



Article

Self-esteem, perceived social support, social capital, and risk-behavior among urban high school adolescents in Nepal

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ABSTRACT

Adolescence is not only characterized by a period of exploration and experimentation but also by vulnerability to risk-behaviors (substance-use, suicidal behavior, and sexual behavior) that can have many negative consequences. Given the lack of studies in Nepal and the variable results from international studies on the association of self-esteem, perceived social support (PSS), and social capital (SC) with risk behaviors, this study aimed to assess the role of these factors by specifying different sources of PSS (family, friends, and others) and SC (family, school, and neighbors), and controlling for demographic, socioeconomic-status (SES), family, and school related factors. A total of 943 adolescents (grades 9–11) in 8 schools from 3 provinces in Nepal participated in the study, and were selected by multi-stage, cluster, random sampling. Data were collected through a self-administered questionnaire (response rate; 91.9%). Multivariate logistic regression analysis (<0.05 significance) revealed that family SC (OR = 0.83) and PSS from family (OR = 0.95) were negatively associated with substance-use. Self-esteem (OR = 0.90), family and school SC (OR = 0.80 and 0.91, respectively), and PSS from family and friends (OR = 0.95 and 0.96, respectively) were protective against suicidal risk. None of the independent variables showed a preventive association with sexual behavior, but self-esteem was positively associated (OR = 1.11). Therefore, to improve the likelihood of adolescents becoming healthy adults, family and school level interventions to enhance self-esteem, PSS, and SC are helpful in protecting them against substance use and suicidal behavior. On the other hand, adolescents with high self-esteem are at greater risk for inappropriate sexual behavior and should therefore be monitored.

Introduction

The Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) have focused on the preventable but most prevalent global problems of substance-use, sexual behavior, and suicide-related behavior, among others, as risk-behaviors for adolescents, mostly in low- and middle-income countries (LMICs) that might be vulnerable to longer lasting effects on health and social functioning (Kann, McManus, Harris, et al., 2018; CDC, 2018; WHO, 2017; WHO, 2018b; WHO, 2018c). According to the WHO, at least 1 in 10 adolescents 13–15 years of age uses tobacco, 11% of all births worldwide are due to teenage pregnancy, and 46 births/1000 girls are in the 15–19 years age range mostly in LMICs (WHO, 2018a; Pan American Health Organization/WHO Regional Office for the Americas, 2018). Suicide is the third most common cause of morbidity and disability among adolescents worldwide and is the leading cause of death among youths in the South-East Asia Region (SEAR), i.e., it has high cause specific

mortality (WHO, 2017; WHO, 2019).

Nepal has the fourth highest global suicide rate for the 15–29 years age group, and a recent SEAR survey among teens aged 13–17 years projected that Nepal had the highest frequency of suicidal ideation (13.7%), a behavior that is the greatest risk for committing suicide (WHO, 2014; WHO, 2017). The survey also showed that 10% of students in Nepal used multiple substances. Furthermore, 17% of adolescents aged 15–19 years were already mothers or pregnant, and one in five women gave birth by age 18 years. Men initiated sexual activity 1.2 years before marriage at age 20 (Aryal, 2017; Ministry of Health, Nepal, 2017; Pandey, Seal and Razee, 2019).

Establishing healthy behaviors during childhood and adolescence is more effective and easier than trying to change behavior in adulthood (Aryal, 2017). Promoting health and behavior of young persons is also important to the success of the 2030 agenda for Sustainable Development (World Bank, 2019). Despite rising aspirations, very little has been done in the area of youth development in Nepal (Ministry of Population

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and Environment: *MoPE*, 2017). Though we have become aware of the extent of this problem only recently, to the best of our knowledge, there is no study in Nepal that focused on possible preventive factors for these risk behaviors.

An adolescent's behavior is determined not only by individual traits but is also influenced by multiple factors within a social context (United Nations Office on Drugs and Crime: *UNODC*, 2018; *Jessor*, 2011; *Currie et al.*, 2009, p. 271). Furthermore, the adolescent's brain is sensitive to social influence, and whether they have a positive or negative perception from relationships with family, caregivers, and peers influences their behavior and the outcome (*Schriber & Guyer*, 2016). A study based on Problem Behavior Theory identified low self-esteem as one of the risk factors for substance-use (*Karaman*, 2013). *Rosenberg* (1965) defines self-esteem as an individual's overall evaluation of self; if one considers self as worthy, then self-esteem will be higher. Some studies demonstrated an inverse relationship between self-esteem and substance-use, suicidal behavior, and sexual risk-behavior (*Veselska et al.*, 2009; *Handren, Donaldson, & Crano*, 2016; *Chen, Martins, Strain, Mojtabei, & Storr*, 2018; *Chatard, Selimbegović, & Konan*, 2009; *Sharaf, Thompson, & Walsh*, 2009; *Ugoji*, 2014; *Enejoh et al.*, 2016). However, there remains a lack of data on the association of self-esteem with those risk-behaviors along with other socio-contextual factors in Nepal. On the other hand, studies based on ecological theory showed social support from family and teachers had a protective effect on adolescent risk behaviors, although a mixed influence from more remote levels, i.e., neighbors and other adults, was revealed (*Sharaf et al.*, 2009; *Kleiman & Riskind*, 2013; *Kang et al.*, 2017; *Reininger, Pérez, Flores, Chen, & Rahbar*, 2012).

Another concept, social capital (SC), a theory established in sociology by renowned theorists, promoted the importance of social features (family, neighborhood, school, and similar human organizations), individual networks, relationships, norms, cohesion, and trust (*Kawachi & Berkman*, 2000; *Tzanakis*, 2013). Studies in different parts of the world have indicated that multiple types of SC impact health behaviors and developmental trajectories, and are associated with better mental health and educational outcome in adolescents (*Kawachi & Berkman*, 2001; *Rothon, Goodwin, & Stansfeld*, 2012). Nepalese surveys demonstrated differences in the prevalence of substance use and suicidal behavior by some demographic, parental occupation, and peer factors (*Kabir & Goh*, 2014; *Karki, Länsimies, Laukkanen, Pirskanen, & Pietilä*, 2016; *Thapa et al.*, 2017). Two review studies also indicated that although SC is likely to be one of the important factors in understanding risk-behaviors, there is need of studies in different sociocultural and economic contexts because the influence of SC might be different in different contexts (*Kaljee & Chen*, 2011; *McPherson et al.*, 2013). Therefore, we evaluated three different sources of SC and perceived social support (PSS) to determine their association with three risk behaviors of adolescents in diverse ethnic, cultural, religious, and socioeconomic contexts.

Several international studies discussed above identified the effects of adolescent risk-behaviors and the relative importance of factors like self-esteem, PSS, and SC in understanding those effects. However, there is a scarcity of studies on this topic in developing countries. Results of a study on health and social vulnerability of adolescents in Nepal showed Nepalese adolescents were vulnerable to various issues like child marriage, school dropout (mainly due to poverty, conflict, substance use), lack of health services, and psychosocial problems (*Adhikari et al.*, 2016). Although Nepal has made impressive progress in life expectancy, maternal and child health, and reduction of infectious diseases including HIV and TB during the last two decades, a promotive and preventive focus on adolescent health and behavior is still far from being achieved. Many youth mental health problems seem to be hidden and under-assessed because adolescents have traditionally been ignored by public sector programs and budgets (*UNICEF*, 2019; *MoPE*, 2017; Ministry of Health and Population (*MoHP*, 2015). Therefore, studies need to be conducted in different contexts to make preventive interventions more specific and effective (*WHO*, 2020).

Hence, with this background, we conducted the first study in Nepal with the objective of identifying the roles of self-esteem, three sources of PSS from family, friends, and significant others, and three sources of SC in family, school, and neighborhood in urban high-school adolescents. If some previously observed associations were the consequences of unmeasured confounding, we hoped our study would add clarity by controlling for variables such as demographics, SES, and family, school, and peer relationships. Furthermore, we hoped this study would help expand our understanding of how self-esteem and different sources of PSS and SC influence different risk behaviors. Ultimately, findings from this study might have important implications for Nepalese adolescents.

Methods

This cross-sectional analytical study was conducted in Nepal, a country located in South Asia between China and India, with a geographical area 147,181 square kilometers and a total population of 28.4 million people, of which almost 24% are adolescents. Although Nepal is a multi-ethnic, multi-lingual, multi-religion, and multi-cultural country, Nepali is the main language, and 81% of people follow the Hindu religion. According to the World Bank income group, it is a country with low income, an adult literacy rate of 65.9%, and agriculture as the major occupation. After recent changes approved by Nepal's Constituent Assembly in September 2015, administratively Nepal is divided into seven provinces, each of which is sub-divided into urban and rural areas. Therefore, a multistage cluster sampling technique was used. Three of these provinces were selected for this study: Province number 3, which included Kathmandu, the capital or main city of Nepal; Province number 4, which included the Kaski district and Pokhara that represented other middle urban areas; and Province number 5, which included the Palpa district and represented the smaller countryside urban areas of Nepal. We selected urban areas because of the higher prevalence of risk behaviors among adolescents in urban areas (*Karki et al.*, 2016; *Adhikari et al.*, 2016) and the possible impact of urbanization on risk behaviors (*Kabir & Goh*, 2014). According to the Ministry of Education (2017), the total number of higher secondary schools in Provinces 3, 4, and 5 was 978, 561, and 532, respectively. Hence, 3 schools (2 government and 1 private) from Kathmandu, 3 schools (1 government and 2 private) from Pokhara, and 2 schools (1 government and 1 private) from Palpa were selected. Classes 9–11 of those schools were the final clusters, and adolescents aged 13–19 years (who were available and willing to participate) were the participants in this study.

Formal permission/assent from school authorities and participants/parents was obtained, and an ethical review was conducted by the authors' university. Participation in the study was fully voluntary, and subjects had full authority to withdraw at any time. Precautions were taken throughout the study to safeguard the rights and welfare of all participants. Anonymity was maintained, and participants were ensured that the information collected would be used only for research purposes. Data were collected with a self-administered questionnaire in classrooms in the presence of a researcher. The questionnaire was first read out loud in front of class by a researcher, and throughout the data collection period a researcher was present in the respective classrooms to further clarify the questions, if needed.

Sociodemographic information consisted of questions related to age, sex, religion, ethnicity, education level, family type, parent's education and occupation, and economic status as perceived by the adolescents; these questions were developed by reference to past studies (*Lamichhane*, 2015; *Karki et al.*, 2016; *Aryal*, 2017; *WHO*, 2017). Social context was assessed by both family- and school-related factors. Family factors included family conflict and violence, perceived love and bonding with parents, family members' use of substances, perceived parental control/monitoring, and access to mass media. School factors included academic performance (result of last annual examination), peer pressure, friends' involvement in risk-behavior, appreciation by teachers, teacher-student relationship, and school rules.

The Rosenberg Self-esteem Scale (RSES) was used to measure self-esteem levels of adolescents. This 10-item self-report measure consisted of 5 positively-worded and 5 negatively-worded items answered on a 4-point scale that ranged from 'strongly agree' (score: 3) to 'strongly disagree' (score: 0), with a total score that ranged from 0 to 30. A higher score indicated higher self-esteem. The data showed reliability of $\alpha = 0.75$.

The Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet, Dahlem, Zimet, et al., 1988) was used to measure PSS from 3 sources: family, friends, and significant others. The scale was comprised of 12 items, scored on a 7-point rating scale that ranged from 1 (very strongly disagree) to 7 (very strongly agree), and resulted in a total PSS score of 12–84. The total PSS score was divided by 12 to convert it into a score of 1–7. This tool showed high reliability ($\alpha = 0.93, 0.88, 0.88, \text{ and } 0.84$, respectively, for total, family, friends, and significant others) in the present study. Inter-item correlation was good, and principal component analysis showed the high factor loadings for which they were intended.

Family SC was measured by 6 items on a 3-point scale (satisfaction, trust, and cohesion at the family level), which we developed after thorough review of available literature (McPherson et al., 2013; Rothon et al., 2012; Magson, Craven, Munns, & Yeung, 2016; Raymond-Flesch, Auerswald, McGlone, et al., 2017). Forward and backward translation of the tool was confirmed with language experts and then a pretest of the tool was conducted before execution for final data collection. After the pretest, questions were modified to make them clearer and easier to answer. Reliability was tested with Cronbach α , and the convergent and discriminant validities of the family SC were studied by confirmatory factor analysis using average variance extracted and maximum shared variance (Hair, Black, Babin, & Anderson, 2010). School and neighborhood SC were measured by 12 items (7 for school and 5 for neighborhood) on a 4-point Likert scale that was previously utilized (Takakura, Hamabata, Ueji, & Kurihara, 2014; Paiva, de Paiva, de Oliveira Filho, et al., 2014). Cronbach's α of the Nepali version of the tool was 0.87 in total, 0.68 for family SC, 0.86 for school SC, and 0.89 for neighborhood SC. Principal component analysis and confirmatory factor analysis demonstrated validity of the tools.

Risk-behavior (substance-use, suicidal behavior, and sexual behavior) was measured with questions based on the CDC Youth Risk-Behavior Survey and a survey questionnaire for adolescents' risk-behavior in South Asia, including Nepalese adolescents (CDC, 2017; WHO, 2017). For substance-use, participants were asked if they had ever used tobacco, alcohol, marijuana, or drugs, and if the response was yes, then how many times had they used the substance in the past 30 days. For suicidal behavior, they were asked about suicidal thoughts, plans, or attempts in the previous 12 months, and for sexual behavior, they were asked if they had watched pornography or ever had sexual contact. Those who responded yes to any of these questions were coded as 1, and those who responded no were coded as 0. The MSPSS and RSES were translated and used in previous studies and reported good reliability and practicality for use among Nepalese adolescents (Lamichhane, 2015). The questions on risk behavior were based on past study in Nepalese adolescents (Aryal, 2017; WHO, 2017). As noted earlier, α values in the present study were good.

Data were analyzed with SPSS version 26.0 (IBM, Tokyo). Descriptive statistics (frequency, percentage, mean, and standard error) were used to describe the characteristics, and inferential statistics (bivariate and multivariate logistic regression analysis) were used at <0.05 significance level. Odds ratio (OR) was calculated with a 95% confidence interval (CI). A crude odds ratio (COR) was used to find bivariate association, and an adjusted odds ratio (AOR) was calculated to find any association of independent variables, with adjustment for possible confounder variables such as demographics, SES (parents' education, occupation, and economic status as perceived by adolescents), family factors (conflict, violence, love-bonding with parents, substance-use by family members, control/supervision by parents), and school-related factors (type of school, peer pressure, friends involvement in risk-

behavior, academic performance, parental expectation in academics, teacher-student relationship, appreciation by teacher, how teachers behave, school rules/monitoring).

Results

A total of 1070 adolescents were willing to participate, of which 943 adolescents provided complete responses and were therefore included in the final analysis (Table 1). The mean age of the respondents was 15.82 years, and the number of female participants was higher (51.7%). A higher percentage of males were involved in substance-use (25.1%) and sexual behavior (22.2%), but suicidal behavior was higher in females (11.9%). Adolescents who belonged to religions other than Hindu had higher rates of suicidal and sexual behavior (16.5% and 20.3%, respectively). Substance-use was higher for adolescents from Kathmandu (23.0%), and suicidal and sexual behaviors were higher in adolescents from Pokhara (12.5% and 20.8%, respectively). The effect of parents' occupations was also significant, as seen by lower rates of risk-behaviors in adolescents whose mothers were homemakers (stay at home), and by less substance-use and suicidal behavior in those whose fathers were employed. Regarding family type, 56.1% of adolescents were from single families and 43.9% were from joint families. Substance-use was higher (21.7%) for those in joint families. Home internet was available to 57.4% of adolescents, and a significant difference was found in sexual behavior in terms of internet access (15.2% vs 10.5%). Substance-use was also significantly higher among those whose family members were substance users. Adolescents in private schools had a higher prevalence of all three risk behaviors. Their friends being involved in risk-behavior and peer pressure were also significant factors. The adolescent's perception of behavior and appreciation by the teacher, relationship with teachers, and strict rules at school were significant factors for all three risk-behaviors.

The mean scores for independent variables were: self-esteem, 16.51; PSS from family, friends, and others, 23.0, 21.39, and 20.35, respectively; and SC at family, school, and neighbor, 15.89, 20.81, and 14.67, respectively. (Table 2). The prevalence of substance-use among adolescents was 18.9% and included alcohol (10.9%), tobacco (smoking, 8.3%; smokeless, 5.6%), marijuana (3.9%), and drugs (1.0%). The prevalence of suicidal behavior was 9.8% (thoughts, 7.8%; plan, 4.3%; attempt, 2.5%). Regarding inappropriate sexual behavior, 11.3% of adolescents watched sexually explicit material/pornography, and 2.4% had sexual contact.

We demonstrated the relationships between each independent variable of self-esteem, PSS, or SC, and each dependent variable, i.e., risk behavior of substance use, suicidal behavior, or sexual behavior (Table 3). Multivariate analysis controlled for all covariates revealed that adolescents with higher support from family and higher family SC benefited from a significant protective effect against substance use. Similarly, adolescents with high self-esteem, higher support from family and friends, and higher family and school SC were significantly less likely to demonstrate suicidal behavior. However, adolescents with high self-esteem were more likely to exhibit sexual behavior, while none of the adolescents with PSS and SC showed any association with sexual behavior. All results of the adjusted models including the OR and CI values for confounding variables are presented in Supplementary Tables 1–7.

Discussion

Adolescent risk-behavior is an important health and social issue globally, and Nepal is no exception. Some studies have tried to indicate prevalence for different risk-behaviors, but a knowledge gap about what are the actual protective factors still remains. Therefore, this study was an attempt to assess the effect of important but rarely explored factors like self-esteem, PSS, and SC on substance-use, suicidal behavior, and sexual behavior by specifying different sources and controlling for all

Table 1
Descriptive information on adolescents' sociodemographic characteristics and SES, family, school-related factors, and risk behavior (n = 943).

Variables	Total	Substance-Use		P	Suicidal Behavior		P	Sexual Behavior		P
		No	Yes		No	Yes		No	Yes	
Age										
13–15 Years	388 (41.1)	311 (80.4)	76 (19.6)	0.627	344 (88.9)	43 (11.1)	0.249	342 (88.4)	45 (11.6)	0.244
16–19 Years	555 (58.9)	453 (81.6)	102 (18.4)		505 (91.2)	49 (8.8)		476 (85.8)	79 (14.2)	
Mean ± Standard Deviation 15.82 ± 1.31										
Sex										
Male	455 (48.3)	341 (74.9)	114 (25.1)	0.000*	420 (92.5)	34 (7.5)	0.023*	353 (77.8)	101 (22.2)	0.000*
Female	488 (51.7)	423 (86.9)	64 (13.1)		429 (88.1)	58 (11.9)		465 (95.3)	23 (4.7)	
Grade										
9	317 (33.6)	253 (79.8)	64 (20.2)	0.209	276 (87.3)	40 (12.7)	0.102	272 (85.8)	45 (14.2)	0.666
10	314 (33.3)	248 (79.2)	65 (20.8)		289 (92.0)	25 (8.0)		276 (88.2)	37 (11.8)	
11	312 (33.1)	263 (84.3)	49 (15.7)		284 (91.3)	27 (8.7)		270 (86.5)	42 (13.5)	
Ethnicity										
Brahmin/Chhetri	333 (35.3)	267 (80.4)	65 (19.6)	0.440	297 (89.7)	34 (10.3)	0.875	281 (84.4)	52 (15.6)	0.254
Janajati	505 (53.6)	407 (80.6)	98 (19.4)		456 (90.3)	49 (9.7)		445 (88.3)	59 (11.7)	
Others (Dalit, Muslim, Terai caste)	105 (11.1)	90 (85.7)	15 (14.3)		96 (91.4)	9 (8.6)		92 (87.6)	13 (12.4)	
Religion										
Hindu	815 (86.4)	666 (81.8)	148 (18.2)	0.158	743 (91.3)	71 (8.7)	0.006*	716 (88.0)	98 (12.0)	0.010*
Others	128 (13.6)	98 (76.6)	30 (23.4)		106 (83.5)	21 (16.5)		102 (79.7)	26 (20.3)	
School District										
Kathmandu	336 (35.6)	258 (77.0)	77 (23.0)	0.004*	303 (90.4)	32 (9.6)	0.035*	301 (89.6)	35 (10.4)	0.000*
Kaski	361 (38.3)	290 (80.3)	71 (19.7)		316 (87.5)	45 (12.5)		286 (79.2)	75 (20.8)	
Palpa	246 (26.1)	216 (87.8)	30 (12.2)		230 (93.9)	15 (6.1)		231 (94.3)	14 (5.7)	
Socio-economic-status										
Hardly-sufficient	66 (7.0)	60 (90.9)	6 (9.1)	0.082	59 (89.4)	7 (10.6)	0.861	61 (92.4)	5 (7.6)	0.205
Sufficient	557 (59.1)	451 (81.1)	105 (18.9)		499 (89.9)	56 (10.1)		476 (85.5)	81 (14.5)	
Surplus	320 (33.9)	253 (79.1)	67 (20.9)		291 (90.9)	29 (9.1)		281 (88.1)	38 (11.9)	
Father's Education										
Illiterate	44 (4.7)	42 (95.5)	2 (4.5)	0.044*	41 (93.2)	3 (6.8)	0.656	42 (95.5)	2 (4.5)	0.223
Literate	757 (80.3)	607 (80.3)	149 (19.7)		683 (90.3)	73 (9.7)		654 (86.4)	103 (13.6)	
Don't know	142 (15.1)	115 (81.0)	27 (19.0)		125 (88.7)	16 (11.3)		122 (86.5)	19 (13.5)	
Mother's Education										
Illiterate	105 (11.1)	85 (81.7)	19 (18.3)	0.511	97 (92.4)	8 (7.6)	0.301	93 (88.6)	12 (11.4)	0.852
Literate	700 (74.2)	572 (81.7)	128 (18.3)		633 (90.6)	66 (9.4)		606 (86.6)	94 (13.4)	
Don't know	138 (14.6)	107 (77.5)	31 (22.5)		119 (86.9)	18 (13.1)		119 (86.9)	18 (13.1)	
Mother's Occupation										
Other	519 (55.0)	406 (78.4)	112 (21.6)	0.018*	456 (88.0)	62 (12.0)	0.012*	439 (84.6)	80 (15.4)	0.024*
Home maker	424 (45.0)	358 (84.4)	66 (15.6)		393 (92.9)	30 (7.1)		379 (89.6)	44 (10.4)	
Father's Occupation										
Not employed	68 (7.2)	47 (69.1)	21 (30.9)	0.009*	55 (80.9)	13 (19.1)	0.007*	56 (82.4)	12 (17.6)	0.250
Employed	871 (92.8)	713 (82.0)	157 (18.0)		791 (91.0)	78 (9.0)		759 (87.2)	111 (12.8)	
Type of family										
Single	529 (56.1)	440 (83.3)	88 (16.7)	0.048*	476 (90.3)	51 (9.7)	0.908	454 (86.0)	74 (14.0)	0.383
Joint	414 (43.9)	324 (78.3)	90 (21.7)		373 (90.1)	41 (9.9)		364 (87.9)	50 (12.1)	
Family conflict										
Most often	24 (2.5)	19 (79.2)	5 (20.8)	0.010*	21 (87.5)	3 (12.5)	0.006*	21 (87.5)	3 (12.5)	0.013*
Sometimes	605 (64.2)	474 (78.3)	131 (21.7)		531 (88.1)	72 (11.9)		511 (84.5)	94 (15.5)	
Never	314 (33.3)	271 (86.6)	42 (13.4)		297 (94.6)	17 (5.4)		286 (91.4)	27 (8.6)	
Domestic violence										
Most often	18 (1.9)	13 (72.2)	5 (27.8)	0.084	15 (83.3)	3 (16.7)	0.000*	14 (82.4)	3 (17.6)	0.528
Sometimes	77 (8.2)	56 (72.7)	21 (27.3)		59 (76.6)	18 (23.4)		64 (83.1)	13 (16.9)	
Never	848 (89.9)	695 (82.1)	152 (17.9)		775 (91.6)	71 (8.4)		740 (87.3)	108 (12.7)	
Love and bonding with parents										
Most often	789 (83.7)	646 (82.0)	142 (18.0)	0.216	716 (91.0)	71 (9.0)	0.235	684 (86.7)	105 (13.3)	0.951
Sometimes	130 (13.8)	98 (75.4)	32 (24.6)		112 (86.2)	18 (13.8)		114 (87.7)	16 (12.3)	
Never	24 (2.5)	20 (83.3)	4 (16.7)		21 (87.5)	3 (12.5)		20 (87.0)	3 (13.0)	
Verbal/emotional abuse at home										
Most often	21 (2.2)	18 (85.7)	3 (14.3)	0.010*	17 (81.0)	4 (19.0)	0.002*	18 (85.7)	3 (14.3)	0.222
Sometimes	258 (27.4)	193 (74.8)	65 (25.2)		219 (85.2)	38 (14.8)		216 (83.7)	42 (16.3)	
Never	664 (70.4)	553 (83.4)	110 (16.6)		613 (92.5)	50 (7.5)		584 (88.1)	79 (11.9)	
Physical abuse at home										
Most often	20 (2.1)	17 (85.0)	3 (15.0)	0.155	17 (85.0)	3 (15.0)	0.099	15 (78.9)	4 (21.1)	0.191
Sometimes	174 (18.5)	132 (75.9)	42 (24.1)		148 (86.0)	24 (14.0)		145 (83.3)	29 (16.7)	
Never	748 (79.4)	614 (82.2)	133 (17.8)		683 (91.3)	65 (8.7)		657 (87.8)	91 (12.2)	
Internet access at home										
No	402 (42.6)	328 (81.8)	73 (18.2)	0.641	367 (91.5)	34 (8.5)	0.248	359 (89.5)	42 (10.5)	0.036*
Yes	541 (57.4)	436 (80.6)	105 (19.4)		482 (89.3)	58 (10.7)		459 (84.8)	82 (15.2)	
Family members' substance-use										
Father No	443 (47.0)	376 (84.9)	67 (15.1)	0.005*	407 (91.9)	36 (8.1)	0.108	388 (87.6)	55 (12.4)	0.522
Yes	500 (53.0)	388 (77.8)	111 (22.2)		442 (88.8)	56 (11.2)		430 (86.2)	69 (13.8)	
Mother No	811 (86.0)	671 (82.2)	139 (17.2)	0.001*	736 (90.9)	74 (9.1)	0.100	715 (88.3)	95 (11.7)	0.001*
Yes	132 (14.0)	93 (70.5)	39 (29.5)		113 (86.3)	18 (13.7)		103 (78.0)	29 (22.0)	
Siblings No	851 (90.2)	706 (83.1)	144 (16.9)	0.000*	775 (91.3)	74 (8.7)	0.001*	746 (87.8)	104 (12.2)	0.010*
Yes	92 (9.8)	58 (63.0)	34 (37.0)		74 (80.4)	18 (19.6)		72 (78.3)	20 (21.7)	

(continued on next page)

Table 1 (continued)

Variables	Total	Substance-Use		P	Suicidal Behavior		P	Sexual Behavior		P
		No	Yes		No	Yes		No	Yes	
Grandparents No	656 (69.6)	548 (83.5)	108 (16.5)	0.004*	605 (92.4)	50 (7.6)	0.001*	571 (87.2)	84 (12.8)	0.642
Yes	287 (30.4)	216 (75.5)	70 (24.5)		244 (85.3)	42 (14.7)		247 (86.1)	40 (13.9)	
Parental control/monitoring										
Inadequate	25 (2.7)	17 (68.0)	8 (32.0)	0.091	22 (88.0)	3 (12.0)	0.716	15 (62.5)	9 (37.5)	0.000*
Adequate	910 (97.3)	740 (81.4)	169 (18.6)		819 (90.2)	89 (9.8)		796 (87.5)	114 (12.5)	
Type of school										
Government/Public	562 (59.6)	474 (84.5)	87 (15.5)	0.001*	521 (92.9)	40 (7.1)	0.001*	501 (89.1)	61 (10.9)	0.011*
Private	381 (40.4)	290 (76.1)	91 (23.9)		328 (86.3)	52 (13.7)		317 (83.4)	63 (16.6)	
Academic performance										
Second, Third division	278 (29.5)	226 (81.3)	52 (18.7)	0.968	252 (91.0)	25 (9.0)	0.615	248 (89.2)	30 (10.8)	0.370
Distinction and First Division	646 (68.5)	523 (81.1)	122 (18.9)		581 (90.1)	64 (9.9)		554 (85.9)	91 (14.1)	
Others	19 (2.0)	15 (78.9)	4 (21.1)		16 (84.2)	3 (15.8)		16 (84.2)	3 (15.8)	
Feel not met parental expectations in academics										
No	282 (29.9)	235 (83.3)	47 (16.7)	0.249	252 (89.4)	30 (10.6)	0.565	255 (90.4)	27 (9.6)	0.033*
Yes	660 (70.1)	528 (80.1)	131 (19.9)		596 (90.6)	62 (9.4)		562 (85.3)	97 (14.7)	
Friend's substance-use										
No	644 (68.3)	570 (88.6)	73 (11.4)	0.000*	598 (93.1)	44 (6.9)	0.000*	597 (92.8)	46 (7.2)	0.000*
Yes	299 (31.7)	194 (64.9)	105 (35.1)		251 (83.9)	48 (16.1)		221 (73.9)	78 (26.1)	
Friend's sexual behavior										
No	837 (88.8)	699 (83.6)	137 (16.4)	0.000*	764 (91.5)	71 (8.5)	0.000*	768 (91.9)	68 (8.1)	0.000*
Yes	106 (11.2)	65 (61.3)	41 (38.7)		85 (80.2)	21 (19.8)		50 (47.2)	56 (52.8)	
Peer pressure										
No	869 (92.2)	727 (83.8)	141 (16.2)	0.000*	794 (91.6)	73 (8.4)	0.000*	778 (89.6)	90 (10.4)	0.000*
Yes	74 (7.8)	37 (50.0)	37 (50.0)		55 (74.3)	19 (25.7)		40 (54.1)	34 (45.9)	
Teacher behaves good at school										
No	142 (15.1)	93 (65.5)	49 (34.5)	0.000*	114 (80.3)	28 (19.7)	0.000*	108 (76.1)	34 (23.9)	0.000*
Yes	801 (84.9)	671 (83.9)	129 (16.1)		735 (92.0)	64 (8.0)		710 (88.8)	90 (11.3)	
Appreciation by Teacher										
No	149 (15.8)	110 (73.8)	39 (26.2)	0.013*	118 (79.2)	31 (20.8)	0.000*	124 (83.8)	24 (16.2)	0.232
Yes	794 (84.2)	654 (82.5)	139 (17.5)		731 (92.3)	61 (7.7)		694 (87.4)	100 (12.6)	
Teacher-student relation good										
No	131 (13.9)	90 (68.7)	41 (31.3)	0.000*	106 (80.9)	25 (19.1)	0.000*	99 (75.6)	32 (24.4)	0.000*
Yes	811 (86.1)	673 (83.1)	137 (16.9)		742 (91.7)	67 (8.3)		718 (88.6)	92 (11.4)	
Strict school rules and monitoring										
No	205 (21.7)	154 (75.5)	50 (24.5)	0.021*	172 (83.9)	33 (16.1)	0.001*	156 (76.5)	48 (23.5)	0.000*
Yes	738 (78.3)	610 (82.7)	128 (17.3)		677 (92.0)	59 (8.0)		662 (89.7)	76 (10.3)	
Substances offered/got in school territory										
No	907 (96.2)	743 (82.0)	163 (18.0)	0.000*	821 (90.7)	84 (9.3)	0.010*	791 (87.3)	115 (12.7)	0.032*
Yes	36 (3.8)	21 (58.3)	15 (41.7)		28 (77.8)	8 (22.2)		27 (75.0)	9 (25.0)	

Numbers in the parentheses indicate percentage, SE; Standard Error *significant P value < 0.05 by chi-square test.

other demographic, SES, family, peer, and school related factors, because even lower prevalence risk-behaviors have very high adverse impacts on not only the adolescents involved but also their families, society, and the nation (UNODC, 2018).

Regarding substance use, a similar prevalence of tobacco and marijuana use has been reported by other studies, but either lower or higher rates of alcohol and other intoxicant use have been reported (WHO, 2017; Kabir & Goh, 2014; Karki et al., 2016). A study in the eastern part of Nepal found that smoking was higher among adolescents of private schools, as was the case in our study, but that difference was not statistically significant (Pradhan, Ghimire, Niraula, et al., 2013). Our study found a lower prevalence of suicidal behavior than that reported by other studies in Nepal (WHO, 2017; Thapa et al., 2017); however, the WHO study included only adolescents who were 13–17 years of age and the other study was conducted in eastern Nepal among adolescents 12–16 years of age. Nepal adolescents and youth survey 2010/11 reported that sexual intercourse among adolescents was 13.27% for ages 10–14 years and 60.64% for ages 15–19 years (MoHP, 2012), and first Global school-based student health survey recently conducted in Nepal showed that almost 21% of school adolescents 13–17 years of age had sexual intercourse (Aryal, 2017). Those percentages are higher than the present findings, and the difference might be because adolescents from both urban and rural areas were included in both studies, although the 2011 report was a household survey of those in school and out of school and therefore might have included more married adolescents in the households. Similar to our findings, a study in Hong Kong reported that 10% of adolescents consumed pornographic materials, and that internet

pornography was the most common medium (Shek & Ma, 2012). There was variation across countries in the reported sexual behavior of adolescents (Lodz, Mutalip, Mahmud, et al., 2019; Enejoh et al., 2016; Reininger et al., 2012).

The mean self-esteem score in our study was similar to findings from previous studies (Lamichhane, 2015; Maharjan, 2008). The mean scores for school and neighbor SC in our study were less than that reported among Japanese adolescents measured with the same scale (Takakura et al., 2014). It seems that adolescents' responses to available SC might differ between geographic areas with unique social contexts.

Substance use

Our multivariate-analysis proved that adolescents with high PSS and SC from family were less vulnerable to substance-use, but the association between self-esteem and substance use was confounded by other factors, i.e., the father's education, occupation and income, friend's substance use, and strongest of all, peer pressure. Although past international studies showed negative associations between self-esteem and substance use including alcohol and marijuana, the role of self-esteem was weakened by the peer-related confounding factors (Handren et al., 2016; Chen et al., 2018; Veselska et al., 2009; Kim, 2011; Karaman, 2013). Peer factors are especially concerning during adolescence because this is the period when more time is spent with friends and most of the time is spent in school or outside the family. Consequently, simply the enhancement of self-esteem is not sufficient. Our study also revealed a negative association between PSS and substance-use and confirmed that

Table 2
Prevalence of risk behavior with self-esteem, perceived social support, and social capital (n = 943).

Variables	Total	Substance-Use#		P	Suicidal Behavior#		P	Sexual Behavior#		P
		No	Yes		No	Yes		No	Yes	
Self-esteem										
Low	281 (29.8)	208 (74.0)	73 (26.0)	0.000*	236 (84.3)	44 (15.7)	0.000*	244 (86.8)	37 (13.2)	0.998
High	662 (70.2)	556 (84.1)	105 (15.9)		613 (92.7)	48 (7.3)		574 (86.8)	87 (13.2)	
Mean ± SE 16.51 ± 0.12										
PSS from family										
Low and Medium	185 (19.6)	120 (65.2)	64 (34.8)	0.000*	146 (79.3)	38 (20.7)	0.000*	147 (79.5)	38 (20.5)	0.001*
High	758 (80.4)	644 (85.0)	114 (15.0)		703 (92.9)	54 (7.1)		671 (88.6)	86 (11.4)	
Mean ± SE 23.0 ± 0.17										
PSS from friends										
Low and Medium	259 (27.5)	188 (72.9)	70 (27.1)	0.000*	214 (82.9)	44 (17.1)	0.000*	206 (79.5)	53 (20.5)	0.000*
High	684 (72.5)	576 (84.2)	108 (15.8)		635 (93.0)	48 (7.0)		612 (89.6)	71 (10.4)	
Mean ± SE 21.39 ± 0.18										
PSS from significant others										
Low and Medium	333 (35.3)	259 (78.0)	73 (22.0)	0.074	288 (86.7)	44 (13.3)	0.008*	278 (83.5)	55 (16.5)	0.024*
High	610 (64.7)	505 (82.8)	105 (17.2)		561 (92.1)	48 (7.9)		540 (88.7)	69 (11.3)	
Mean ± SE 20.35 ± 0.20										
Family SC										
Low	12 (1.3)	5 (41.7)	7 (58.3)	0.000*	9 (75.0)	3 (25.0)	0.189	8 (66.7)	4 (33.3)	0.100
High	929 (98.7)	757 (81.6)	171 (18.4)		839 (90.5)	88 (9.5)		808 (87.1)	120 (12.9)	
Mean ± SE 15.89 ± 0.06										
School SC										
Low	60 (6.4)	44 (73.3)	16 (26.7)	0.113	51 (85.0)	9 (15.0)	0.160	45 (75.0)	15 (25.0)	0.005*
High	882 (93.6)	719 (81.6)	162 (18.4)		797 (90.6)	83 (9.4)		772 (87.6)	109 (12.4)	
Mean ± SE 20.81 ± 0.12										
Neighbor SC										
Low	91 (9.7)	65 (71.4)	26 (28.6)	0.013*	81 (89.0)	10 (11.0)	0.682	76 (83.5)	15 (16.5)	0.324
High	852 (90.3)	699 (82.1)	152 (17.9)		768 (90.4)	82 (9.6)		742 (87.2)	109 (12.8)	
Mean ± SE 14.67 ± 0.09										

Numbers in the parentheses indicate percentage, SE; Standard Error *significant P value < 0.05 by chi-square test # multiple response.
 #Substance-use: 178 (18.9%), alcohol 103 (10.9%), smoking tobacco 78 (8.3%), smokeless tobacco 53 (5.6%), marijuana 37 (3.9%), and drug use 9 (1.0%).
 #Suicidal behavior: 92 (9.8%), suicidal thought 74 (7.8%), plan 41 (4.3%), attempted 24(2.5%).
 #Sexual behavior: 124 (13.2%), watch pornography/sexually explicit material 107 (11.3%), sexual contact 23 (2.4%).
 Abbreviations: PSS, perceived social support; SC, social capital.

Table 3
Odds ratios and confidence intervals for the effect of self-esteem, three sources of social support, and three sources of social capital on substance use, suicidal behavior and sexual behavior of adolescents, controlling all other variables including demographic, SES, family, and school factors (n = 943).

Independent variables	Substance Use (Yes)						Suicidal Behavior (Yes)						Sexual behavior (Yes)					
	Crude Model			Adjusted Model			Crude Model			Adjusted Model			Crude Model			Adjusted Model		
	OR	LCI	UCI	OR	LCI	UCI	OR	LCI	UCI	OR	LCI	UCI	OR	LCI	UCI	OR	LCI	UCI
Self esteem	0.93	0.89	0.97	0.95	0.90	1.00	0.85	0.80	0.91	0.90	0.83	0.96	1.02	0.97	1.08	1.11	1.04	1.19
PSS from family	0.93	0.90	0.95	0.95	0.91	0.98	0.92	0.89	0.95	0.95	0.91	0.99	0.95	0.92	0.97	0.98	0.93	1.03
PSS from friends	0.94	0.92	0.97	0.97	0.94	1.00	0.93	0.90	0.96	0.96	0.92	0.99	0.94	0.91	0.96	0.96	0.92	1.00
PSS from other significant persons	0.97	0.94	0.99	1.00	0.96	1.03	0.96	0.93	0.99	0.97	0.93	1.01	0.96	0.94	0.99	0.99	0.95	1.03
Family social capital	0.82	0.76	0.88	0.83	0.75	0.93	0.78	0.72	0.86	0.80	0.70	0.92	0.88	0.81	0.96	0.87	0.75	1.01
School social capital	0.93	0.89	0.97	1.00	0.94	1.05	0.87	0.83	0.92	0.91	0.85	0.98	0.91	0.87	0.95	0.98	0.91	1.04
Neighborhood social capital	0.91	0.85	0.98	0.96	0.90	1.03	0.91	0.85	0.98	0.97	0.89	1.06	0.97	0.91	1.03	1.01	0.92	1.10

OR: odds ratio, CI: confidence interval, LCI: lower confidence interval, UCI: upper confidence interval, SES: socioeconomic status, PSS: perceived social support. Crude models show ORs and CIs between each independent variable and three types of dependent variables. Adjusted models show ORs and CIs between each independent variable and three types of dependent variables adjusted for all covariates of demographic, SES, family, and school factors. We removed values for all covariates from this table. See [Supplementary Tables 1–7](#).

family PSS was the strongest and most consistent source of PSS. When SC was taken into account, an association with substance use was demonstrated by several studies (Curran, 2007; Wen, 2017; Magson et al., 2016). An Indian study also showed significant associations with family factors like parent-child relationship and communication (Chhabra & Sodhi, 2012). However, evidence from those studies was not sufficient to determine the association between SC and substance-use in the context of Nepal, and if SC is strongly influenced by other factors that

are known to be associated with these substance-use behaviors, it is now clear from this study that adolescents with high family SC are less likely to use substances. Furthermore, past studies showed an association between neighbor SC and substance use (Jorge, Paiva, Vale, Kawachi, & Zarzar, 2018; Åslund & Nilsson, 2013). In this context, the present study provided insight that other factors such as SES, peers etc. have a greater effect on such an association. Moreover, although past studies from developed nations showed the role of community or neighbors, the

relationship or the perception and availability of neighbor SC might be different in different parts of the world. Therefore, our findings suggest that if family can provide and create higher support, and SC, adolescents might be deterred from substance-use.

Suicidal behavior

This study indicated the role of self-esteem, PSS (from family and friends), and SC (family and school) in protecting adolescents from suicidal behavior. We found that higher self-esteem makes adolescents less prone to suicidal behavior, and this effect of self-esteem has also been demonstrated in previous studies that included South Asian countries (Sharaf et al., 2009; Kleiman & Riskind, 2013; Huang et al., 2017; Xu, Wang, & Shi, 2018; Chatard et al., 2009). Therefore, we conclude that self-esteem is a strong protector of adolescents against suicidal behavior.

The consistent protective effect of family and friends observed in this study and in studies from other countries supports the present finding that adolescents with high PSS from family were less likely to exhibit suicidal behavior (Kang et al., 2017; Springer, Parcel, Baumler, & Ross, 2006; Randall, Doku, Wilson, & Peltzer, 2014). Similarly, Jamaican adolescents who had protective factors in the home were at less risk of suicide, however, there was no association with protective factors outside the home (Abel, Sewell, Martin, Bailey-Davidson, & Fox, 2012). This again suggests that family factors, especially having parents in the home, play an important protective role. Furthermore, previous studies determined that suicidal behavior was exhibited less by adolescents with high support from friends (Dema et al., 2019; Xu et al., 2018; Kleiman & Riskind, 2013). Based on these findings, adolescents should first be helped to enhance and maintain their self-esteem level. Additionally, family and friends need to support adolescents in such a way that they can perceive that adequate support is available.

Studies from South Korea and Canada observed a predictive effect of SC on suicidal behavior in adolescents (Bae, 2019; Langille, Asbridge, Kisely, & Rasic, 2012). The first study was related to communication and getting help from family and friends, and the second study focused mostly on interaction with others in society, religious beliefs, and trust and reciprocity at school. The present study revealed that adolescents with high SC at family and school were at less risk for suicide, and provided evidence that family and school SC were more important than the neighborhood in prevention of suicidal behavior in adolescents. Furthermore, the association with family SC was stronger than with school SC. There is need for future studies to focus more on different types and levels of SC in different types and areas of communities to broaden these findings.

Sexual behavior

Our focus was on self-esteem, PSS, and SC as protective mechanisms against inappropriate sexual behaviors among adolescents in Nepal. Our findings were similar to those from past studies, but one difference was that we observed a positive association between self-esteem and sexual behavior. In contrast, a previous study showed no association between self-esteem and sexual behavior (Kalina et al., 2009), and our findings were also contradicted by results from studies in Nigerian (Ugoji, 2014; Enejoh et al., 2016), Turkish (Karaman, 2013), American (Kerpelman, McElwain, Pittman, & Adler-Baeder, 2016), and Korean adolescents (Kim, 2011), which identified low self-esteem as the risk factor. Our finding of an association between higher self-esteem and inappropriate sexual behavior suggests that the role of self-esteem varies in different contexts. A possible explanation could be that adolescents with higher self-esteem are confident, take pride in themselves, and can make decisions (Rosenberg, 1965). Therefore, besides the positive effects, higher self-esteem may sometimes lead to risks in adolescents, who are exploratory, vulnerable, and in a transitional period of life (WHO, 2014; WHO, 2018a). Our findings showed the double-edged sword effect of

self-esteem on risk behavior, i.e., it has a negative effect on suicide behavior and substance use, but a positive effect on sexual behavior. Adolescents' self-esteem should be assessed; those with low self-esteem should be helped with their ability to prevent risk behavior, most importantly suicidal risk, while those with high self-esteem should be monitored and prevented from engaging in inappropriate sexual behavior. Considering the scarcity of evidence from past studies, our finding is novel and could be considered for future studies to explore this discrepancy, which might be due to differences in country contexts.

Unlike in the present study, a protective effect of PSS from parents against sexual risk-behavior was found in Salvadoran adolescents and boys from Mexico, and a protective effect of PSS from parents and friends was observed in adolescents from Turkey (Springer et al., 2006; Reininger et al., 2012; Çakar & Tagay, 2017).

Regarding SC studies in developed countries including the US, Australia, and Europe reported that family and peer support, school environment, relationships and communication between student and teacher, and family and neighborhood SC were important factors for preventing risk-behavior, including sexual risk-behavior (Crosby, Hotgrave, DiClemente et al., 2003; Magson et al., 2016; Currie et al., 2009, p. 271). Indian study found that more sexual activity was associated with family factors like parent-child relationship and communication (Chhabra & Sodhi, 2012), which are the elements considered as family SC in the present study. However, we found that the overall effect of SC was influenced by the peer factor. Although past findings have suggested that family and school SC serve as control mechanisms for sexual behavior, we would add that peer influence weakens those mechanisms and should therefore be considered as a factor for promoting healthy sexuality among developing adolescents.

Strengths and limitations

This study covered a large geographic area with probability sampling so that findings could be generalized to adolescents studying in urban high-schools in Nepal. Beyond only prevalence studies conducted in isolation, this study tried to explore multiple risk-behaviors and the role of self-esteem, PSS, and SC from several sources by adjusting for demographics, SES, and family- and school-peer related factors in the prevention of these behaviors. However, this study was limited to adolescents attending formal schools in urban areas, and it therefore does not imply an understanding of the risk behavior of adolescents who are out of school and live in rural areas of Nepal. Moreover, a cross-sectional design is limited in its ability to infer any cause-effect relationships between variables and risk-behavior. Although the researchers applied their best efforts to get information on different levels of SC, the lack of a valid standard measure remains. Future studies could consider the development and validation of a tool by referencing the present study.

Conclusion

Self-esteem, PSS from family and friends, and SC at the family and school levels were protective against suicidal behavior; PSS from family and SC at the family level were negatively associated with adolescent substance use, however, none of these variables showed a protective effect for sexual behavior. In contrast, self-esteem was adversely associated with sexual behavior. Although self-esteem was found to be protective for all risk behaviors in past studies, we found other contextual factors influenced the association between self-esteem and risk behaviors, especially influence by peers. Therefore, prevention of peer influence should be emphasized. Similarly, the role of community or neighbor might vary in different contexts. In conclusion, protective and risk factors identified in this study should be considered for preventive interventions at the family and school levels to ensure a better and safer transition into adulthood by preventing risk behaviors.

Implications

The study yielded information about risk-behaviors and the preventive role of self-esteem, PSS, and SC in adolescents. The findings might have practical implications for planning interventions and educational implications for different audiences (parents/families, teachers, school health nurses, communities, and others) in the areas of adolescent health and behavior. Our study would contribute to the literature on adolescents' risk-behaviors in the context of Nepal. It would also supplement the existing international literature by filling the knowledge gap on sources of SC and PSS for multiple risk behaviors within the context of a developing country, and by measuring the influence of confounder effects. Going forward, this study will be helpful to students, researchers, and others who are interested in designing future studies in this area.

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Declaration of competing interest

All authors have no conflict of interest to declare.

CRediT authorship contribution statement

Ratna Shila Banstola: Methodology, Formal analysis, Writing - original draft. **Tetsuya Ogino:** Methodology, Formal analysis, Writing - original draft. **Sachiko Inoue:** Methodology, Formal analysis, Writing - original draft.

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Appendix A. Supplementary data

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References

- Abel, W. D., Sewell, C., Martin, J. S., Bailey-Davidson, Y., & Fox, K. (2012). Suicide ideation in Jamaican youth: Sociodemographic prevalence, protective and risk factors. *West Indian Medical Journal*, 61(5), 521–525.
- Adhikari, R. P., Upadhaya, N., Pokhrel, R., Suwal, B. R., Shrestha, M. P., & Subedi, P. K. (2016). Health and social vulnerability of Adolescents in Nepal. *SM J Public Health Epidemiol*, 2(3), 1032. <https://doi.org/10.1186/s12889-019-7791-0>.
- Aryal, K. K. (2017). *Global school-based student health survey Nepal, 2015*. Nepal Health Research Council.
- Åslund, C., & Nilsson, K. W. (2013). Social capital in relation to alcohol consumption, smoking, and illicit drug use among adolescents: A cross-sectional study in Sweden. *International Journal for Equity in Health*, 12(1), 33. <https://doi.org/10.1186/1475-9276-12-33>.
- Bae, S. M. (2019). Individual and social stress, social capital, and depressive symptoms as predictors of adolescent suicide in South Korea: A mediated moderation model. *Journal of Health Psychology*, 1359105319847257. <https://doi.org/10.1177/1359105319847257>.
- Çakar, F. S., & Tagay, Ö. (2017). The mediating role of self-esteem: The effects of social support and subjective well-being on adolescents' risky behaviors. *Educational Sciences: Theory and Practice*, 17(3), 859–876. <https://doi.org/10.12738/estp.2017.3.0024>.
- Centers for Disease Control and Prevention. (2017). 2017 national youth risk behavior survey. https://www.cdc.gov/healthyyouth/data/yrebs/pdf/2017/2017_yrebs_nation_al_hs_questionnaire.pdf.
- Centers for Disease Control and Prevention. (2018). Adolescent and school health, why schools? Schools: The right place for a healthy start. *The centers for disease control and prevention*. https://www.cdc.gov/healthyyouth/about/why_schools.htm.
- Chatard, A., Selimbegović, L., & Konan, P. N. D. (2009). Self-esteem and suicide rates in 55 Nations. *European Journal of Personality: Published for the European Association of Personality Psychology*, 23(1), 19–32. <https://doi.org/10.1002/per.701>.
- Chen, L. Y., Martins, S. S., Strain, E. C., Mojtabai, R., & Storr, C. L. (2018). Sex and age differences in risk factors of marijuana involvement during adolescence. *Addictive Disorders & Their Treatment*, 17(1), 29–39. <https://doi.org/10.1097/ADT.0000000000000120>.
- Chhabra, G. S., & Sodhi, M. K. (2012). Impact of family conflict on the psychosocial behaviour in male adolescents. *Journal of Nepal Paediatric Society*, 32(2), 124–131. <https://doi.org/10.3126/jnps.v32i2.6147>.
- Crosby, R. A., Holtgrave, D. R., DiClemente, R. J., Wingood, G. M., & Gayle, J. A. (2003). Social capital as a predictor of adolescents' sexual risk behavior: A state-level exploratory study. *AIDS and Behavior*, 7(3), 245–252.
- Curran, E. M. (2007). The relationship between social capital and substance use by high school students. *Journal of Alcohol & Drug Education*, 51(2), 59.
- Currie, C., Zanotti, C., Morgan, A., Currie, D., De Looze, M., Roberts, C., et al. (2009). *Social determinants of health and well-being among young people. Health behaviour in school-aged children (HBSC) study: International report from the 2009/2010 survey*, 2010.
- Dema, T., Tripathy, J. P., Thinley, S., Rani, M., Dhendup, T., Laxmishwar, C., et al. (2019). Suicidal ideation and attempt among school going adolescents in Bhutan—a secondary analysis of a global school-based student health survey in Bhutan 2016. *BMC Public Health*, 19(1), 1605.
- Enejoh, V., Pharr, J., Mavegam, B. O., Olutola, A., Karick, H., & Ezeanolue, E. E. (2016). Impact of self-esteem on risky sexual behaviors among Nigerian adolescents. *AIDS Care*, 28(5), 672–676. <https://doi.org/10.1080/09540121.2015.1120853>.
- Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate data analysis* (7th ed.). Upper Saddle River, NJ, USA: Prentice-Hall, Inc.
- Handren, L. M., Donaldson, C. D., & Crano, W. D. (2016). Adolescent alcohol use: Protective and predictive parent, peer, and self-related factors. *Prevention Science*, 17(7), 862–871. <https://doi.org/10.1007/s11121-016-0695-7>.
- Huang, Y. H., Liu, H. C., Sun, F. J., Tsai, F. J., Huang, K. Y., Chen, T. C., et al. (2017). Relationship between predictors of incident deliberate self-harm and suicide attempts among adolescents. *Journal of Adolescent Health*, 60(5), 612–618. <https://doi.org/10.1016/j.jadohealth.2016.12.005>.
- Jessor, R. (2011). Adolescent problem behavior in Nairobi's informal settlements: Applying problem behavior theory in sub-saharan africa. *Journal of Urban Health*, 88(2), 298–317.
- Jorge, K. O., Paiva, P. C. P., Vale, M. P. D., Kawachi, I., & Zarzar, P. M. (2018). Alcohol intake among adolescent students and association with social capital and socioeconomic status. *Ciência & Saúde Coletiva*, 23, 741–750.
- Kabir, M. A., & Goh, K. L. (2014). Determinants of tobacco use among students aged 13–15 years in Nepal and Sri Lanka: Results from the global youth tobacco survey, 2007. *Health Education Journal*, 73(1), 51–61. <https://doi.org/10.1177/0017896912469576>.
- Kalina, O., Geckova, A. M., Jarcuska, P., Orosova, O., van Dijk, J. P., & Reijneveld, S. A. (2009). Psychological and behavioural factors associated with sexual risk behaviour among Slovak students. *BMC Public Health*, 9(1), 15. <https://doi.org/10.1186/1471-2458-9-15>.
- Kaljee, L. M., & Chen, X. (2011). Social capital and risk and protective behaviors: A global health perspective. *Adolescent Health, Medicine and Therapeutics*, 2, 113.
- Kang, B. H., Kang, J. H., Park, H. A., Cho, Y. G., Hur, Y. I., Sim, W. Y., et al. (2017). The mediating role of parental support in the relationship between life stress and suicidal ideation among middle school students. *Korean Journal of Family Medicine*, 38(4), 213–219. <https://doi.org/10.4082/kjfm.2017.38.4.213>.
- Kann, L., McManus, T., Harris, W. A., Shanklin, S. L., Flint, K. H., Queen, B., et al. (2018). Youth risk behavior surveillance—United States, 2017. *MMWR Surveillance Summaries*, 67(8), 1.
- Karaman, G. N. (2013). Predicting the problem behavior in adolescents. *Egitim Arastirmalari, Eurasian Journal of Educational Research*, 52, 137–154.
- Karki, S., Lämsimies, H., Laukkanen, E., Pirskanen, M., & Pietilä, A. M. (2016). Substance use by adolescents in the western developmental region of Nepal. *Journal of Substance Use*, 21(1), 98–106. <https://doi.org/10.3109/14659891.2015.1005182>.
- Kawachi, I., & Berkman, L. (2000). Social cohesion, social capital, and health. *Social epidemiology*, 17(4), 174–180.
- Kawachi, I., & Berkman, L. F. (2001). Social ties and mental health. *Journal of Urban Health*, 78(3), 458–467.
- Kerpelman, J. L., McElwain, A. D., Pittman, J. F., & Adler-Baeder, F. M. (2016). Engagement in risky sexual behavior: Adolescents' perceptions of self and the parent-child relationship matter. *Youth & Society*, 48(1), 101–125. <https://doi.org/10.1177/0044118X13479614>.
- Kim, Y. (2011). Adolescents' health behaviours and its associations with psychological variables. *Central European Journal of Public Health*, 19(4).
- Kleiman, E. M., & Riskind, J. H. (2013). Utilized social support and self-esteem mediate the relationship between perceived social support and suicide ideation. *Crisis*. <https://doi.org/10.1027/0227-5910/a000159>.
- Lamichhane, D. (2015). *Factors associated with self-esteem among adolescents in public schools in Kathmandu*. Master's thesis. Tribhuvan University Library. Available from: .
- Langille, D. B., Asbridge, M., Kisely, S., & Rasic, D. (2012). Suicidal behaviours in adolescents in nova scotia, Canada: Protective associations with measures of social capital. *Social Psychiatry and Psychiatric Epidemiology*, 47(10), 1549–1555. <https://doi.org/10.1007/s00127-011-0461-x>.
- Lodz, N. A., Mutalip, M. H. A., Mahmud, M. A. F., Awaluddin, M., Yoep, N., Paiwai, F., et al. (2019). Risky sexual behaviours among school-going adolescent in Malaysia-

- findings from National Health and Morbidity Survey. *Journal of Environmental Sciences*, 3(2), 226–235. <https://doi.org/10.26502/jesph.96120059>.
- Magson, N. R., Craven, R. G., Munns, G., & Yeung, A. S. (2016). It is risky business: Can social capital reduce risk-taking behaviours among disadvantaged youth? *Journal of Youth Studies*, 19(5), 569–592. <https://doi.org/10.1080/13676261.2015.1098776>.
- Maharjan, S. (2008). Self-esteem of Adolescents in rupandehi and Kathmandu district. retrieved from https://sujenman.files.wordpress.com/2010/01/maharjan2008_self_steem.pdf.
- McPherson, K. E., Kerr, S., Morgan, A., McGee, E., Cheater, F. M., McLean, J., et al. (2013). The association between family and community social capital and health risk behaviours in young people: An integrative review. *BMC Public Health*, 13(1), 971. <https://doi.org/10.1186/1471-2458-13-97>.
- Ministry of Education Science & Technology. (2017). *Education in figures*. Government of Nepal. At a Glance Report.
- Ministry of Health. (2017). *2016 Nepal demographic and health survey key findings*. Nepal; New ERA; & ICF. Kathmandu, Nepal: Ministry of Health Nepal.
- MoHP. (2012). *Nepal adolescents and youth survey 2010/11*. Government of Nepal, Ministry of Health and Population.
- MoHP. (2015). *Nepal health sector strategy 2015 – 2020*. Ministry of Health and Population Nepal.
- MoPE. (2017). *National population report 2017. Ministry of population and environment, singha durbar, Kathmandu*.
- Paiva, P. C. P., de Paiva, H. N., de Oliveira Filho, P. M., Lamounier, J. A., de Ferreira, E. F., Ferreira, R. C., et al. (2014). Development and validation of a social capital questionnaire for adolescent students (SCQ-AS). *PLoS One*, 9(8), e103785.
- Pan American Health Organization/WHO Regional Office for Americas. (2018). *The health of adolescents and youth in the Americas: Implementation of the regional strategy and plan of action on adolescent and youth health 2010-2018* (Washington, DC).
- Pandey, P. L., Seale, H., & Razeed, H. (2019). Exploring the factors impacting on access and acceptance of sexual and reproductive health services provided by adolescent-friendly health services in Nepal. *PLoS One*, 14(8).
- Pradhan, P. M. S., Niraula, S. R., Ghimire, A., Singh, S. B., & Pokharel, P. K. (2013). Tobacco use and associated factors among adolescent students in dharan, eastern Nepal: A cross-sectional questionnaire survey. *BMJ open*, 3(2), e002123.
- Randall, J. R., Doku, D., Wilson, M. L., & Peltzer, K. (2014). Suicidal behaviour and related risk factors among school-aged youth in the Republic of Benin. *PLoS One*, 9(2), e88233. <https://doi.org/10.1371/journal.pone.0088233>.
- Raymond-Flesch, M., Auerswald, C., McGlone, L., Comfort, M., & Minnis, A. (2017). Building social capital to promote adolescent wellbeing: A qualitative study with teens in a Latino agricultural community. *BMC Public Health*, 17(1), 177. <https://doi.org/10.1186/s12889-017-4110-5>.
- Reininger, B. M., Pérez, A., Flores, M. I. A., Chen, Z., & Rahbar, M. H. (2012). Perceptions of social support, empowerment and youth risk behaviors. *Journal of Primary Prevention*, 33(1), 33–46. <https://doi.org/10.1007/s10935-012-0260-5>.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, New Jersey: Princeton University Press.
- Rothon, C., Goodwin, L., & Stansfeld, S. (2012). Family social support, community “social capital” and adolescents’ mental health and educational outcomes: A longitudinal study in England. *Social Psychiatry and Psychiatric Epidemiology*, 47(5), 697–709.
- Schriber, R. A., & Guyer, A. E. (2016). Adolescent neurobiological susceptibility to social context. *Developmental Cognitive Neuroscience*, 19, 1–18.
- Sharaf, A. Y., Thompson, E. A., & Walsh, E. (2009). Protective effects of self-esteem and family support on suicide risk behaviors among at-risk adolescents. *Journal of Child and Adolescent Psychiatric Nursing*, 22(3), 160–168. <https://doi.org/10.1111/j.1744-6171.2009.00194.x>.
- Shek, D. T., & Ma, C. M. (2012). Consumption of pornographic materials among early adolescents in Hong Kong: Profiles and psychosocial correlates. *International Journal on Disability and Human Development*, 11(2), 143–150. <https://doi.org/10.1515/ijdh-2012-0024>.
- Springer, A., Parcel, G., Baumler, E., & Ross, M. (2006). Supportive social relationships and adolescent health risk behavior among secondary school students in El Salvador. *Social Science & Medicine*, 62(7), 1628–1640. <https://doi.org/10.1016/j.socscimed.2005.08.018>.
- Takakura, M., Hamabata, Y., Ueji, M., & Kurihara, A. (2014). Measurement of social capital at school and neighborhood among young people. *Japanese Association of School Health*, 10(1), e8.
- Thapa, B., Powell, J., Yi, J., McGee, J., Landis, J., Rein, L., et al. (2017). Adolescent health risk and behavior survey: A school based survey in central Nepal. *Kathmandu University Medical Journal*, 15(60), 301–307.
- Tzanakis, M. (2013). Social capital in Bourdieu’s, Coleman’s and Putnam’s theory: Empirical evidence and emergent measurement issues. *Educa*, 13(2), 2–23.
- Ugoji, F. N. (2014). Determinants of risky sexual behaviours among secondary school students in Delta State Nigeria. *International Journal of Adolescence and Youth*, 19(3), 408–418. <https://doi.org/10.1080/02673843.2012.751040>.
- UNICEF. (2019). Shedding much-needed light on mental health. <https://www.unicef.org/nepal/stories/shedding-much-needed-light-mental-health>.
- United Nations Office on Drugs and Crime (UNODC). (2018). *World drug report 2018*. United Nations publication. Sales No. E. 18. XI. 9 2018.
- Veselska, Z., Geckova, A. M., Orosova, O., Gajdosova, B., van Dijk, J. P., & Reijneveld, S. A. (2009). Self-esteem and resilience: The connection with risky behavior among adolescents. *Addictive Behaviors*, 34(3), 287–291. <https://doi.org/10.1016/j.addbeh.2008.11.005>.
- Wen, M. (2017). Social capital and adolescent substance use: The role of family, school, and neighborhood contexts. *Journal of Research on Adolescence*, 27(2), 362–378. <https://doi.org/10.1111/jora.12299>.
- World Bank. (2019). *Reproductive, maternal, child and adolescents health*.
- World Health Organization. (2014). *Preventing suicide: A global imperative*. World Health Organization.
- World Health Organization. (2017). *Mental health status of adolescents in South-East Asia: Evidence for action*.
- World Health Organization. (2018). *Adolescents: Health risks and solutions*.
- World Health Organization. (2018). *Regional atlas on adolescent and youth 2017: Monitor the health status and trend of adolescent and youth in africa*.
- World Health Organization. (2018). *Situation of child and adolescent health in Europe*. World Health Organization, Regional Office for Europe.
- World Health Organization. (2019). Adolescent mental health Fact sheet. <https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health>.
- World Health Organization. (2020). Adolescent health in the South-East Asia region. <https://www.who.int/southeastasia/health-topics/adolescent-health>.
- Xu, Y., Wang, C., & Shi, M. (2018). Identifying Chinese adolescents with a high suicide attempt risk. *Psychiatry Research*, 269, 474–480. <https://doi.org/10.1016/j.psychres.2018.08.085>.