OR = 1.40, p=0.034** (1.03, 1.92)	OR = 1.10, p=0.550 (0.80, 1.52)
	Boys	**OR = 1.37, p=0.033** (1.03, 1.84)	**OR = 1.95, p<0.001** (1.38, 2.75)	**OR = 1.64, p=0.011** (1.12, 2.40)	OR = 1.45, p=0.090 (0.94, 2.22)

Table 4: Odds of chore-sharing behavior by chore-sharing attitudes. Multivariable logistic regression.[a]

		Wave 1 Girls: n=1,005 Boys: n=1,113 OR, p-value (95% CI)	**Wave 2** Girls: n=1,005 Boys: n=1,113 OR, p-value (95% CI)	**Wave 3** Girls: n=705 Boys: n=778 OR, p-value (95% CI)	**Wave 4** Girls: n=664 Boys: n=737 OR, p-value (95% CI)
Gender-equitable attitudes *(ref. gender-inequitable attitudes)*	Girls	**OR = 1.53, p=0.002** (1.17, 2.00)	**OR = 1.50, p=0.005** (1.13, 2.00)	**OR = 1.39, p=0.046** (1.01, 1.91)	OR = 1.09, p=0.609 (0.79, 1.51)
	Boys	**OR = 1.42, p=0.022** (1.05, 1.92)	**OR = 1.94, p<0.001** (1.37, 2.76)	**OR = 1.73, p=0.006** (1.17, 2.57)	OR = 1.43, p=0.105 (0.93, 2.21)
Attitudes*studygroup interaction	Girls	-	OR = 1.06, p=0.839 (0.59, 1.92)	OR = 1.37, p=0.340 (0.71, 2.65)	OR = 1.34, p=0.386 (0.69, 2.62)
	Boys	-	OR = 1.09, p=0.825 (0.52, 2.24)	OR = 0.76, p=0.550 (0.34, 1.69)	OR = 1.45, p=0.408 (0.60, 3.55)

[a]Models control for: characteristics measured at Wave 1: adolescent age, family wealth tertile, household composition, and school status.

Table 5: Wave 1 gender equitable attitudes and Wave 2 chore-sharing behavior. Bivariate sex-stratified logistic regression & multivariable sex-stratified logistic regression.[a]

		Bivariate analyses Girls: n=1,005 Boys: n=1,113 OR, p-value (95% CI)	**Multivariable analyses** Girls: n=1,005 Boys: n=1,113 OR, p-value (95% CI)
Gender-equitable attitudes *(ref. gender-inequitable attitudes)*	Girls	**OR = 1.51, p=0.004** (1.18, 1.97)	**OR = 1.50, p=0.005** (1.13, 2.00)
	Boys	**OR = 1.94, p<0.001** (1.37, 2.75)	**OR = 1.94, p<0.001** (1.37, 2.76)
Attitudes*studygroup interaction	Girls	-	OR = 1.06, p=0.839 (0.59, 1.92)
	Boys	-	OR = 1.09, p=0.818 (0.53, 2.25)

[a]Models control for: characteristics measured at Wave 1: adolescent age, family wealth tertile, household composition, and school status.

achieve statistical significance in Wave 4. These trends of association across waves held in fully adjusted models (Table 4). There were no statistically significant results for the study group interaction term (Table 4).

The final set of analyses examine the correlation between Wave 1 gender-equitable chore-sharing attitudes and Wave 2 chore-sharing behavior. As mentioned above in the methods section, for this final analysis, the attitude variable is modeled to

distinguish between adolescents who remained gender-equitable from Wave 1 to Wave 2 or whose attitudes shifted from gender-inequitable to gender-equitable between waves and adolescents who remained gender-inequitable or changed from having gender-equitable to gender-inequitable attitudes between waves. As shown in Table 5, retaining or switching to gender-equitable attitudes between Waves 1 and 2 was associated with 1.5 times (p=0.004) the odds of having a brother help with chores at Wave 2 for girls, and 1.94 times (p<0.001) the odds of helping a sister with chores at Wave 2 for boys. These estimates were roughly the same in the fully adjusted models. As in the cross-sectional results presented above, we see no statistically significant interaction by study group.

Discussion

Unpaid care work is disproportionately undertaken by women and negatively impacts their life opportunities. In recognition of this, international bodies such as the International Labor Organization have called for unpaid care and domestic work to be recognized, reduced, and redistributed and to reward paid care work and to provide representation for care workers' social dialogue and collective bargaining via a framework for action known as the '5 Rs'[5]. The successful implementation of the 5R framework for decent care work will require, in part, the promotion of information and education for more gender-equal households, workplaces, and societies[5]. We examined one strategy designed to achieve this: a gender-transformative program for very young adolescents in Kinshasa, the Growing Up GREAT! (GUG) project. Specifically, we examined the impact of GUG on participating adolescents' attitudes surrounding gender-equitable chore-sharing among siblings. We also tested whether gender-equitable attitudes translated into gender-equitable chore-sharing behavior.

We find that the GUG intervention group was 2.3 times (p<0.001) more likely to hold gender-equitable attitudes towards chore-sharing at baseline (Wave 2) as compared to control group participants. This finding was equally true among both boys and girls. When we examined the correlation between attitudes and behaviors, we found a positive correlation between gender-equitable attitudes and a boy helping his sister with chores. At Wave 1, girls' gender-equitable attitudes were associated with 1.5 (p=0.002) times the odds of having a brother help with chores and boys' gender-equitable attitudes to be associated with 1.42 (p=0.022) times the odds of helping his sister with chores. This association held across all four waves, though the results were no longer statistically significant at Wave 4.

Finally, we used attitudes measured across Waves 1 and 2 to predict behaviors at Wave 2. After adjusting for a number of demographic covariates, we find that, boys who retained or adopted gender-equitable attitudes from Wave 1 to Wave 2, were 1.9 (p<0.001) times more likely to help their sisters with chores as compared to boys who retained or adopted gender-inequitable attitudes towards chore-sharing between waves. Girls who retained or adopted gender-equitable attitudes between waves were 1.5 (p=0.005) times more likely to have received help from their brothers with chores as compared to girls who retained or adopted gender-inequitable attitudes. These quantitative findings are reflected in findings from a youth-led qualitative evaluation of the Growing Up GREAT (GUG) project. A 12-year-old boy who had participated in GUG noted, "At the Growing Up GREAT! Club, I learned about all the household chores [that have to be done]. What girls did, I also started to do. I believe that it is good for a boy to do chores…[24]"

Given these previous qualitative findings, we were somewhat surprised to not see a statistically significant intervention interaction term in any of the logistic regression models that examined the link between attitudes and behaviors. This null intervention effect may point to the need for increased dosing of programmatic components that focus on chore-sharing. It may also point to the strength of the broader gender norms within households and communities in dictating appropriate behavior in the lives of adolescents. For example, even if a boy had a positive attitude about helping his sister with chores, he may have been met with a disapproving parent at home when he tried to help. The GUG project was indeed working against decades of policies, workplace and community norms, media sources, and educational curricula that reinforce the norm that unpaid care work is mostly women's and girls' responsibility[1]. And, on the flip side, engaging in 'women's work' is seen as emasculating[13], and may bring shame not

only to a male family member, but also upon female family members for not fulfilling their duties as women. Thus, the lack of intervention effects in the attitude-behavior relationship may also point to the importance of continuing to engage in multilevel and multisectoral strategies to achieve the broader norms change required to enable younger generations to deviate from paths long established by previous generations. Our findings do indicate, however, that the correlation between gender-equitable attitudes and behaviors was not fleeting and persisted across multiple waves of data collection. Subsequent waves of the GEAS data will allow an examination if this continues into older adolescence.

Limitations and future directions

Despite the strong quasi-experimental design of the outcome evaluation and availability of the longitudinal data, the behavioral measure of a boy helping his sister is limited to boys' self-report. Roughly four-fifths of boys in the sample reported they helped their sister with any of her chores in the past month before the survey. However, only about half of girls in the sample reported they received help from their brother with their household chores. This rather large discrepancy between the sexes in both sets of reports could be explained by expectancy bias, with girls expected to report less help from brothers, and social-desirability bias playing a role in boys' reports of helping their sisters with chores.

In addition, the behavior measure for girls assesses whether the girl's brother helped her with her chores. This does not, however, capture the intermediate pathways that link girls' increases in gender-equitable attitudes and their brothers' chore-sharing behavior. For example, were improvements in attitudes linked to desire to advocate for herself? If yes, did this advocacy occur between siblings or via girl-to-parent bids for change in allocation of household chores? Answers to these questions can help inform program efforts that target gender-equity in chore-sharing. Relatedly, more research is needed to understand how and whether a more gender-equitable home, peer, and community contexts would modify the relationship between attitudes and behaviors in adolescent chore-sharing. This is linked to a point made in previous research that most programs that target gender inequality and restrictive norms for the health and wellbeing of children and adolescents typically focus on improving the immediate circumstances of the individual program participants, rather than focusing on addressing the broader systems that are linked to inequality[20]. Working for this systems-level change and identifying funding to measure and assess change is difficult but necessary.

Ethical approval

VYAs provided oral assent and received caregiver consent for participation. Ethical approval was provided by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board (IRB) (Protocol No. 00007510) and the Kinshasa School of Public Health IRB (Protocol No. ESP/CE/023/2017).

Conclusion

The results of this study provide empirical evidence in support of the attitudinal-behavioral link in gender-equitable chore-sharing among very young adolescents (ages 10-14). Given the limiting nature of unpaid care work in the lives of girls and women globally, prioritizing gender-transformative programs that target adolescent attitudes behaviors around gender-equitable chore-sharing may serve to set the stage early in life on the importance of gender-equity in other domains such as education and paid work.

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