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The intersection of adolescent depression and peer violence: baseline results from a randomized controlled trial of 1752 youth in Pakistan

Nargis Asad[1], Rozina Karmaliani[2], Judith McFarlane[3], Shireen Shehzad Bhamani[2], Yasmeen Somani[2], Esnat Chirwa[4] & Rachel Jewkes[4]

[1]*Department of Psychiatry, The Aga Khan University, Karachi 3500, Pakistan. E-mail: nargis.asad@aku.edu*
[2]*School of Nursing & Midwifery, The Aga Khan University, Karachi, Pakistan*
[3]*College of Nursing, Texas Woman's University, Houston, TX, USA*
[4]*South African Medical Research Council, Pretoria, South Africa*

Background: Depression and peer violence are global issues impacting youth. We are presenting baseline data as part of a cluster randomized control trial underway, on adolescent depression, and associated factors among boys and girls in schools. **Method:** Cluster randomized control trial is underway for measuring the effectiveness of school-based play intervention program of the NGO Right to Play, in a sample of 1752 grade 6 youth in 40 public schools of Hyderabad, Pakistan. Students responded to Child Depression Inventory (CDI-2), the Peer Victimization Scale (PVS), the Peer Perpetration Scale (PPS), and investigator-driven seven-item School Performance Scale. **Results:** We report baseline assessments to examine the prevalence of depressive symptoms, and associated occurrence of peer perpetration and victimization. Boys report significantly more depressive symptoms as well as perpetration and victimization compared to girls ($p \leq .0001$). Our analysis indicates that among boys, depression was found associated with greater age, food insecurity, poorer school performance and working for money, as well as being beaten at home and witnessing beating of their mother by their father or other relatives. Among girls, depression was associated with a younger age, greater food insecurity and poorer school performance. Depression was also associated with a great likelihood of engagement in peer violence, experience of punishment at home, and witnessing their father fighting with other men or beating their mother. **Conclusions:** Engagement in violent behaviors, exposure to violent acts and poverty surfaces as detrimental to mental health in youth age groups, suggesting strong measures to address youth violence, and poverty reduction for positive mental health outcomes in school age children.

Key Practitioner Message

- Depression and peer violence are global issues impacting youth.
- Exposure to family violence is a risk for negative mental health outcomes.
- Poverty reduction is essential for violence reduction.
- Comprehensive family programs for positive parenting and addressing violence issues within families are needed.
- School-based mental well-being programs for building resilience in young students are pivotal for positive mental health.

Keywords: Peer violence; depression; abuse; youth; Pakistan

Introduction

Depression in youth is a common but serious mood disorder and is characterized by somatic, cognitive, affective, and social symptoms, including low mood, lack of vigor, social reclusiveness, and a myriad of physical disorders (Calear, 2012). Depression among youth including children and adolescents can be a major cause of morbidity taking a recurring and episodic course (Merry, McDowell, Wild, Bir, & Cunliffe, 2004).

The adolescent age group is reported to be the most sensitive to developing depressive symptoms, especially during the early teen years when transitioning from childhood to adolescence (Fleming, Offord, & Boyle, 1989). A Chinese study on university students yielded prevalence rates of borderline clinical depression in 40.1% of participants; moderate and severe depression was estimated in 8.4% and 3.3% of participants (Chen et al., 2013).

There are strong theoretical rationales, as well as empirical evidence, that abuse of any kind can lead to depression and that experience of abuse can result in profound direct and mediated influences on the risk of later depression (Moretti & Craig, 2013). Furthermore, there is evidence reporting an association between abuse and depressive symptoms, in particular, major depressive

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disorder (MDD) (Brown, Cohen, Johnson, & Smailes, 1999; Paul & Eckenrode, 2015; Widom, White, Czaja, & Marmorstein, 2007).

Equally concerning as youth depression is peer violence, including victimization and perpetration. One form of youth violence, specifically bullying, is reported by the World Health Organization (WHO) as impacting 32% of children (one in three) across 38 countries (WHO, 2009). All types of peer victimization, both physical and emotional, are associated with maladjustment and psychological distress among boys and girls of all ages (Hawker & Boulton, 2000). The most cited mental health correlates of peer victimization are depression and anxiety, ideation, attempted and completed suicides, school-related fear, anxiety, and avoidance. Researchers in India, a culture closer to the present study context, also report a high prevalence of peer victimization and associated psychosocial consequences such as low self-esteem and compromised academic performance (Malhi, Bharti, & Sidhu, 2014).

To better understand the intersection of youth depression and youth violence, the social and family context must be considered. From an ecological perspective, peer victimization and perpetration processes result from a multifactorial interaction between person and environment, with factors including individual characteristics, family patterns, peer relationships, school functioning, and community, culture, and society norms (Mishna, Khoury-Kassabri, Gadalla, & Daciuk, 2012). There is a consensus that peer victimization and perpetration is connected to parenting characteristics and family environment context (Boel-Studt & Renner, 2013). Characteristics of the family and home environment related to peer victimization and perpetration include parent–child conflict, parental discipline techniques, and parent communication patterns (Boel-Studt & Renner, 2013). In a study of Scandinavian boys, Olweus described the families of boys who bully as lacking in warmth, parental monitoring, and as using more physical violence within the family (Olweus, 1994). A detached and hostile family environment among youth who bully is described in many other studies (Espelage & Swearer, 2003; Griffin & Gross, 2004; Hong & Espelage, 2012; Smith, 2004). However, much less information is known about what parenting and familial factors are associated with youth who are victimized. Cook found that family and home environments significantly predicted victimization; however, the overall effect sizes were lower than other factors such as community factors and peer influences (Cook, Williams, Guerra, Kim, & Sadek, 2010).

Some families with peer victimized youth may be cohesive; yet sometimes parents, and in particular mothers, can be over protective of victimized children, which may inhibit the development of independence and the skills needed to effectively navigate social interactions and resolve conflict (Berdondini & Smith, 1996; Bowers, Smith, & Binney, 1994; Duncan, 1999). Research documents a connection between a hostile family environment and child maltreatment and peer victimization. Youth who experience one form of victimization may also be at greater risk of other forms of victimization (Finkelhor, Ormrod, Turner, & Hamby, 2005).

Clearly, to optimize adolescent development, more information is needed on the intersection and consequences of youth depression and victimization. The Department for International Development (DFID) of UKAID (Works, 2015) is funding a program of research to understand better how to prevent violence against women and girls. One of the interventions being evaluated is located in urban public schools in Pakistan and seeks to measure the differential outcomes of youth violence (i.e. peer perpetuation and victimization) and improved child mental health (i.e. less depressive symptoms) following a 2-year play-based intervention delivered by the NGO Right to Play (Play, 2016).

This paper describes the prevalence of youth depression, by gender, and its association with peer youth victimization and perpetration, family characteristics, gender attitudes, and youth academic performance among sixth graders attending public schools in Pakistan. If youth depression is to be prevented and meaningful interventions applied, contextual factors must be examined and understood, such as peer violence.

This study is groundbreaking in Pakistan; we have not been able to find another work with the same age group (as young as sixth graders) looking at mental health outcomes and its association with violence of various forms occurring in schools and families. Family life characteristics, such as poverty and food insecurity and its impact on mental health, also remain unexplored in the local context.

Methods

This paper presents an analysis of the baseline data from a cluster randomized controlled trial. The details of the intervention, as well as methods of the 2-year cluster randomized controlled trial, are described elsewhere (McFarlane et al., 2017).

Forty fairly homogenous schools in the urban city of Hyderabad, which is located in the southern providence of Sindh about 50 miles from the megacity of Karachi, were chosen for randomization. Youth in the sixth grade, usually 12–14 years of age, were selected as the target population. Inclusion criteria for a child included the parent's consent to the study and the child's agreement to participate in it themselves. A child also needed to be able to read the national language of Pakistan Urdu or the provincial language Sindhi so that they could self-complete the questionnaire.

Following an Internal Review Board approval and completion of informed consent procedures, consisting of parental written consent and child assent, data were collected for the 40 schools over a 60-day period. For the 40 schools, we sent home a total of 2486 parental consent forms and received 1858 affirmed parent consents for a return rate of 75%. Of the 1858 forms signed and returned by the parents, 1767 children assented for a rate of 95%. In general, parents of girls consented more often than parents of boy, 79% compared to 70% respectively. A total of 1752 youth questionnaires were completed and entered into a SPSS database.

Instruments

The Children's Depression Inventory 2 (CDI-2) is a 28-item self-report questionnaire designed to assess the severity of current or recent depressive symptoms in youth aged 7–17. The CDI-2 includes symptoms of depression, such as feeling lonely and not liking oneself, over the preceding 2 weeks. The response options for each item are rated on a 3-point scale as: 0 (no symptom); 1 (probable or mild symptom); and 2 (definite, marked symptom). The range of scores is 0–56, where higher scores represented increased depressive symptoms. The CDI-2 has a high level of internal consistency (Cronbach's alpha = .91), a high test–retest reliability (.76–.92), and has correlated positively and significantly with other measures of childhood depressive symptomology,

including the Beck Depression Inventory Youth version (BDI-Y) (rs = .37) and the Conner's Comprehensive Behaviors Rating Scales (CRBS) (rs = .57) (Kovacs, 2011) .

For this study, the raw scores for the CDI-2 were converted into *t*-scores based on age and gender attributes of the participants according to the specifications in the CDI-2 technical manual. The *T*-scores range from ≤40 to ≥90. In preanalysis diagnostics, the univariate distribution for the depression *t*-scores was adequately normally distributed for linear regression analysis. Scores obtained from the CDI-2 may be classified as a binary outcome, with a *T*-score of ≥65 consistent with a diagnosis of depression, although in this paper we are chiefly using them as a continuous variable due to a lack of validation of the cutoff point in Pakistan (Kovacs, 2011).

The Peer Victimization Scale (PVS) is a 16-item measure with four subscales, each with four questions, assessing physical and verbal victimization, social manipulation, and property attacks (Mynard & Joseph, 2000). Designed for youth, aged 11–17, respondents are asked, how often over the last 4 weeks [i.e. never, once, a few times (2–3), or many times (four or more)] an event happened to them (i.e. victimization). Scale scores are computed by summing item responses. Scores on the total scale have a possible range of 0–48. Higher scores reflect more victimization. Coefficient alpha for this study was .87.

The Peer Perpetration Scale (PPS) asks the same 16 items of the Peer Victimization scale with the wording adjusted to measure perpetration. Youth are asked, how often over the last 4 weeks [i.e. never, once, a few times (2–3), or many times (four or more)] they perpetrated an event (i.e. perpetration). Scale scores are computed by summing item responses (range 0–48). Higher scores reflect more perpetration. Coefficient alpha for this study was .89.

School Performance is a 7-item, investigator-derived scale that assesses child performance in subjects of language, math, science and social studies (i.e. below average, average, above average). Coefficient alpha of .642 was measured for the four academic performance items that had a similar metric. The number of absences from school in the preceding 4 weeks was tallied and the reasons for the absences were recorded.

Data analysis

The Peer Perpetration score was dichotomized into 'perpetrators' and 'nonperpetrators' and the Peer Victimization score was dichotomized into 'victimized' and 'nonvictimized'. In order to do this, we used thresholds suggested by the US Centers for Disease Control and Prevention (CDC) guidelines (Hillis et al., 2016). These guidelines define a participant score in the last 4 weeks on the Peer Victimization Scale or Peer Perpetration Scale of 0–1 as low violence, and 2 or greater as high violence. These were further combined to create a three-category variable: 0 = nonperpetrator and nonvictimized (equivalent to CDC's 'low' category for victimization or perpetration), 1 = victimized only, and 2 = any perpetration. Four other indexes were created. A hunger score was created from two items that asked learners how often in the last 4 weeks they had gone to school without breakfast, and also, how often in the last 4 weeks they had gone to sleep without dinner due to lack of food at home. The two items were measured on a 4-point scale, with 0 indicating 'never', and 3 indicating 'all or most days'. A school performance score measured a child's performance in four subjects: reading and writing, social studies, math, and science, with each item measured on a 4-point scale ranging from 1 = failing to 3 = excellent. A crowding index was used to capture household family size to household room number ratio and derived by dividing the number of people in each household by the number of rooms.

All analysis of this baseline study took into account the study design, with participants clustered within schools. Descriptive analyses were carried out on all potential explanatory variables, summarized initially by sex of participant. These variables included family life characteristics, home or school experiences of violence, school attendance/performance, and peer victimization and perpetration of violence. Summary statistics for categorical explanatory variables were frequencies and percentages, and means and standard deviations were used as summary statistics for continuous variables. Chi-square tests were used to compare categorical explanatory variables between boys and girls, using the standard linearization methods for clustered data. Simple linear random effect models were used to compare continuous variables between boys and girls, and standard errors were estimated using the clustered robust method to account for school clustering.

Simple linear random effects modeling (with school as the clustering variable) was further used to assess the bivariate relationships between these possible explanatory variables and childhood depression. Due to significant differences in home or school experience of violence, as well as school performance and attendance variables between boys and girls, a separate analysis of factors associated with childhood depression was done for boys and girls. Prior to modeling factors associated with childhood depression, the distribution of CDI-2-total scores was assessed for normality.

Generalized linear mixed model (GLMM) was used to investigate factors associated with childhood, with school representing random effect. A Gauss–Hermite quadrature integration method was used to obtain likelihood functions for the observed data (Engel & Keen, 1994). To account for school clustering, standard errors of the estimates were estimated using the clustered robust method. A backward elimination method was used, with all factors initially found to be associated with childhood depression in the bivariate analysis added to the model. They were added to the model in two groups sequentially. The first model included all sociodemographic factors such as hunger score, number of siblings (sisters or brothers), the household crowd index, and parental behavioral factors such as father's violent behavior toward mother or toward other men. The exclusion criterion for the backward elimination was a *p*-value of .15 as suggested by Vittinghoff. (Vittinghoff, Shiboski, Glidden, & McCulloch, 2005). A second group of variables, which included factors such as participant's experience of violence by peers, educators, or parents, and participant's school performance or attendance, was then added to the first model. Only factors with *p*-value less than or equal to .05 were included in the final model. Variance inflation factor was then used to assess any multicollinearity among the explanatory variables. All analyses were done using Stata 14 software package.

Results

The mean age of the boys participating is 12.5 years and of the girls was 12.3 years (Table 1). Most of the children came from large families, with the mean number of brothers 2.7 for boys and 2.2 for girls, and of sisters 2.2 for boys and 2.6 for girls. School attendance was patchy with boys having missed an average of 4.1 days school in the previous month and girls an average of 3.1 days. About 24.5% of boys and 14.2% of girls said the last day they missed was due to having to work at home. About 7.7% of boys and 1.6% of girls had missed school due to the need to work to earn money. The poorer attendance was reflected in self-reported school performance, which was higher for girls than boys. Boys scored more highly for depression than girls, with the mean CDI-2 *T*-scores 56.75 and 54.61, respectively. Overall, 14.9% of girls and 19.9% of boys had a *T*-score of = or >65 indicating depression.

The children reported considerable exposure to and engagement in violence at school and at home and, in all cases, boys reported more exposure than girls (Table 1). About 75.5% of boys and 50.6% of girls had perpetrated peer violence on more than one occasion in the past month, many of these also reported experiencing peer violence. About 17.8% of boys and 28.5% of girls had

Table 1. Descriptive statistics by sex of participants

		Boys		Girls		
Factor	*N*	*n*/mean	% / *SD*	*n*/mean	% / *SD*	*p*-value
Peer perpetration/victimization						
None	249	55	6.7	194	20.9	<.001
Victimization only	411	146	17.8	265	28.5	
Any perpetration	1092	621	75.5	471	50.6	
Experienced corporal punishment at School	1317	751	91.4	566	60.9	<.001
Experienced corporal punishment at home	840	495	60.3	345	37.1	<.001
Missed school due work at home	325	195	24.5	130	14.2	.005
Missed school due work for money	76	61	7.7	15	1.6	<.001
Witnessed father fight with other men	377	211	25.7	166	17.9	.002
Witnessed father beat mother	136	80	9.7	56	6	.016
Witnessed relative beat mother	74	38	4.6	36	3.9	.396
Father drinks alcohol	53	28	3.4	25	2.7	.35
Age[a]		12.51	1.5	12.27	1.38	.001
Number of brothers[a]		2.7	1.61	2.21	1.39	<.001
Number of sisters[a]		2.2	1.57	2.63	1.81	<.001
Room crowding index[a]		3.71	2.51	3.89	2.41	.162
School days missed[a]		4.07	4.17	3.14	2.85	.001
School Performance[a]		9.27	1.81	9.55	1.77	.065
Hunger score[a]		0.65	1.09	0.48	0.97	.016
CDI-2 depression Total *T*-score[a]		56.75	9.69	54.61	9.26	.002

[a]Summary statistics are mean and standard deviation.

been victims of peer violence but had not perpetrated. Corporal punishment was very common at school with 91.4% of boys experiencing it in the last 4 weeks and 60.9% of girls. At home, 60.3% of boys and 37.1% of girls had experienced it. Many of the children had also witnessed parental involvement and experience of physical violence. About 25.7% of boys and 17.9% of girls had witnessed their father fight with other men in the past month, 9.7% of boys and 6% of girls had witnessed their father beat their mother, and 4.6% of boys and 3.9% of girls had witnessed another relative hit their mother in the previous 4 weeks.

Table 2 shows the distribution of responses to items on the CDI-2 for boys and girls. Several of the item responses were significantly different for boys and girls and, in almost all instances, boys reported more negative feelings than did girls. Overall, negative mood was reported by quite a small proportion of girls and boys. Sadness was reported more than once in a while by 13.7% of boys and 7.8% of girls, with only 4% and 3%, respectively, reporting it 'all the time'. About 8.3% of boys and 7.2% of girls reported that they felt like crying every day. A similar proportion, 8.2% of boys and 7.7% of girls reported 'feeling cranky all the time'. Around 3.9% of boys and 1.4% of girls reported 'I want to kill myself'. Only 3.6% of boys and 2% of girls reported never having fun at school,

A sense of ineffectiveness was much more commonly reported, with 18.4% of boys and 14.3% of girls indicating their belief that 'all bad things are my fault'. About 27.7% of boys and 24.3% of girls reported doing many things or everything (2.4% boys v. 1.2% girls) wrong. A much greater proportion of boys and girls, 31.9% and 41.4% respectively, disclosed that 'I cannot make up my mind about things'. Uncertainty about the future was expressed as 'nothing will ever work out for me' and reported by 12.6% of boys and 6.5% of girls.

A small proportion of children had negative self-esteem, with 8.9% of boys and 4.8% of girls reporting that 'I can never be as good as other kids'. About 10.2% of boys and 5.5% of girls reported that their families would be 'better off without them'. Around 18.1% of boys and 1.2% of girls reported that they were 'not sure' that anyone loved them or that 'nobody' loved them. Overall, 3.3% of boys and 1.6% of girls perceived that they 'looked ugly'.

Interpersonal problems were also reported by more boys than girls. About 15.5% of boys and 5.5% of girls endorsed 'I do not want to be with people at all', and 4.5% of boys and 3.3% of girls said that they had no friends. Around 11.4% of boys and 7.1% of girls reported that they felt alone all the time, and 11.2% of boys and 3.2% of girls reported 'getting into arguments with friends all the time'.

Functional problems were more commonly expressed. About 27.9% of boys and 22.2% of girls reported 'I have to push myself all the time to do my schoolwork'. Exactly 12.9% of boys and 10.8% of girls disclosed having trouble sleeping every night, 8.8% of boys and 5.5% of girls were tired 'all the time', and 14.8% of boys and 8.1% of girls reported falling asleep during the day all the time. About 20.5% of boys and 13.7% of girls said they worried about aches and pains all the time and 13% of boys and 14.5% of girls said most days they did not feel like eating.

Table 3 shows the association between measures of the social lives and exposure to violence of the children and their depression scores. In boys, depression scores increased with higher age, but with girls they were lower for older girls. For boys, depression was higher among those with more crowded homes and they were higher among those experiencing more food security. Girls who missed school more often were more depressed, as were boys who missed school to work for money, and girls and boys with poorer school performance were also more depressed. Depression was associated with peer violence for boys and girls,

Table 2. Distribution of child depression inventory items by gender

	Boys		Girls		
Item	*n*	%	*n*	%	*p*-value
CDI-21					
I am sad once in a while	709	86.3	832	89.5	.26
I am sad many times	80	9.7	70	7.5	
I am sad all the time	33	4	28	3	
CDI-22					
Nothing will ever work out for me	105	12.8	60	6.5	<.001
I am not sure if things will work out for me	175	21.3	147	15.8	
Things will work out for me	542	65.9	723	77.7	
CDI-23					
I do most things ok	593	72.2	703	75.7	.144
I do many things wrong	208	25.3	215	23.1	
I do everything wrong	20	2.4	11	1.2	
CDI-24					
I have fun in many things	512	62.3	628	67.5	.152
I have fun in some things	272	33.1	273	29.4	
Nothing is fun at all	38	4.6	29	3.1	
CDI-25					
I am important to my family	604	73.5	753	81	.004
I am not sure if I am important to my family	134	16.3	129	13.9	
My family is better off without me	84	10.2	48	5.2	
CDI-26					
I hate myself	26	3.2	22	2.4	.52
I do not like myself	54	6.6	65	7	
I like myself	742	90.3	843	90.6	
CDI-27					
All bad things are my fault	151	18.4	133	14.3	.059
Many bad things are my fault	203	24.7	238	25.6	
Bad things are not usually my fault	467	56.9	559	60.1	
CDI-28					
I do not think about killing myself	588	71.5	693	74.6	.037
I think about killing myself but would not do it	202	24.6	223	24	
I want to kill myself	32	3.9	13	1.4	
CDI-29					
I feel like crying everyday	68	8.3	67	7.2	.342
I feel like crying many days	63	7.7	55	5.9	
I feel like crying once in a while	691	84.1	808	86.9	
CDI-210					
I feel cranky all of the time	69	8.4	72	7.7	.767
I feel cranky many times	141	17.2	168	18.1	
I am almost never cranky	612	74.5	690	74.2	
CDI-211					
I like being with people	590	71.8	813	87.5	<.001
I do not like being with people many times	105	12.8	65	7	
I do not want to be with people at all	127	15.5	51	5.5	
CDI-212					
I cannot make up my mind about things	262	31.9	385	41.4	<.001
It is hard to make my mind about things	241	29.4	314	33.8	
I make up my mind about things easily	318	38.7	231	24.8	
CDI-213					
I look OK	657	79.9	793	85.3	.021
There are some bad things about my looks	138	16.8	122	13.1	
I look ugly	27	3.3	15	1.6	
CDI-214					
I have to push myself all the time to do my schoolwork	229	27.9	206	22.2	.069
I have to push myself many times to do my schoolwork	114	13.9	96	10.3	
Doing schoolwork is not a big problem	479	58.3	628	67.5	
CDI-215					
I have trouble sleeping every night	106	12.9	100	10.8	.419
I have trouble sleeping many nights	92	11.2	110	11.8	
I sleep pretty well	624	75.9	720	77.4	
CDI-216					
I am tired once in a while	628	76.4	790	84.9	.002
I am tired many days	122	14.8	89	9.6	
I am tired all the time	72	8.8	51	5.5	

(continued)

Table 2. (continued)

Item	Boys		Girls		*p*-value
	n	%	*n*	%	
CDI-217					
Most days I do not feel like eating	107	13	135	14.5	<.001
Many days I do not feel like eating	117	14.2	191	20.6	
I eat pretty well	598	72.7	603	64.9	
CDI-218					
I do not worry about aches and pains	434	52.9	542	58.3	.003
I worry about aches and pains many times	219	26.7	261	28.1	
I worry about aches and pains all the time	168	20.5	127	13.7	
CDI-219					
I do not feel alone	566	68.9	678	72.9	.02
I feel alone many times	162	19.7	186	20	
I feel alone all the time	94	11.4	66	7.1	
CDI-220					
I never have fun at school	30	3.6	19	2	.035
I have fun at school only once in a while	159	19.3	144	15.5	
I have fun at school many times	633	77	767	82.5	
CDI-221					
I have plenty of friends	624	75.9	717	77.1	.258
I have some friends but wish I had more	161	19.6	182	19.6	
I do not have any friends	37	4.5	31	3.3	
CDI-222					
My schoolwork is alright	689	83.8	795	85.6	.384
My schoolwork is not as good as before	88	10.7	96	10.3	
I do very badly in subjects I used to be good in	45	5.5	38	4.1	
CDI-223					
I can never be as good as other kids	73	8.9	45	4.8	.002
I can be as good other kids if I want to	268	32.6	303	32.6	
I am just as good as other kids	481	58.5	582	62.6	
CDI-224					
Nobody really loves me	46	5.6	31	3.3	.039
I am not sure if anybody loves me	103	12.5	82	8.8	
I am sure that somebody loves me	673	81.9	816	87.8	
CDI-225					
It is easy for me to get along with friends	567	69	812	87.3	<.001
I get into arguments with friends many times	163	19.8	88	9.5	
I get into arguments with friends all the time	92	11.2	30	3.2	
CDI-226					
I fall asleep during the day all the time	122	14.8	75	8.1	<.001
I fall asleep during the day many times	189	23	230	24.7	
I almost never fall asleep during the day	511	62.2	625	67.2	
CDI-227					
Most days I feel like I can't stop eating	84	10.2	101	10.9	.002
Many days I feel like I can't stop eating	87	10.6	134	14.4	
My eating is OK	651	79.2	695	74.7	
CDI-228					
It is easier for to remember things	548	66.7	706	75.9	<.001
It is a little hard to remember things	220	26.8	177	19	
It is very hard to remember things	54	6.6	47	5.1	

such that both perpetration of violence and experience as a victim were associated with more depression. Girls who experienced corporal punishment at school had higher depression scores, as did both boys and girls experiencing it at home. Depression scores were higher for boys and girls who had witnessed their father fighting with other men, beating their mother or relatives doing the same.

Table 4 shows the multiple regression model of factors associated with depression scores in boys and girls. Among boys, depression was associated with greater age, food insecurity, poorer school performance and working for money. It was associated with being beaten at home and witnessing beating of their mother by their father or other relatives. Among girls, depression was associated with a younger age, greater food insecurity, and poorer school performance. Depression is associated in girls with a great likelihood of engagement in peer violence, experience of corporal punishment at home, and witnessing their father fighting with other men or beating their mother.

Discussion

Our finding suggests that depression in boys and girls in grade 6 is intersected by peer violence, exposure to violence at home, outside of home, and poverty.

Our major findings suggest that, for boys and girls, depression is found significantly associated with poverty

Table 3. Bivariate analysis of factors associated with depression score among boys and girls

	Boys				Girls			
		95% Conf. Interval				95% Conf. Interval		
	β	LCL	UCL	*p*-value	β	LCL	UCL	*p*-value
Age	0.53	0.09	0.97	.018	−1.42	−1.85	−0.99	<.001
Room crowd index	0.27	0.002	0.54	.048	0.09	−0.16	0.33	.497
Hunger score	2.42	1.83	3.01	<.001	1.91	1.32	2.51	<.001
School days missed	0.03	−0.13	0.19	.712	0.26	0.05	0.47	.014
School Performance	−1.58	−1.94	−1.22	<.001	−1.28	−1.61	−0.96	<.001
Missed school due work for money	4.23	1.68	6.78	.001	0.81	−0.91	2.52	.357
Peer perpetration/victimization								
None								
Victimization only	4.23	1.3	7.17	.005	4.23	2.59	5.88	<.001
Any perpetration	7.45	4.85	10.06	<.001	6.24	4.74	7.74	<.001
Experienced corporal punishment at school	2.19	−0.17	4.55	.069	3.39	2.16	4.62	<.001
Experienced corporal punishment at home	2.96	1.62	4.31	<.001	4.12	2.91	5.32	<.001
Witnessed father fight with other men	3.7	2.2	5.2	<.001	3.64	2.12	5.15	<.001
Witnessed father beat mother	6.82	4.62	9.02	<.001	6.57	4.09	9.04	<.001
Witnessed relative beat mother	8.94	5.82	12.07	<.001	6.4	3.38	9.42	<.001

Each model fitted using generalized linear mixed model to adjust for school clustering.

Table 4. Generalized linear mixed model results of factors associated with depression score for boys and girls

	Boys				Girls			
		95% Conf. Interval				95% Conf. Interval		
	β	LCL	UCL	*p*-value	β	LCL	UCL	*p*-value
Age	0.51	0.13	0.94	.010	−1.62	−2.01	−1.23	<.001
Hunger score	1.90	1.34	2.48	<.001	1.32	0.77	1.89	<.001
School Performance	−1.36	−1.88	−0.85	<.001	−1.16	−1.46	−0.87	<.001
Missed school due to work for money	2.84	0.53	5.15	.016				
Peer victimization/ perpetration								
None								
Victimization					3.46	1.94	4.98	<.001
Any perpetration					3.95	2.48	5.42	<.001
Corporal Punishment at home	1.69	0.42	2.95	.009	1.83	0.52	3.14	.003
Father fights with other men					1.51	0.07	2.94	.039
Mother hit by father	3.95	1.60	6.36	<.001	3.06	0.72	5.40	.010
Mother beaten by relatives	6.81	3.84	9.78	<.001				

Both models adjusted for school.

as indicated by hunger index. It may be noted that we derived our data from public schools which cater to socioeconomically impoverished student pool; students studying in these institutions are faced with more than one adversity, and there is a lack of subsistence at home as well as poor infrastructure in their academic environments. Most of these schools are devoid of basic amenities such as seating, water, and sanitation, which, on its own, can be a significant source of frustration. Additionally, for boys, depression is associated with them having to miss school to earn money for their household, which was another poverty indicator. This association was found stronger for boys as, in the local cultural context, boys compared to girls are responsible for outside work to earn money and, at a tender age, young children exposed to this kind of labor are more emotionally vulnerable as they may be at greater risk for abuse of all kinds (Karmaliani et al., 2017). Thwarted ambitions from missing school for work can be another relevant cause for compromised mental health. Food insecurity and hunger is found to be closely associated with depression elsewhere in more or less the same age group (Slopen, Fitzmaurice, Williams, & Gilman, 2010). WHO meta-analysis on poverty and common mental illness in developing countries, including Pakistan, confirms that lack of income flow and financial insecurity is associated with common mental disorders (Patel & Kleinman, 2003).

Depression is also associated with school performance, such that boys and girls are found to be more likely to be depressed if they were not performing well in class. This may be due to the disappointment and stress of finding school work hard, but it is also the case that depression in preadolescents impacts concentration and is often manifested in poorer school academic performance (Lepore & Kliewer, 2013). Association of depression and low academic achievement is also well documented in the literature (Valdez, Lambert, & Ialongo, 2011). In our sample of sixth-grade students, such an association has important implications,

especially in light of the earlier discussed findings of poverty and depression. How, when there is little to eat and children are compelled to go to school without breakfast, or sleep without dinner, a lack of nutrition can be a strong driver for low school performance.

Depression in girls is found associated with engagement in youth violence, both victimized and perpetrating. For boys, this association between peer violence perpetration and victimization and depression was found significant in bivariable analysis only. Our findings of a strong association of peer violence with depression are consistent with the literature (Sullivan, Farrell, & Kliewer, 2006).

Additionally, we identified no other studies that separated peer perpetration from peer victimization, by gender, and correlated to symptoms of depression. Our data indicate that peer perpetration impacts girls' risk of depression differently than boys, yielding females at greater risk to depression when reporting the same levels of perpetration as boys. Although from our data, a pathway to girls' perpetration and depression cannot be established, perhaps a sociocultural explanation can be better applied. For instance, socializing norms in the local context of study setting dictate that girls should be submissive and obedient; indulging in perpetrating behaviors perhaps generates an inner unacceptability and hence more depressive feelings when they act as perpetrators toward peers.

Exposure and experience of violence is found to be a significant factor in leading to depression for boys and girls. Both boys and girls who experienced physical punishment at home are more likely to be depressed, and for girls, witnessing their mother being abused by their father is associated with depression. Girls are also found more likely to be depressed if witnessing their father fight with other men. However, for boys witnessing other relatives beat their mother is associated with depression. The negative impact of child exposure to violence directed against the mother at home is well established, including an increased level of internalizing and externalizing behavior problems (Evans, 2003; Jaffee, Moffitt, Caspi, Taylor, & Arseneault, 2002). Internalizing behaviors include depression, anxiety, and withdrawal; externalizing behaviors include aggressive and delinquent behaviors (Achenbach & Edelbrock, 1991).

More significantly, our findings show that violence against the mother inflicted not only by the father but also by his relatives, also impacts on child depression rates. This is a very important feature of domestic violence in South Asia, which is often ignored in other settings but requires immediate attention due to the regularity of multigenerational households and the importance of mother-in-law and daughter-in-law relationships (or tensions) (Krishnan, Subbiah, Chandra, & Srinivasan, 2012). The literature documents a higher prevalence of depression worldwide among women compared to men and certainly, a much higher prevalence of intimate partner violence (WHO, 2009), which may explain the differential gender impact of perpetration on depression beginning in adolescence.

Concerns about violence in schools and peer victimization/perpetration are magnified due to the high psychosocial costs attached to such behaviors leading to immensely adverse social, psychological, and academic functioning in both victims and perpetrators. Our findings suggest an urgent need for interventions to address violence in schools, household levels, and a reduction of poverty for better mental health.

Limitations

Our research methodology has limitations in that it may under- or overrepresent symptoms of youth depression, youth-to-youth victimization and perpetration, as well as characteristics of violence at home and youth academic performance. The questions may miss some episodes of youth victimization or perpetration and violence at home, particularly as we only asked about exposure over a 4-week reporting period. Children may not accurately recall the timing and type of victimization or perpetration they experienced (i.e. whether or not the exposure occurred within the last 4 weeks). The researchers acknowledge recall bias is operant in all questions. The CDI-2 is used as a scale and is not analyzed with a cutoff point. We acknowledge that associated factors may not be the same if we had used a cutoff point but believe our approach to be robust given the lack of cutoff point validation in Pakistan. We have used *t*-scores however to adjust for age, and acknowledge error may be introduced here as the *t*-score curves were not developed in our population. We feel the error is unlikely to substantially impact our findings because we are not using a cutoff point. Our participants were limited to Sindhi (regional language) and Urdu (national language) speakers, although these are the languages of teaching in the participating schools. Despite these limitations, the researchers feel this study provides a framework for examining the occurrence of youth depression within the context of youth-to-youth violence and association with exposure to violence at home and academic performance. We feel this research is the most detailed and comprehensive data available on the interrelationship of school age depression and associated youth-to-youth perpetration and victimization for male and female youth in grade 6 in urban public schools in Pakistan.

Conclusions

Adolescent depression and peer violence are global issues impacting youth. Our key findings show that early adolescent depression is associated with poverty and violence of several forms, including engaging in and experiencing violent behaviors in school, exposure and experience of violence at home, particularly domestic violence directed against the child's mother or the father fighting with other men on streets; youth also reported depression as a consequence to corporal punishment at home.

Such findings suggest a need for policy formulation as well as multilevel interventions. As mentioned earlier, we targeted public schools catering to low socioeconomic strata; in addition, providing basic facilities with innovative strategies of 'school feeding programs' can be a small step toward addressing the issue. Such programs of food on campus can ensure at least a complete meal for students once a day. There have been some government-led initiatives such as nutrition programs for children and

pregnant women in the country as well as cash transfer schemes to enhance family income, but unfortunately, these have not been sufficient to meet the needs of the ultrapoor; more robust and comprehensive programs are needed toward this end.

Addressing psychological needs of the young boys and girls who engage in peer violence can reduce violence in school environment. Capacity building of teachers in supporting students to adopt better coping techniques and school-based mental well-being programs for building resilience are essential to ensure reduction in violence and better mental health outcomes; school-based intervention like the one offered by Right To Play as part of the present study can be instrumental in instilling positive social skills and healthy engagement with school environment and peers. We aim to report later on the effectiveness of the trial once completed.

Any initiative for violence reduction and positive mental health will be incomplete unless the violence at family and household level is addressed through offering public educational programs on social skills with children and conflict resolution in marital relationships.

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