



ELSEVIER

JOURNAL OF
ADOLESCENT
HEALTHwww.jahonline.org

Original article

Changes in the Sexual Double Standard Associated With Sociodevelopmental Factors Among Young Adolescents in Kinshasa



Beniamino Cislighi, Ph.D.^{a,*}, Amiya Bhatia, Sc.D., M.P.H.^a, Mengmeng Li, M.D., M.S.P.H.^b, Qiguo Lian, M.D.^c, Sarah Baird, Ph.D., M.S.^d, Patrick Kayembe, M.D., M.P.H., Ph.D.^e, Effie Chipeta, Ph.D.^{f,g}, and Caroline Moreau, M.D., M.P.H., Ph.D.^{b,h}

^a Department of Global Health and Development, London School of Hygiene and Tropical Medicine, London, UK

^b Department of Population, Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland

^c NHC Key Lab. of Reproduction Regulation (Shanghai Institute of Planned Parenthood Research), Fudan University, Shanghai, People's Republic of China

^d Department of Global Health, Milken Institute School of Public Health, George Washington University, Washington, District of Columbia

^e Kinshasa School of Public Health, Kinshasa, Democratic Republic of the Congo

^f Department of Public Health, School of Public Health and Family Medicine, College of Medicine, University of Malawi, Blantyre, Malawi

^g Centre for Reproductive Health (CRH), University of Malawi, College of Medicine, Blantyre, Malawi

^h Soins Primaires et Prévention, Inserm U1018, Center for Research in Epidemiology and Population Health (CESP), Paris, France

Article history: Received April 11, 2020; Accepted July 27, 2020

Keywords: Adolescence; Social norms; Gender norms; Sexual double standard; Longitudinal; DRC; Gender equality; Sexual and reproductive health

A B S T R A C T

Purpose: This study aimed to describe the changes in adolescents' perceptions of a sexual double standard (SDS) over time and to examine the developmental and social factors associated with these changing perceptions.

Methods: The sample includes 2,163 10- to 14-year-old adolescents from Kinshasa, interviewed at two time points (T0 and T1), 1 year apart. We examined associations between SDS and pubertal onset, family interactions, peer interactions, and media exposure. We conducted sex-stratified generalized estimation equation models to test associations between changes in SDS and sociodevelopmental factors at T0 as well as with changes in sociodevelopmental factors between T0 and T1.

Results: At T0, the SDS score was 4.15/5 among boys and 4.43/5 among girls, signaling highly gender unequal perceptions. SDS scores increased over time, shifting toward greater inequality. Adolescents who were prepubertal at T0 experienced greater increases in SDS scores than those who were pubertal at T0. The greatest increase in SDS scores was observed among girls who transitioned through puberty between T0 and T1. High parental monitoring of boys mitigated the increase in SDS as did boys' increased exposure to social media between T0 and T1. Girls who had mixed-sex friendships also experienced less change in SDS perceptions compared with those who socialized in same-sex groups.

Conclusions: Puberty was associated with changes in SDS perceptions for all adolescents, whereas family interactions and media exposure affected changes in SDS perceptions for boys and peer interactions affected changes in SDS perceptions for girls.

© 2021 Society for Adolescent Health and Medicine. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

IMPLICATIONS AND CONTRIBUTION

This study documents a high sexual double standard among young adolescents in Kinshasa, which increased over time and was influenced by developmental and social factors. Findings underscore the importance of developing interventions to change gender norms before puberty, which work across an adolescent's social network and which consider how best to use media.

Conflicts of interest: None of the authors have potential conflicts of interest to be disclosed.

Disclaimer: Publication of this supplement was supported by the Johns Hopkins Bloomberg School of Public Health Department of Population, Family and Reproductive Health with funding from the Bill and Melinda Gates Foundation.

* Address correspondence to: Beniamino Cislighi, Ph.D., Department of Global Health and Development, London School of Tropical Hygiene and Tropical Medicine, 15-17 Tavistock Place, WC1H 9SH London, United Kingdom.

E-mail address: ben.cislighi@lshth.ac.uk (B. Cislighi).

Adolescence is a critical period of development in which to invest [1]: investments during adolescents can result in a “triple dividend of benefits” spanning across an individual’s lifespan and expanding into the next generation [2]. Purposeful investments address adolescence as a time of gender intensification [3]: During puberty, adolescents triangulate their understanding of gender through social interactions that redefine their social roles as they leave childhood [4,5]. As adolescents reach puberty, they are increasingly pressured to conform to the system of gender norms, active in their context.

Gender norms are unwritten rules defining and dictating appropriate attributes and actions for men and women in a given society [6,7]. The effect of gender norms on health and well-being is particularly powerful in adolescence when health disparities between boys and girls begin to emerge [1,8,9]. Globally, for instance, adolescent boys and girls differ in terms of age of sexual debut [10,11] or number of sexual partners [12]. Gender stereotypical attitudes have also been found to be associated with several adolescent health outcomes, including physical health [13], mental disorders [14,15], and sexual health [16], in ways that can affect adolescents’ future adult health [17].

Recent cross-cultural findings from the Global Early Adolescence Study (GEAS) support the gender intensification hypothesis, showing that pubertal development brings about differential gender expectations for boys and girls, linked to the sexualization of girls’ bodies and the gendered division of social roles [18,19]. Although other studies have questioned the gender intensification hypothesis, showing no shifts in adolescents’ gender attitudes over time [20,21], much literature agrees that gender norms in these formative years affect adolescents’ short- and long-term health trajectories [22].

Despite the conceptual clarity offered by gender theory in differentiating sex and gender [23], and the sensible suggestion that both sex and gender matter (albeit to different extents), evidence is still growing on how developmental and social factors entangle in affecting adolescents’ sex-related views, actions, and outcomes [24,25]. We adopt conceptual premises from social norms theory [6] and gender intensification theory [3] to examine how pubertal development and social relationships can influence adolescents’ normative beliefs toward boys and girls having multiple sexual partners. To investigate further how gender norms change during adolescence, the present study specifically aims to (1) describe shifts in young girls’ and boys’ normative beliefs about adolescent romantic experiences as they age and (2) examine the developmental and social factors associated with these changing normative beliefs. We studied one specific gender norm: the Sexual Double Standard (SDS), a measure of different normative expectations for romantic activities, rewarding boys but devaluing girls for engaging in the same behaviors [26].

Methods

Study design and procedures

Our study uses longitudinal data collected in Kinshasa, the Democratic Republic of the Congo, as part of the GEAS, implemented by the Kinshasa School of Public Health. The study includes an intervention arm to evaluate the *Growing Up Great* (GUG) project. In this article, we draw on data from the first two waves of data collection (T0 and T1) for both the intervention and control groups. Data collection took place in two of the

largest urban poor communes of Kinshasa, Masina, and Kimbanseke, with a combined population of more than 1.8 million residents, more than 90% of whom live in poverty. In Kinshasa, 16% of early adolescents children are out of school, and the literacy rate for 15- to 24-year-olds is 73% for girls compared with 91% for boys. One in five girls are married, and 13% give birth by 18 years of age [27].

Sampling procedures and study sample

Two samples of adolescents (in-school and out-of-school) aged 10–14 years were recruited at T0 using multistage sampling procedures. Both samples were recruited from the same neighborhoods in Kinshasa, which were randomly selected from the two communes. For the school sample, 80 schools from the identified neighborhoods were selected, equally divided as intervention and control sites. Intervention and control schools were matched based on school type and location. Twenty-five students per school were invited to participate in the study based on their participation in the GUG intervention or randomly selected in the control group. The out-of-school sample was selected from the same neighborhoods based on participation in the GUG intervention or based on a random selection of out-of-school adolescents identified from a listing of households in the control neighborhoods. A total of 2,842 adolescents were enrolled in the study at T0, and 2,533 of them were identified and reinterviewed 1 year later (T1). The lost to follow-up (LFU) rates were highest among out-of-school adolescents in the intervention group (18%) and adolescents who lived with no parents (17%). No other significant patterns of LFU were observed, especially with respect to SDS scores. In addition to LFU, we excluded 14 participants with poor data quality, 45 who had missing data on the SDS at either time point, and participants who had missing values on key sociodevelopmental factors ($n = 229$) and on adjusted covariates ($n = 82$). Our sample consisted of 2,163 adolescents (1,030 boys and 1,133 girls).

Data collection

Data collection at T0 occurred between June and November 2017 and at T1 between October and December 2018. Both surveys collected information on adolescents’ social context and their health and their perceptions of gender norms. Information on the adolescent’s family and socioeconomic circumstances was collected at T0. A more detailed description of the GEAS survey instruments is available at <https://www.geastudy.org>. Interviews were conducted in Lingala or French based on adolescent preference.

Measures

Outcome: SDS. Our primary outcome of interest was SDS, a measure assessing perceptions of differential expectations regarding romantic engagement, rewarding for boys but devaluing girls [26]. The scale is comprised of six items described in Table 1, with response options in the form of a 5-point Likert scale (“disagree a lot” to “agree a lot”). Measure development was informed by a mixed-methods formative research [9], and exploratory analysis confirmed the unidimensionality of the scale and its high internal reliability (polychoric ordinal Cronbach alpha = .85 at T0 and T1). We

Table 1
SDS mean scores at both time points stratified by sex

	SDS mean score					Change in SDS score						
	T0		T1			T0		T1				
	Overall	Boys	Girls	p value	Overall	Boys	Girls	p value	Overall	Boys	Girls	p value
Scale-based SDS mean score (mean ± SD)	4.29 ± .88	4.15 ± .91	4.43 ± .82	<.001 ^a	4.38 ± .80	4.22 ± .87	4.53 ± .71	<.001 ^a	.09 ± 1.05	.08 ± 1.12	.10 ± .99	.600 ^a
Scaled SDS items (n, %—agree a lot, agree a little)									N/A			
Girls are the victims of rumors if they have boyfriends	1,860 (86.0%)	870 (84.5%)	990 (87.4%)	.051	1,930 (89.2%)	914 (88.7%)	1,016 (89.7%)	.480				
Boys tell girls they love them when they do not	1,588 (73.4%)	702 (68.2%)	886 (78.2%)	<.001	1,691 (78.2%)	758 (73.6%)	933 (82.3%)	<.001				
Adolescent girls should avoid boys because they trick them into having sex	1,753 (81.0%)	796 (77.3%)	957 (84.5%)	<.001	1,824 (84.3%)	826 (80.2%)	998 (88.1%)	<.001				
Boys have girlfriends to show off to their friends	1,775 (82.1%)	823 (79.9%)	952 (84.0%)	.013	1,863 (86.1%)	871 (84.6%)	992 (87.6%)	.044				
Adolescent boys lose interest in a girl after they have sex with her	1,728 (79.9%)	767 (74.5%)	961 (84.8%)	<.001	1,780 (82.3%)	777 (75.4%)	1,003 (88.5%)	<.001				
Adolescent boys fool girls into having sex	1,800 (83.2%)	829 (80.5%)	971 (85.7%)	.001	1,882 (87.0%)	861 (83.6%)	1,021 (90.1%)	<.001				

N/A = not applicable; SD = standard deviation; SDS = sexual double standard.

^a Wilcoxon rank-sum test.

calculated the SDS score for each time point as the average score across items, ranging from 1 to 5.

Exposures: sociodevelopmental covariates. We considered how sociodevelopmental factors, including (1) age (13–14 years vs. <13 years); (2) pubertal development; (3) caregiver closeness; (4) caregiver monitoring; (5) peer socialization; (6) peer network composition; and (7) exposure to media, could contribute to shifts in young people’s perceptions of SDS, following a popular conceptual framework for key factors influencing health in early adolescence [28]. They were measured at each time point. Pubertal onset (yes vs. no) was assessed based on questions about menstruation and breast growth for girls and voice change, facial hair, and onset of wet dream for boys. Family interactions were examined by asking young people about their feelings of closeness to their caregiver (close vs. not close/no caregiver) and the extent to which their caregiver monitored their activities at school, with their friends, or during their free time (high vs. low monitoring/no caregiver). Peer interactions were explored through peer network composition (mixed-sex vs. same-sex friends/no friends) and time spent with peers (spending ≥3 to 4 times per week with friends vs. <3 to 4 times per week/no friends). Finally, media exposure (yes vs. no) was examined by assessing social media use, chatting with friends online, playing computer games, or using other types of interactive media. In addition, we adjusted for seven covariates including school achievement (age-expected grade), family structure (living with both parents and one parent or none), household wealth tertiles, freedom of movement (above or below the mean score), experience of peer violence in the last 6 months (yes vs. no), study group (intervention or control), and history of romantic relationship (ever vs. never).

Analytical approach

First, we conducted sex-specific bivariate analyses of SDS in relation to the key sociodevelopmental factors and the additional covariates at T0 and T1. We then specified a series of generalized estimation equation models to test how each socio-developmental factor at T0 was associated with changes in SDS between T0 and T1. Specifically, we examined how (1) young people’s developmental stage (pubertal onset and age); (2) their social environment (family relations and peer relations); and (3) media exposure was associated with changes in SDS score. We modeled each type of sociodevelopmental exposure separately and specified unadjusted and adjusted models. Finally, we examined the associations between changes in socio-developmental factors between T0 and T1 and changes in the SDS score, using the same unadjusted and adjusted generalized estimation equation models as described previously. All adjusted models included T0 covariates described in the previous paragraph as well as the study group. Two-sided p values <.05 were chosen to indicate statistical significance. All analyses were performed using Stata Version 15.1 (StataCorp LLC, College Station, TX).

Ethical approval

The study received ethical approval from the Democratic Republic of the Congo ethical review board in Kinshasa and the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

Table 2

Study population characteristics stratified by sex and survey waves

Sample characteristics	Baseline			Wave 2		
	Boys (n = 1,030)	Girls (n = 1,133)	p value	Boys (n = 1,030)	Girls (n = 1,133)	p value
	n (%)	n (%)		n (%)	n (%)	
Age of child						
Mean ± SD	12.05 ± 1.38	11.89 ± 1.39	.007	12.97 ± 1.39	12.83 ± 1.40	.020
10 years	185 (18.0)	240 (21.2)	.077	15 (1.5)	14 (1.2)	.100 ^a
11 years	194 (18.8)	241 (21.3)		184 (17.9)	239 (21.1)	
12 years	230 (22.3)	248 (21.9)		197 (19.1)	245 (21.6)	
13 years	223 (21.7)	210 (18.5)		236 (22.9)	242 (21.4)	
14 years	198 (19.2)	194 (17.1)		224 (21.7)	218 (19.2)	
15 years	-	-	-	171 (16.6)	175 (15.4)	
16 years	-	-	-	3 (.3)	0 (.0)	
Puberty onset						
Pubertal	478 (46.4)	833 (73.5)	<.001	785 (76.2)	1,029 (90.8)	<.001
Study group						
Control	496 (48.2)	577 (50.9)	.198	-	-	-
Intervention	534 (51.85)	556 (49.1)		-	-	-
Age for grade						
Lower than age-expected grade	406 (39.4)	391 (34.5)	.018	316 (31.7)	291 (26.4)	.007
In age-expected grade or higher	624 (60.6)	742 (65.5)		681 (68.3)	813 (73.6)	
Household composition						
No parents or one parent only	445 (43.2)	474 (41.8)	.520	-	-	-
Both parents	585 (56.8)	659 (58.2)		-	-	-
Family wealth tertile						
Low	358 (34.8)	355 (31.3)	.060	-	-	-
Middle	322 (31.3)	407 (35.9)		-	-	-
High	350 (34.0)	371 (32.7)		-	-	-
Caregiver awareness						
High	572 (55.5)	709 (62.6)	<.001	632 (61.4)	728 (64.3)	.160
Child feels close to caregiver						
Yes	894 (86.8)	969 (85.5)	.390	853 (82.8)	937 (82.7)	.940
Freedom of movement						
Above mean	556 (54.0)	351 (31.0)	<.001	538 (53.5)	248 (22.4)	<.001
Sex composition of peers						
One or more opposite-sex friends	432 (41.9)	406 (35.8)	.004	434 (42.1)	425 (37.5)	.028
Peer socialization						
≥3 to 4 times a week	809 (78.5)	739 (65.2)	<.001	772 (75.0)	615 (54.3)	<.001
Peer violence victimization in last 6 months						
Yes	516 (50.1)	423 (37.3)	<.001	478 (46.6)	388 (34.3)	<.001
Romantic relationship (ref: never)						
Yes	126 (12.2)	79 (7.0)	<.001	228 (25.8)	168 (18.4)	<.001
Media exposure (ref: no exposure)						
Some exposure to the media	291 (28.3)	78 (6.9)	<.001	390 (37.9)	136 (12.0)	<.001

SD = standard deviation.

^a Fisher's exact test.

Results

Sample characteristics

The sociodemographic characteristics of the study sample stratified by sex and wave are presented in Table 2. A majority of the girls (73.5%) had experienced signs of puberty at T0, increasing to 90.8% at follow-up, whereas pubertal onset rose from 46.4% to 76.2% between T0 and T1 among boys. Most adolescents reported feeling close to their parents at T0 (86.8% of boys and 85.5% of girls), which decreased at T1 for both sexes (82.8% of boys and 82.7% of girls). At both time points, boys reported greater freedom of movement than girls, spent more time with their peers and were more likely to socialize in mixed-sex groups and to have ever engaged in romantic relationships. Although peer socialization decreased between waves, the percentage of adolescents who reported ever having a romantic relationship more than doubled for both sexes. Although exposure to social media increased over time for both sexes, small

proportions of boys (37.9%) and girls (12.0%) had access to social media at T1.

Change in boys' and girls' SDS scores between T0 and T1

SDS was widespread among boys and girls and increased over time (Figure 1). Specifically, at T0, the SDS was 4.15 (95% confidence interval [CI]: 4.09–4.20) on a scale from 1 to 5 among boys, and higher among girls: 4.43 (95% CI: 4.38–4.48). Between T0 and T1, null models showed the SDS increased by .08 points among boys (95% CI: .01–.15; $p < .05$) and by .10 points (95% CI: .04–.16; $p < .01$) among girls (Table 1).

Associations between T0 sociodevelopmental factors and change in SDS

Table 3 presents adjusted sex-stratified interaction effects between sociodevelopmental factors at T0 and changes in SDS score between T0 and T1. Unadjusted coefficients for the

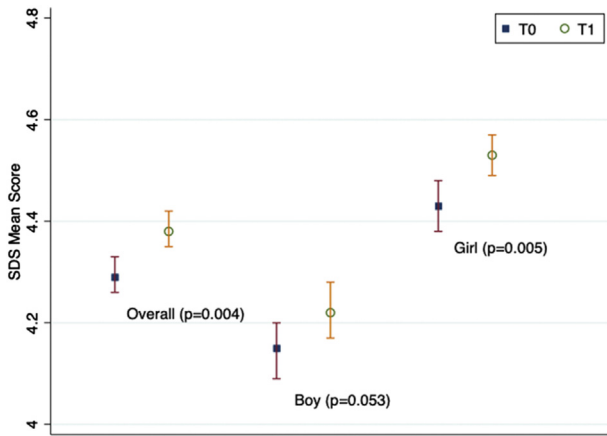


Figure 1. Distribution of sexual double standard (SDS) mean scores at T0 and T1 by sex. Intended for reproduction in color on the web and black/white in print.

interaction terms were the same as adjusted results and are available from the authors on request.

Among boys, both pubertal status and caregiver awareness/monitoring at T0 were associated with differential changes in the SDS score between T0 and T1. Prepubertal status at T0 was associated with an additional increase in the SDS score of .17 points ($p = .017$), compared with being pubertal at T0. In other words, there was a significant increase of .15 points in the predicted SDS score among boys who were prepubertal at T0 but no change among those who had already reached puberty. Low caregiver monitoring at T0 was associated with an additional increase of .17 points in SDS score over time ($p = .017$), compared

with high caregiver monitoring. Although significant interaction effects were not observed for other sociodevelopmental factors, the following subgroups of boys had significant increases in the predicted SDS change score: boys who did not have a caregiver or who did not feel close to their caregiver, boys who socialized in mixed-sex groups, and boys who had no exposure to social media.

Among girls, pubertal development and peer network composition at T0 were both associated with differential changes in the SDS between T0 and T1. Specifically, girls who were prepubertal at T0 had an additional .15 point increase ($p = .025$) compared with girls who were pubertal, which corresponded to a .21 point increase in predicted SDS score for prepubertal girls. A same-sex peer network at T0 was associated with an additional increase in the SDS score of .17 points ($p = .005$) between T0 and T1 compared with having mixed-sex friends. Thus, the predicted SDS score increased by .16 points among girls with same-sex friends or no friends but did not change among girls with mixed-sex friends. Although significant interaction effects were not observed for other factors, the following subgroup of girls had significant increases in the predicted SDS change score: younger girls aged <13 years, girls who felt close to their caregiver, girls with high caregiver monitoring, girls who spent little time with friends, and girls who had no exposure to social media.

Associations between changes in sociodevelopmental factors and change in SDS

Table 4 presents adjusted sex-stratified associations between changes in sociodevelopmental factors and changes in SDS score.

Table 3
Changes in SDS score according to T0 developmental factors, family and peer relations, as well as social media exposure

	Boys		Girls	
	Interaction term coefficient (95% CI)	Predicted SDS score change (95% CI)	Interaction term coefficient (95% CI)	Predicted SDS score charge (95% CI)
(a) Age (T0)				
<13 years (ref)		.07 (-.02, .16)		.13*** (.06, .20)
13–14 years		.09 (-.02, 0.19)	-.09 (-.21, .04); $p = .166$	.04 (-.05, .14)
(B) Puberty (T0)				
Prepubertal (ref)		.15*** (.06, .25)		.21*** (.10, .32)
Pubertal	-.17** (-.30, -.03); $p = .017$	-.01 (-.11, .09)	-.15** (-.28, -.02); $p = .025$	.06* (-.01, .13)
(c) Caregiver closeness (T0)				
No caregiver or not feeling close (ref)		.23** (.05, .42)		.07 (-.08, .23)
Feeling close	-.18* (-.38, .02); $p = .078$	.05 (-.02, .13)	.03 (-.13, .20) $p = .693$	.10*** (.04, .17)
(d) Caregiver monitoring (T0)				
No caregiver or no/low monitoring (ref)		.17*** (.07, .27)		.09** (.00, .19)
Caregiver high monitoring	-.17** (-.31, -.03); $p = .017$	.00 (-.09, .09)	.01 (-.11, .13) $p = .918$	.10*** (.03, .17)
(e) Peer composition (T0)				
No friends or unisex network (ref)		.03 (-.06, .12)		.16*** (.09, .23)
Mixed-sex network	.11 (-.03, .25); $p = .117$	.14** (.03, .25)	-.17*** (-.29, -.05); $p = .005$	-.00 (-.11, .08)
(f) Peer socialization (T0)				
No friends or low peer socialization (<3 to 4 times per week) (ref)		.10 (-.05, .25)		.17*** (.07, .26)
High Peer socialization (≥ 3 to 4 times per week)	-.03 (-.20, .13); $p = .692$	.07* (-.01, .15)	-.10* (-.23, .02); $p = .090$	.06 (-.01, .13)
(g) Media exposure (T0)				
No media exposure (ref)		.09** (.01, .17)		.10*** (.04, .16)
Media exposure	-.04 (-.19, .11); $p = .623$	.05 (-.08, .18)	-.09 (-.32, .14); $p = .439$	.01 (-.20, .23)

Models a to g: each model includes “time” variable, investigated ecological factor, and the interaction term (time × ecological factor) and additionally adjusts for T0 covariates, including age, education attainment, intervention status, family structure, family wealth, freedom of movement, peer violence victimization, romantic relationship history, and other key ecological factors that are not assessed in the model.

95% CI = confidence interval; SDS = sexual double standard.

* $p < .1$, ** $p < .05$, *** $p < .01$.

Table 4

Changes in SDS score according to time dynamics in developmental factors, –family and peer relations, as well as social media exposure

	Boys		Girls	
	Predicted SDS score change (95%CI)	p value (level-specific interaction term)	Predicted SDS score change (95%CI)	p value (level-specific interaction term)
(a) Puberty		<i>p</i> value (overall interaction) = .057		<i>p</i> value (overall interaction) = .033
No change: prepubertal at both waves (ref)	.17** (.03, .31)	-	.10 (-.08, .29)	-
Transition from prepubertal to pubertal	.14** (.02, .27)	.818	.26*** (.13, .40)	.184
No change: pubertal at both waves	-.01 (-.11, .09)	.041	.06* (-.01, .13)	.657
(B) Caregiver closeness		<i>p</i> value (overall interaction) = .159		<i>p</i> value (overall interaction) = .782
No change: not feeling close at both waves (ref)	.26 (-.13, .65)	-	-.02 (-.33, .30)	-
Transition from feeling close to not close	.17 (-.01, .36)	.691	.05 (-.10, .20)	.702
Transition from not feeling close to close	.23** (.01, .44)	.879	.10 (-.08, .27)	.532
No change: feeling close at both waves	.03 (-.05, .11)	.251	.11*** (.05, .18)	.424
(c) Caregiver monitoring		<i>p</i> value (overall interaction) = .108		<i>p</i> value (overall interaction) = .978
No change: no awareness no/low awareness at both waves (ref)	.14* (-.00, .29)	-	.09 (-.05, .23)	-
Transition from high to no/low awareness	.02 (-.14, .19)	.300	.08 (-.06, .21)	.876
Transition from no/low to high awareness	.20*** (.05, .34)	.612	.10 (-.03, .22)	.957
No change: high awareness at both waves	-.01 (-.12, .10)	.107	.11** (.02, .20)	.816
(d) Peer composition		<i>p</i> value (overall interaction) = .404		<i>p</i> value (overall interaction) = .038
No change: no friends or having same-sex friends at both waves (ref)	.03 (-.08, .14)	-	.17*** (.09, .26)	-
Transition from opposite-sex to no/same-sex friends	.10 (-.06, .26)	.476	-.02 (-.16, .11)	.014
Transition from no/same-sex friends to opposite-sex friends	.03 (-.13, .19)	.992	.13** (.01, .26)	.590
No change: opposite-sex friends at both waves	.17** (.03, .32)	.117	.00 (-.14, .14)	.038
(e) Peer socialization		<i>p</i> value (overall interaction) = .421		<i>p</i> value (overall interaction) = .001
No change: no socialization of <3 to 4 times per week at both waves (ref)	.22* (-.05, .48)	-	.18** (.04, .32)	-
Transition from ≥3 to 4 times per week to no/less frequent between	-.02 (-.18, .14)	.132	-.09 (-.19, .02)	.003
Transition from no/less frequent to ≥3 to 4 times per week	.05 (-.13, .23)	.317	.16** (.02, .29)	.817
No change: ≥3 to 4 times per week at both waves	.10** (.01, .19)	.407	.18*** (.09, .28)	.943
(f) Media exposure		<i>p</i> value (overall interaction) = .214		<i>p</i> value (overall interaction) = .160
No change: no exposure at both waves (ref)	.15*** (.05, .25)	-	.12*** (.06, .19)	-
Transition from no exposure to having exposure between waves	-.02 (-.16, .11)	.044	-.05 (-.22, .13)	.073
Transition from having exposure to no exposure between waves	.07 (-.10, .24)	.439	.08 (-.16, .33)	.738
No change: having exposure at both waves	.02 (-.18, .22)	.245	-.24 (-.72, .24)	.143

Models a to g: each model includes "time" variable, investigated ecological **transition** factor, and the interaction term (time × ecological transition factor) and additionally adjusts for T0 covariates, including age, education attainment, intervention status, family structure, family wealth, freedom of movement, peer violence victimization, romantic relationship history, and other key T0 ecological factors that are not assessed in the current model.

p* < .1, *p* < .05, ****p* < .01.

Table S1 available online provides adjusted interaction coefficients for each sociodevelopmental factor.

Among boys, group-specific interaction effects revealed different SDS trajectories associated with pubertal status and media exposure. Compared with boys who were prepubertal at both time points, boys who transitioned through puberty experienced a similar increase in SDS scores ($p = .818$), whereas those who had already reached puberty at T0 experienced no change in SDS score, and these differences were statistically significant ($p = .041$). Group-specific interaction effects also showed that an increase in media exposure (from no exposure to some exposure) between T0 and T1 was associated with no change in SDS score, whereas the predicted increase for boys who remained without access to media was .15 points. This difference in SDS trends was statistically significant ($p = .044$).

Among girls, group-specific interaction effects indicated that girls who transitioned from prepubertal to pubertal had the greatest predicted increase in SDS score (.26 points). This increase was significantly larger ($p = .009$) than the .06 point increase in SDS score observed among girls who had already undergone pubertal onset at T0. Girls who transitioned from mixed-sex friendships to same-sex friendships between T0 and T1 experienced no SDS change, whereas those who were already in same-sex groups at T0 saw a .17 point increase in SDS score ($p = .014$). Likewise, girls who had only same-sex friendships at both time points experienced a much greater increase ($p = .038$) in SDS score than girls who had mixed-sex friendships at both time points. Finally, girls who transitioned from frequent to less frequent peer socialization experienced no change in predicted SDS score, whereas those who socialized infrequently in both waves experienced a predicted change in SDS score of .18 points ($p = .003$).

Discussion

We drew on longitudinal data from adolescents in two low-income neighborhoods in Kinshasa (interviewed 1 year apart). We found that, overall, SDS scores increased for both boys and girls between T0 and T1, although the increase was higher among girls. Several developmental and social factors affected these changes.

With regard to developmental factors, we found that changes in SDS score were significantly associated with puberty and pubertal onset, with larger increases in SDS score among boys and girls who had not completed puberty at T0. We also found that pubertal onset mattered more for girls than for boys: girls who entered puberty between T0 and T1 had large increases in their predicted SDS score than those who did not become pubertuous. These results are inconsistent with the previous longitudinal studies in high-income settings that found gender attitudes becoming less stereotypical with increasing age (although attitudinal trajectories varied by sex and family context) [4]. With the available data, it is not possible to disentangle the social consequences of attaining puberty for girls. Prior research suggests that caregivers might increasingly worry about girls' sexual safety as their bodies develop during puberty [19], resulting in increased pressure on girls to act respectably and preserve their sexual purity (possibly to avoid family shame [29]) in ways that could eventually increase girls' SDSs score over time. As for boys, there are several possible explanations for the fact that their SDS score changed before puberty as much as during transition. For instance, because most boys in this sample had older sisters, they

might have been witnessing parents' concerns for their older sisters' reputation, so that their outlook changed before that of their sisters. Or, as another example, the social response to boys' development could be different from that experienced by girls. Further research on puberty and gender attitudes is warranted to explain shifts in gender norms in relation to pubertal transitions.

We also found that the influence of peers and caregivers varied for boys and girls. Changes in peer socialization and peer network composition between T0 and T1 affected girls' SDS score but not that of boys. High T0 caregiver monitoring did not affect girls' SDS score, but it did affect boys'. In alignment with what has been found elsewhere [19], our analyses also reveal that girls tend to spend more time with their parents, whereas boys tend to spend more time with their peers. This raises the question of why girls would be more affected by peers and boys by parents. One possible explanation is that girls and boys who, respectively, spend more time with their peers and families are social outliers: boys who spend more time with caregivers might be in a protective family that favors the development of gender-equitable outlooks and girls who are allowed to spend time with their peers might group together with peers who have similarly equitable views. Our findings provide empirical evidence supporting Pulerwitz's conceptual framework considering the intersection of development and social relations in shaping normative gender expectations, which set the boundaries of appropriate romantic relations [30].

Finally, we found changes in media access to play an important role. Boys' uptake of media was associated with a slight decrease in SDS compared with boys who had no media exposure. The role of media exposure in counteracting SDS raises important questions about the potential of media access and traveling narratives of gender equality to affect local attitudes [31].

Our study has several limitations; we point out the main three. First, our use of SDS as the primary outcome limits us to examine one aspect of the entire gender system that affects these adolescents' life. Second, there may be unmeasured social and developmental factors that affect SDS. Third, our findings are not representative of all adolescents in Kinshasa. Finally, the data we use are based on 1-year of follow-up, which limits our ability to examine changes as they occur throughout puberty. Despite these limitations, the GEAS study provides a unique perspective on gender socialization in an understudied population growing up in deprived urban areas of Sub-Saharan Africa. Its longitudinal design offers an opportunity to examine the interplay of developmental and social factors affecting adolescent socialization in the existing gender system, allowing researchers to adjust for a range of covariates and benefit from the temporal ordering of variations. The SDS scale provides new benefits for the field of gender equality, specifically in heterosexual sexual relationships among young adolescents. The scale seemingly functions independent of other gender measures [32], which is suggestive of the fact that contrasting gendered attitudes toward different aspects of life can coexist in the same person; that is, that one person can be equal when it comes to distribution of labor and unequal when it comes to SDS. In addition, The SDS is shown to be more strongly related to adolescent empowerment than other gender norms measure in the GEAS study [33], supporting its saliency at this early stage of adolescent development [32]. With additional forthcoming longitudinal information from other GEAS sites, we believe future research should seize opportunities to explore how the SDS scale performs both later in life (with older participants) and in other cultural contexts.

These findings call for a better understanding of the ways young people come to reinterpret and reenact gender norms through interactions with family, peers, community, and the media [5]. Further research should continue to examine how developmental, social, and contextual changes affect adolescents' gender normative outlooks, to better evaluate how long gender norms take to change, and which factors are associated with these changes in the short term and long term. Future research should also aim to increase the understanding of which social factors shape the experiences of boys and girls.

The findings from this study support the need for early interventions and suggest that the period before puberty is important to changing gender norms. The finding that caregivers and peers have different influences on boys' and girls' SDS underscores how interventions that aim to transform gender relations in a given setting should be inclusive of an adolescent's social network, including family and friends. Interventions could test and integrate media components in ways that create greater opportunities for adolescents to be exposed to gender transformative content. Finally, these findings also bear important implications for the timing of sex education interventions (both in-school and out-of-school). Specifically, because of what our data suggest in terms of the earlier transition of girls to puberty, these interventions would be most effective if they worked with girls at least 1–2 years before menarche.

Funding Sources

This study was conducted with support from the UNDP-UNFPA-UNICEF-WHO-World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP), a co-sponsored program executed by the World Health Organization (WHO). Support was also provided by the Oak Foundation (OCAY-17-649), Bill & Melinda Gates Foundation (OPP1125119, OPP1197258), the Packard Foundation (2017-66517), and the United States Agency for International Development (AID-OAA-A-15-00042).

Supplementary Data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.jadohealth.2020.07.041>.

References

- [1] Patton GC, Sawyer SM, Santelli JS, et al. Our future: A Lancet commission on adolescent health and wellbeing. *Lancet* 2016;387:2423–78.
- [2] WHO. Health for the World's Adolescents. A second change in the second decade. Geneva: WHO; 2014.
- [3] Hill JP, Lynch ME. The intensification of gender-related role expectations during early adolescence. In: Brooks-Gunn J, Petersen A, eds. *Girls at Puberty: Biological and Psychosocial Perspectives*. New York: Plenum; 1983:201–28.
- [4] Kägesten A, Gibbs S, Blum RW, et al. Understanding factors that shape gender attitudes in early adolescence globally: A mixed-methods systematic review. *PLoS One* 2016;11:e0157805.
- [5] John N, Stoebenau K, Ritter S, et al. Gender socialization during adolescence in low and middle income countries; conceptualization, influences and outcomes. Innocenti Discussion Paper. Florence: UNICEF Office of research-Innocenti; 2017-01.
- [6] Legros S, Cislighi B. Mapping the social norms literature: An overview of reviews. *Perspect Psychol Sci* 2020;15:62–80.
- [7] Cislighi B, Heise L. Gender norms and social norms: Differences, similarities and why they matter for effective global health action. *Social Health Illn* 2020;42:407–22.
- [8] MacLean A, Sweeting H, Egan M, et al. How robust is the evidence of an emerging or increasing female excess in physical morbidity between childhood and adolescence? Results of a systematic literature review and meta-analyses. *Soc Sci Med* 2013;78:96–112.
- [9] Patalay P, Fitzsimons E. Development and predictors of mental ill-health and wellbeing from childhood to adolescence. *Soc Psychiatry Psychiatr Epidemiol* 2018;53:1311–23.
- [10] Cavazos-Rehg PA, Krauss MJ, Spitznagel EL, et al. Age of sexual debut among US adolescents. *Contraception* 2009;80:158–62.
- [11] Peltzer K. Early sexual debut and associated factors among in-school adolescents in eight African countries. *Acta Paediatr* 2010;99:1242–7.
- [12] Zimmer-Gembeck MJ, Collins WA. Gender, mature appearance, alcohol use, and dating as correlates of sexual partner accumulation from ages 16–26 years. *J Adolesc Health* 2008;42:564–72.
- [13] The Lancet Public Health. Time to tackle the physical activity gender gap. *Lancet Public Health* 2019;4:e360.
- [14] Baird S, Buttha Z, Abu Hamad B, et al. Do restrictive gender attitudes and norms influence physical and mental health during very young adolescence? Evidence from Bangladesh and Ethiopia. *SSM - Popul Health* 2019; 9:100480.
- [15] Kapungu C, Petroni S. Understanding and tackling the gendered drivers of poor adolescent mental health. Washington, DC: International Center for Research on Women; 2017.
- [16] Jewkes R, Flood M, Lang J. From work with men and boys to changes of social norms and reduction of inequities in gender relations: A conceptual shift in prevention of violence against women and girls. *Lancet* 2015;385: 1580–9.
- [17] Sawyer S, Affi R, Bearinger L, et al. Adolescence: A foundation for future health. *Lancet* 2012;379:1630–40.
- [18] Blum RW, Mmari K, Moreau C. It begins at 10: How gender expectations shape early adolescence around the world. *J Adolesc Health* 2017;61: S3–4.
- [19] Mmari K, Gibbs S, Moreau C, et al. 'Yea, I've grown; I can't go out anymore': Perceived risks for girls and boys entering adolescence. *Cult Health Sex* 2018;20:787–98.
- [20] Kahn NF, Halpern CT. Is developmental change in gender-typed behavior associated with adult sexual orientation? *Dev Psychol* 2019; 55:855–65.
- [21] Priess HA, Lindberg SL, Hyde JS. Adolescent gender-role identity and mental health: Gender intensification revisited. *Child Dev* 2009;80: 1531–44.
- [22] Shakya HB, Domingue B, Nagata JM, et al. Adolescent gender norms and adult health outcomes in the USA: A prospective cohort study. *Lancet Child Adolesc Health* 2019;3:529–38.
- [23] Heise L, Greene M, Opper N, et al. Gender inequality and restrictive gender norms: Framing the challenges to health. *Lancet* 2019;393: 2440–54.
- [24] Springer KW, Hankivsky O, Bate L. Gender and health: Relational, intersectional, and biosocial approaches. *Soc Sci Med* 2012;74: 1661–6.
- [25] McHale SM, Kim JY, Dotterer AM, et al. The development of gendered interests and personality qualities from middle childhood through adolescence: A biosocial analysis. *Child Dev* 2009;80:482–95.
- [26] Moreau C, Li M, De Meyer S, et al. Measuring gender norms about relationships in early adolescence: Results from the global early adolescent study. *SSM Popul Health* 2019;7:100314.
- [27] Performance Monitoring and Accountability 2020 (PMA2020) Kinshasa, DRC. Adolescents and Young Adults Health Brief. September–November 2017. Available at: <https://www.pma2020.org/sites/default/files/Kinshasa-R6-adol-brief-EN.pdf>. Accessed October 3, 2020.
- [28] Blum RW, Astone NM, Decker MR, Mouli VC. A conceptual framework for early adolescence: A platform for research. *Int J Adolesc Med Health* 2014; 26:321–31.
- [29] Djamba YK. Social capital and premarital sexual activity in Africa: The case of Kinshasa, Democratic Republic of Congo. *Arch Sex Behav* 2003;32: 327–37.
- [30] Pulerwitz J, Blum R, Cislighi B, et al. Proposing a conceptual framework to address social norms that influence adolescent sexual and reproductive health. *J Adolesc Health* 2019;64:S7–9.
- [31] Haider H. Changing gender & social norms, attitudes and behaviours. K4D Helpdesk Research Report Series. Brighton, UK: Institute of Development Studies; 2017. Available at: <https://opendocs.ids.ac.uk/opendocs/handle/123456789/13191>. Accessed October 3, 2020.
- [32] Moreau C, Li M, Ahmed S, Zuo X, Cislighi B. Assessing the spectrum of gender norms perceptions in early adolescence: A cross-cultural analysis of the global early adolescent study. *JAH supplement*, under review.
- [33] Zimmerman LA, Koenig LR, Pulerwitz J, Kayembe P, Maddelena M, Moreau C. Disentangling power and gender norms: A case for addressing empowerment and gender unequal norms among young adolescents.