

Review article

Psychosocial Predictors of Adolescent Aggression

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ABSTRACT

Aggression is one of the most common Paediatric Psychiatric emergency problems presented in healthcare services with major public health impacts. The aim of this review is to determine the psychosocial predictors of adolescent aggression. Systematic review on observational study designs were conducted. Recent five years English published journal articles (2014-2018) were searched in three databases (Science Direct, PubMed and EBSCO) from April 2018 until May 2018. The final 15 articles (seven prospective cohort, eight cross-sectional studies) were included in the systematic review. Psychological predictors were mainly on the personality traits and emotional problems experienced by the adolescents including callous-unemotional traits, hostility, anger, and low empathy. Self-control was found to be protective against adolescent aggression. Social predictors that contribute to the aggression among adolescents according to the highest reported number of articles were peer influence, followed by school climate, substance use, neighbourhood influence, family, and parent factors. In conclusion, psychosocial predictors of adolescent aggression include both Psychological Factors; mainly personality traits and emotional problems, and Social Factors; mainly peer influence and substance use. This warrants for more holistic approach in dealing with aggressive adolescents that can be applied in more targeted and focused intervention strategy deliveries.

Keywords: Adolescent, aggression, predictors, psychosocial

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INTRODUCTION

The term “Aggression” is always used interchangeably with aggressive behaviour, which can be defined as any action with the purpose of resulting harm, injury, or pain

against others (Zirpoli, 2008). It is a broad construct that comprises physical such as at-risk behaviours, delinquency, violence, and non-physical forms such as bullying, slandering, and suicide behaviours (Liu et al., 2013). There are many classifications of aggression (Liu, 2004) based on its forms (overt and relational), motives (reactive and proactive), and functions (hostile and instrumental). Overt aggression involves obvious and outward confrontational acts of aggression, which differ from the covert or relational aggression that is more hidden and manipulative (Conner & Barkley, 2004). Reactive and hostile aggression reflects overheated and uncontrolled reactions in response to potential harm caused by physical or verbal aggression initiated by others as to protect oneself, whereas proactive and instrumental aggression reflect controlled, purposeful, and cold-blooded actions in achieving one's goal without harm consideration for others (Liu, 2004; Card & Little, 2006). These typologies are subjected to overlap, comprising of physical and verbal aggressive acts. Though this review is on adolescent aggression, the literature review also covers related disruptive and criminal behaviour, delinquent, bullying as well as violence.

Adolescence is being perceived as a period of "storm and stress" (Hamid et al., 2015), which predisposes them into more serious aggression and violence in the early period including gang fights and use of knives (Liu, 2004). It becomes a public health concern as it contributes to the major cause of mortality in this age group by risk-taking behaviours that can result in unintentional injuries (Rashtriya & Swasthya, 2014; World Health Organization, 2017). In the year 2000, the violent death rate in low- to middle-income countries was 32.1 per 100 000 population, which was more than twice as compared to the rate in high-income countries of 14.4 per 100,000 population (Krug et al., 2002). This disproportionate statistic persisted as homicide rate worldwide report in 2012 was more pronounced in low- and upper middle-income countries than in lower middle- and high-income countries (Butchart & Mikton, 2014).

Following the 2002 World report on violence and health, many programmes, policies and legislative measures have been implemented across the worlds to prevent violence-related aggression in the community (Butchart & Mikton, 2014). The strategies proposed for the children and adolescents included developing life skills, safe, stable and nurturing relationships with their parents and caregivers, and reducing the common factors of violence act such as alcohol abuse and access to weapon. However, aggression was still prevalent among youth, with the highest homicide rates in the world in 2012 represented by adolescents' aged 15-29 years old; 10.9 per 100,000 population. As in Malaysia, aggressive-related behaviours such as bullying and physical fight were reported to occur amongst 28% of the adolescents (Hussin et al., 2014) and the juvenile crime cases reported among school students included homicide, rape, robbery, wilderness, and inflicting injury to others (Ibu Pejabat Polis Kontijen, 2018).

Different socio-cultural influence of aggression manifestation warrants for different strategical approaches (Kim et al., 2010). Hence, interventions succeeded in developed countries may not be practical in other developing countries. Even though many interventions preventing adolescent aggression conducted in Malaysia, which include health education, counselling, and rehabilitation programmes (World Health Organization, 2006), their effectiveness and evidence-based driven are still not well established and informed.

Aggression is one of the most common paediatric psychiatric emergency problems presented in healthcare services (Carubia et al., 2016). It can be associated with many psychiatric disorders such as anxiety (Liu et al., 2013) and depression that was reported to occur amongst 10-20% of Malaysian adolescents (Srinath et al., 2010). Increased aggression in adolescence may also indicated atypical development and higher vulnerability for future negative mental health outcomes (Yang et al., 2016).

Psychosocial relates to “the interrelation of social factors and individual thought and behaviour” (Psychosocial, 2019, para 2). It has important implications for health researchers and social epidemiologists as psychosocial determinants of health can explain the mediating effects and contextual factors of social structures on individual’s health (Martikainen et al., 2002). Many studies have investigated psychological factors of adolescent aggression such as self-esteem (Arokiaraj et al., 2011), emotional intelligence (Masoumeh, 2014), antisocial personality (Duru, 2015), and social factors including family environment (Seong, 2008; Azmawati et al., 2015) and functioning (Zainah et al., 2011), peer and teacher attachment (Duru, 2015). However, these underlying factors were looked into the psychosocial contribution separately, which is important to be collectively integrated in public health action (Macleod & Smith, 2003). Psychosocial treatments have shown promising effect on aggressive children and adolescents with conduct disorder (Kazdin, 1997). This warrants for a systematic review to determine the common psychosocial predictors of aggression among adolescents, joint in one review, and compare psychological and social predictors that were commonly reported from the recent research evidences. In that way, evidence-based practice in developing more targeted and effective preventive interventions can be produced to curb this global situation of aggression among adolescents.

MATERIALS AND METHODS

A systematic review on observational study designs (cohort, case-control, and cross sectional studies) were conducted using the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 statement (ref:<http://www.prisma-statement.org>) and registered with PROSPERO (registration no: CRD42018093821). Recent five years published journal articles (2014-2018) were searched in three databases, incorporating medical and social science literature (Science Direct, PubMed, and EBSCO) from April 2018 until May 2018. Only English language articles were searched by the

researchers with consultation from the university health sciences librarian, using search techniques of Boolean operator, truncation & phrase searching of specific words and MeSH terms: (psychological OR social) AND (predictors OR determinants OR factors) AND (adolescent* OR teenager* OR youth) AND (aggression OR agonistic behaviour OR bullying). As the systematic review focusing on 'aggression' term, only one source of MeSH terms (PubMed) was used, excluding other related MeSH terms such as juvenile delinquency and violence.

Considering general classification of aggression and its detrimental health impact on adolescents, the focus of the review was on studies that investigated physical and/or verbal aggression. Self-reported validated questionnaires that measure adolescent aggression by continuous means or categorical were included in the review, as there is no gold standard measurements on adolescent aggression yet. Studies in both developed and developing countries, which addressed bias and efforts taken to reduce them were also included in the review. Other systematic reviews or review articles and non-empirical works such as case studies or commentaries were excluded from the review. For each selected study, the participants need to be randomly selected as to represent the adolescents age (10-19 years old according to WHO standard) or secondary/middle school students. As the review focused on psychosocial predictors of adolescent aggression, study participants with underlying organic brain injury, psychiatric disorder, or neurological disorder that can manifest aggression as one of the symptoms will be excluded. For cohort studies, at least two follow-up points were required for the results to be included in the review. As for case-control studies, the cases and controls done should derive from similar population background and characteristic. If they were matching, the cases and controls should not be matched more than 1:3 ratio. The statistical analyses for each study designs should apply multivariate analysis in eliciting the significant predictors and presented in Adjusted Odds Ratio (AOR), Relative Risk (RR), or Beta coefficient with 95% Confidence Interval not crossing at one or p value less than .05. Cross-sectional studies that met the inclusion and exclusion criteria were only included in the systematic review.

The process of study selection was conducted in two stages of (1) primary screening on the title/abstract of the articles, and (2) secondary screening on the full text articles when inclusion or exclusion criteria were not clear from the title/abstract. Article citations were organized, downloaded and reviewed in Mendeley desktop. After duplication of articles were recognized by comparing the author names and study title, selected full texts were retrieved and systematically assessed to be included in the review. The eligibility criteria screening for study inclusions was conducted by one reviewer, followed by assessment of second set of reviewers (N.A.M.Z., H.S.M, and N.A) on the retrieved study articles for any doubt on article's eligibility. Disagreements were met by mutual consensus.

At present, there is still lack of specific tool to assess the quality of aggression studies. Hence, the NIH (National Institutes of Health) Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies was used to assess the quality of study design, data collection, and data analysis. Various results obtained were classified into psychological and social predictors with different study designs in a logical framework of each study's overview of author/year, participants/inclusion criteria, outcome measurements, and results of a study. After summarizing all the selected research evidence, which included tabulation of study characteristics and quality, they were interpreted and recommended for improvements based on their limitations in the discussion. Due to the high heterogeneity of included observational study designs and their outcome measures, meta-analyses are unable to be computed for this review.

RESULTS

The electronic search through three databases produced initial 670 references (PubMed= 545; EBSCO= 107; Science Direct= 18). The search process required assessment of the title, proceed by the abstract. Eight articles were found to be duplicated across all the searches, which resulted in 662 articles to be screened after duplications being removed. Most of the articles; 638 out of 662, were excluded from the primary screening on title and abstract as they didn't fulfil the study selection criteria such as more than five-years recent articles and unpublished observational studies. After the remaining articles were screened based on inclusion criteria, only 24 full articles were retrieved for secondary screening and assessments of the articles' content, which covered the introduction, methodology, result, discussion, and conclusion. A total of nine articles were excluded due to several reasons: absence of regression analysis findings, only one-point follow up in cohort study, youth study participants, and aggression as the independent rather than dependent variable. This has resulted in the final 15 articles (seven were prospective cohort studies, eight were cross-sectional studies) that were included in the systematic review. There was a lack of recent case-control studies that met the inclusion criteria to be included in this systematic review. The flow diagram of study selection is described in Figure 1, guided by the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines 2009 (Moher et al., 2009).

Study quality assessment using the NIH Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies showed fair to good quality of the selected studies (Table 1). All studies described the study objectives clearly with participation rate of eligible person of more than 50% except for several studies among urban African American (Finigan-Carr et al., 2015), adolescents with severe conduct problems in Amsterdam (Jambroes et al., 2018), and Positive Action's participants in North Carolina (Stalker et al., 2018). The independent variables were clearly defined, valid, reliable, implemented

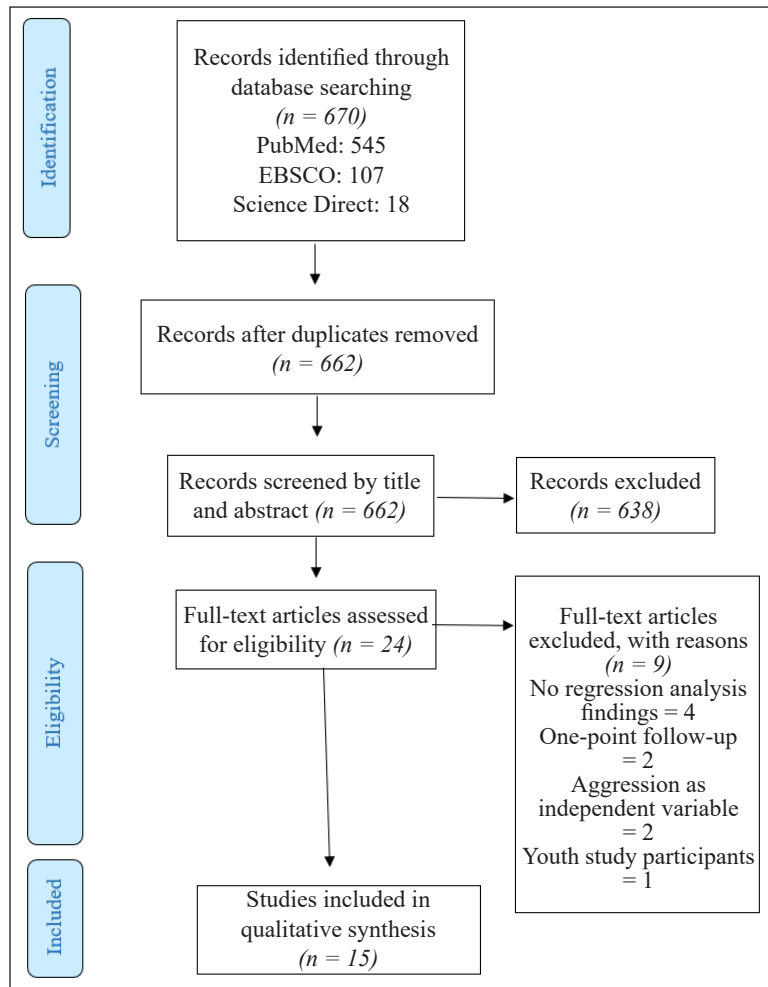


Figure 1. PRISMA flowchart for systematic search on psychosocial predictors of adolescent aggression

constantly across all study participants, and assessed more than once over time. Same goes for the dependent variables which encompassed physical and/or verbal aggression, have been validated and presented good reliability test (Cronbach's $\alpha > 0.70$) in respective population as shown in Tables 2 and 3. Confounding variables were also being measured and adjusted by statistical measures in determining the relationship between independent and dependent variables.

The findings of each article were discussed in Table 2 (cross-sectional study) and Table 3 (cohort study). There were eight cross sectional studies with participants ranging from 156 (Barry et al., 2018) to 4,674 adolescents (Kivimaki et al., 2014), mainly in developed countries except for single study in developing (China) and undeveloped country (Gaza). Almost all studies examined adolescents in public schools except for several studies which focused on adolescents with conduct problems like school dropped-out (Barry et al., 2018;

Table 1
Quality assessment tool for studies of adolescent aggression predictors

Criteria	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Research question/objective clearly stated	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
2. Study population clearly specified & defined	√	X	X	√	√	√	√	√	X	X	X	√	X	√	√
3. Participation rate at least 50%	X	√	√	X	√	NR	√	√	√	√	√	√	√	X	√
4. Subjects recruited from same population with uniformly applied eligibility criteria	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
5. Sample size justification, power description, or variance and effect estimates	X	X	X	X	X	X	X	X	X	X	√	X	X	√	X
6. Exposure(s) of interest measured prior to the outcome(s)	X	X	X	X	X	X	X	X	√	√	√	√	√	√	√
7. Timeframe sufficient to see an association between exposure and outcome	X	X	X	X	X	X	X	X	√	√	√	√	√	√	√
8. Examine different levels of the exposure as related to the outcome	NA	NA	√	NA	√	NA	√	√	√	√	√	√	√	√	√
9. Independent variables clearly defined, valid, reliable, and implemented consistently	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
10. Exposure(s) assessed >1 over time	NA	NA	NA	NA	NA	NA	NA	NA	√	√	√	√	√	√	√
11. Dependent variables clearly defined, valid, reliable, and implemented consistently	NR	√	√	√	√	√	√	√	√	√	√	√	√	√	√
12. Outcome assessors blinded to the exposure status of participants	√	NA	NA	NR	√	NR	√	NR	X	X	√	X	√	√	√
13. Loss to follow-up after baseline 20% or less	NA	NA	NA	NA	NA	NA	NA	NA	√	√	√	√	√	X	X
14. Key potential confounding variables measured and adjusted statistically	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Note. NR = not recorded; NA= not applicable

Table 2
Psychosocial predictors of adolescent aggression in cross-sectional study articles

Author/Year	Participants/Inclusion criteria	Outcome Measurement	Results
<p>1. Title: Using the Theory of Planned Behavior to Predict Aggression and Weapons Carrying in Urban African American Early Adolescent Youth</p> <p>Finigan-Carr, Cheng, Gielen, Haynie, & Simons-Morton (2015) https://doi.org/10.1177/1090198114548479</p>	<p>452 of 6th graders in three urban middle schools on probation for classification as “persistently dangerous” under the State of Maryland’s No Child Left Behind Act policy. The sample was mainly African American, with 12.6% Hispanic. There were almost equal numbers of males and females with a median age of 12 years old.</p>	<ul style="list-style-type: none"> • Frequency of aggressive behaviours were measured by five items developed by Bosworth and Espelage (1995) to gather information about physical and nonphysical aggressive behaviours 	<ul style="list-style-type: none"> • Those with medium and high levels of problem friend influence were found to be almost three (AOR= 2.61; 95%CI= 1.68-4.07) and five times (AOR= 5.05; 95%CI= 3.03-8.39) more likely to manifest aggressive behaviors, respectively. • Adolescent reports of parental disapproval of fighting (AOR= 0.39, 95%CI= 0.21-0.76) and increased self-control (AOR= 0.59; 95%CI= 0.39-0.88) were seen as protective factors.
<p>2. Title: The Indirect Effects of Adolescent Psychopathic Traits on Aggression Through Social-Cognitive Factors</p> <p>Lui, Berry, & Schoessler (2017) https://doi.org/10.1007/s10826-017-0667-y</p>	<p>209 adolescents (178 males, 31 females) aged 16 to 19 years (M= 16.83, SD=.80), from a voluntary military-style residential program in south-eastern USA for school dropped-out adolescents. Ethnicities: 56% White, 34.4% Black, 1% other ethnicities (8.6%)</p>	<ul style="list-style-type: none"> • Peer Conflict Scale. Factor analysis confirmed existence of reactive and proactive aggression dimensions, Cronbach’s alpha was 0.83 for reactive aggression and .88 for proactive aggression (Marsee et al., 2011). 	<ul style="list-style-type: none"> • The model with CU traits (callous, uncaring, unemotional, narcissism) predicting reactive (R²= 0.24; b=. .06; 95%CI= -0.02 - 0.15) and proactive aggression (R²= 0.14; b=.14; 95%CI= -0.01 - 0.16) had a significant total effect.
<p>3. Title: Global and contingent self-esteem as moderators in the relations between adolescent narcissism, callous unemotional traits, and aggression</p> <p>Barry, McDougall, Anderson, & Bindon (2018) https://doi.org/10.1016/j.paid.2017.10.036</p>	<p>156 adolescents (126 males, 29 females, 1 unreported; 81% males, 19% females) aged 16–19 (M = 16.81, SD = 0.77), enrolled in a voluntary military-style program for at-risk youth who have dropped out of school. The racial/ethnic composition was 52.6% White, 29.5% Black, 0.6% Hispanic, 0.6% Other, and 16.7% unreported.</p>	<ul style="list-style-type: none"> • Peer Conflict Scale (PCS); Marsee et al., 2011) assess reactive and proactive aggression. Good reliability with Cronbach’s α value of 0.95 for proactive aggression and 0.90 for reactive aggression. 	<ul style="list-style-type: none"> • Significant main effect for narcissism in predicting self-reported proactive aggression, b = 0.16, se = 0.05, p < 0.001, and reactive aggression, b = 0.14, se = 0.05, p = 0.003. • significant main effects for CU traits in the prediction of self-reported proactive aggression, b = 0.42, se = 0.09, p < 0.001, and self-reported reactive aggression, b = 0.35, se = 0.09, p < 0.001.

Table 2 (continue)

Author/Year	Participants/Inclusion criteria	Outcome Measurement	Results
4. Title: Dimensions of psychopathy in relation to proactive and reactive aggression: Does intelligence matter?			
Jambroes et al. (2018) https://doi.org/10.1016/j.paid.2018.03.001	159 adolescents between the ages of 12 and 18 years old (mean age 15.1 ± 1.3 years), who attended closed treatment (TACT, Training Aggression Control) for severe conduct problems in Amsterdam. Almost half (49%) was male, and 37% was of non-Western origin (predominantly Moroccan or Surinamese).	Dutch version of the Reactive and Proactive aggression Questionnaire (RPQ). Good reliability with Cronbach's α of 0.90 for proactive and reactive aggression scale (Cima, Raine, Meesters, & Popma, 2013)	<ul style="list-style-type: none"> • Callous-unemotional dimension of psychopathy predicted reactive ($\beta = 0.26$; 95%CI = 0.02-0.36) and proactive aggression ($\beta = 0.25$; 95%CI = 0.02-0.36) • Impulsive-irresponsible dimension of psychopathy predicted reactive ($\beta = .36$; 95%CI = .08-.35) and proactive aggression ($\beta = .25$; 95%CI = 0.02-0.29)
5. Title: Predicting Aggression in Adolescence: The Interrelation between (a lack of) Empathy and Social Goals			
Van Hezebroek, Olthof, & Goossens (2016) https://doi.org/10.1002/ab.21675	550 participants (49.5% boys), between age 11 and 14 (mean age 12.97 years, SD = 5.69 months) from five schools (25 classes) in Netherland.	Instrument for Reactive and Proactive Aggression (IRPA) (Polman, Orbio De Castro, Thomaes, & Van Aken, 2009) measured physical, verbal, hidden and relational aggressive behaviour. Good reliability for reactive (Cronbach's $\alpha = 0.82$) and proactive (Cronbach's $\alpha = 0.84$) aggression.	<ul style="list-style-type: none"> • lack of empathic significantly predicted both proactive ($b = 0.005$; $p < 0.01$) and reactive ($b = 0.007$, $p = 0.02$) aggression • agentic goals significantly predicted proactive aggression ($b = 0.026$; $p < 0.01$) • model $R^2 = 0.04$
6. Title: School climate and adolescent aggression: A moderated mediation model involving deviant peer affiliation and sensation seeking			
Wang, Yu, Zhang, Chen, Zhu, & Liu (2017) https://doi.org/10.1016/j.paid.2017.08.004	1401 early adolescents (50.2% male) ranging from 11-14 years old (mean: 12.46 ± 0.61 years) from 4 junior middle schools in Guangdong. 21.3% came from rural areas, 24.2% from county seats, 27.8% from small-medium cities, and 26.6% from metropolitan areas. Most students' family monthly income (71.7%) between ¥ 1000 - ¥ 4000 with less than junior college educated parents.	Chinese version of the Buss-Warren aggression questionnaire (BWAQ; Maxwell, 2008) measures physical, verbal, and indirect aggression. Cronbach's $\alpha = 0.86$.	<ul style="list-style-type: none"> • High quality school climate negatively predicted adolescent aggression ($b = -0.21$; $p < 0.01$) • Deviant peer affiliation predicted adolescent aggression ($b = 0.18$; $p < 0.01$)

Table 2 (continue)

Author/Year	Participants/Inclusion criteria	Outcome Measurement	Results
7. Title: Positivity Ratio Links Self-control Skills to Physical Aggression and Happiness in Young Palestinians Living in Gaza			
Rosenbaum, Ronen, Abuelaish, Orkibi, & Hamama (2018) https://doi.org/10.1177/1103308817743371	744 Gazan Palestinian adolescents, 48% girls (n = 358). Participants were born between 1988 and 1995, with mean age of 15.67 years (SD = 1.62), studying in Grades 8–12 (part of compulsory basic and secondary education in Gaza). As for religion, 96% were Muslim, and 4% were Christian, Druze or Bedouin.	Buss and Perry's (1992) Aggression Questionnaire, which includes four subscales: hostile thoughts, anger, verbal aggression and physical aggression. The Arabic version scale's internal consistency coefficient value ranged 0.63-0.77 (acceptable).	<ul style="list-style-type: none"> • Self-control skills negatively predicted adolescent aggression ($\beta = -0.07$; $p < 0.05$) • Hostility ($\beta = .14$; $p < 0.001$) and anger ($\beta = 0.14$; $p < 0.001$) directly predicted adolescent aggression
8. Title: Alcohol use among adolescents, aggressive behaviour, and internalizing problems			
Author/Year	Participants/Inclusion criteria	Outcome Measurement	Results
Kivimäki et al. (2014) https://doi.org/10.1016/j.adolescence.2014.06.011	4074 pupils of 13-18 years of age from all local schools (excluding schools for pupils with impaired cognitive skills) in Kuopio, Eastern Finland. 53% of them were female and the types of school were comprehensive school for 1840, upper secondary school for 1474 and vocational school for 900 participants.	ASEBA- Youth Self report (Achenbach & Rescorla, 2001), which examined multiple aspects of adolescent behaviour and well-being including aggressive behaviour. Cronbach's α value ranged from 0.7 - 0.83.	<ul style="list-style-type: none"> • Alcohol use predicted aggressive behaviour in both male (OR= 1.09; 95%CI: 1.05-1.13) and female (OR= 1.11; 95%CI= 1.06-1.16) • Level of alcohol consumption predicted aggressive behaviour in both male (IRR= 1.03; 95%CI= 1.02-1.04) and female (IRR= 1.02; 95%CI= 1.01-1.02)

Note.

TPB = theory of planned behaviour

CU = callous-unemotional

ASEBA= Achenbach System of Empirically Based Assessment

Table 3
Psychosocial predictors of adolescent aggression in cohort study articles

Author/Year	Participants/Inclusion criteria	Outcome Measurement	Results
<p>9. Title: Aggressive Delinquency Among North American Indigenous Adolescents: Trajectories and Predictors Sittner & Hautala (2016) https://doi.org/10.1002/ab.21622</p>	<p>659 adolescents from waves 1, 2, 3, 5, and 7 of a longitudinal study on three reservations in the northern Midwest and four Canadian reserves.</p>	<p>Aggressive delinquency measured by nine items, adapted from conduct disorder module of the Diagnostic Interview Schedule for Child IV. Fair to good reliability with Cronbach's $\alpha = 0.68 - 0.73$ (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000).</p>	<ul style="list-style-type: none"> • Increased parental rejection associated with higher risk of being chronic desistor (RR= 1.36, $p<0.05$) • Positive school adjustment associated with aggression trajectory profile (RR= 0.65 in high desistor and RR=0.67 in chronic desistor, $p<0.05$) • Delinquent peer associations increased the risk of being in high desistor (RR= 2.05, $p<0.01$) and chronic groups (RR= 2.94, $p<0.01$) • Ever trying substances increased risk of being in moderate desistor (RR= 2.45), high desistor (RR=3.45), and chronic desistor (RR=4.78) • Early dating increased the relative risk of being in the high desistor (RR= 2.76; $p<0.05$) and chronic groups (RR= 2.65; $p<0.05$) than in the non-offender group
<p>10. Title: Multi-level risk factors and developmental assets associated with aggressive behaviour in disadvantaged adolescents. Smokowski, Guo, Cotter, Evans, & Rose (2016) https://doi.org/10.1002/ab.21612</p>	<p>Middle school students came from the RAP study and the data were collected in spring of 2011, spring of 2012, and spring of 2013. 4,065 observations at baseline, 4,251 observations of Wave 2 or 12 months after the baseline, and 4,256 observations at Wave 3 or 24 months after the baseline. They were racially/ ethnically diverse: 27% White, 23% African-American, 28% American-Indian, 14% mixed race/other, and 8% Latino. About half of the sample (52%) was female, 85% of resided in a two-parent family, and 86% received free or reduced-price lunch.</p>	<p>Modified subscales from the YSR. Good reliability with Cronbach's alpha value 0.86 -0.70 for each year of follow-up (Achenbach & Rescorla, 2001)</p>	<ul style="list-style-type: none"> • Two-parent family structure predicted aggression (ExpB= 0.979, $p<.001$) • Negative proximal processes of parent-adolescent conflict (ExpB= 1.013, $p<0.001$), friend rejection (ExpB= 1.023, $p<.001$), peer pressure (ExpB= 1.018, $p<0.01$), delinquent friends (ExpB= 1.124, $p<0.001$), and school hassles (ExpB= 1.063, $p<0.001$) were significant predictors of aggression. • Positive proximal processes of ethnic identity (ExpB= 0.991, $p<0.01$), religious orientation (ExpB= 0.98, $p<0.001$), and school satisfaction (ExpB= 0.948, $p<0.05$) buffers against aggression.

Table 3 (continue)

Author/Year	Participants/Inclusion criteria	Outcome Measurement	Results
11. Title: Social Information Processing in Child-to-Parent Aggression: Bidirectional Associations in a 1-Year Prospective Study			
Calvete, Gámez-Guadix, García-Salvador(2015) https://doi.org/10.1007/s10826-014-0023-4	Participants were students from 67 classrooms located within 21 secondary schools in Bizkaia, Basque Country, Spain, including public and private centres. Participants were 1,272 adolescents (653 girls, 619 boys; Mean age = 14.74, SD = 1.21), who completed the measures at two- time measurements within a 1-year interval. Majority of participants were Spanish (91.5%), and the remaining participants were South American (4.9%), Eastern European (0.6%), African (0.5%), and Asian (0.2%).	<ul style="list-style-type: none"> Child-to-Parent Aggression Questionnaire (CPAQ; Calvete et al., 2013). Excellent psychometric properties in a Spanish adolescents, with exploratory factor support for its structure and good reliability (Cronbach's $\alpha = 0.75-0.85$) 	<ul style="list-style-type: none"> Aggressive response access ($\beta = 0.18$, $p < 0.001$) and anger ($\beta = 0.08$, $p < 0.01$) predicted T2 psychological aggression Anger ($\beta = 0.07$, $p < 0.05$), low empathy ($\beta = -0.08$, $p < 0.05$), and hostile attribution ($\beta = 0.08$, $p < 0.05$) predicted T2 physical aggression. Model explained 12% variance of psychological and physical aggression.
12. Title: Substance Use and Physical Dating Violence: The Role of Contextual Moderators			
Reyes, Foshee, Tharp, Ennett, & Bauer (2015) https://doi.org/10.1016/j.amepre.2015.05.018	2,299 public school students in two counties of North Carolina contributed at least two waves of data, with 78% participating in three or more waves ($n = 1,920$). The participants' demographic characteristics were 47% black, 48% were male, and 40% with either parent's highest education was high school or less.	<ul style="list-style-type: none"> Physical violence dating perpetration was measured by six items listing physically violent behaviour acts. Good reliability with Cronbach's α of 0.93 (Reyes et al., 2015) 	<ul style="list-style-type: none"> Physical dating violence perpetration increased at time points when heavy alcohol (β coefficient = 0.17, $p < 0.001$) and hard drug use were elevated (β coefficient = 0.05, $p = 0.01$)
13. Title: The Role of Bicultural Stress and Perceived Context of Reception in the Expression of Aggression and Rule Breaking Behaviours Among Recent-Immigrant Hispanic Youth			
Forster, Grigsby, Soto, Schwartz, & Unger (2015) https://doi:10.1177/0886260514549052	302 adolescents recently arrived (5 years or less) Hispanic immigrants in Miami and Los Angeles and participated in COPAL study. Participants from Los Angeles were mainly Mexican (70%), and those from Miami were mainly Cuban (61%). Adolescents were entering or currently enrolled in 9th grade at a public school in 10 schools in Miami-Dade or 13 schools in Los Angeles Counties. Only schools that were at least 75% Hispanic were selected for the study.	<ul style="list-style-type: none"> Aggressive Behaviour subscale from the Youth Self-Report. Good reliability with Cronbach's α of 0.91 (Achenbach & Rescorla, 2001) 	<ul style="list-style-type: none"> Bicultural stress ($\beta = 0.318$, $p < 0.001$), negative context of reception ($\beta = .184$, $p = .021$), aggression at baseline (model $R^2 = 0.299$; $\beta = 0.220$, $p = 0.027$) Delinquent peers ($\beta = 0.1024$, $p = 0.047$) had independent associations with changes in aggressive behaviour during the first year of high school (model $R^2 = 0.37$, $p < 0.001$).

Table 3 (continue0

Author/Year	Participants/Inclusion criteria	Outcome Measurement	Results
14. Title: The impact of the positive action program on substance use, aggression, and psychological functioning: Is school climate a mechanism of change?			
Author/Year	Participants/Inclusion criteria	Outcome Measurement	Results
Stalker, Wu, Evans, & Smokowski (2018) https://doi.org/10.1016/j.hildyouth.2017.11.020	8333 participants participated in Rural Adaptation Project (RAP) in North Carolina; 50.63% were female. Racial/ethnic compositions: 28.27% Caucasian, 25.50% African American, 25.35% American Indian, 12.26% Mixed Race/Other, and 8.62% Hispanic/Latino. Majority (78.99%) received free/reduced price lunch and 70.32% lived with two parent families.	Youth Self-Report. Good reliability with Cronbach's α of 0.91 (YSR; Achenbach & Rescorla, 2001)	<ul style="list-style-type: none"> • School hassles (as proxy to school climate) predicted adolescent aggression ($b= 0.347$; $p<0.001$)
15. Title: Gender moderates the association between psychopathic traits and aggressive behavior in adolescents			
Orue, Calvete, & Gamez-Guadix (2016) https://doi.org/10.1016/j.paid.2016.01.043	765 (464 girls and 301 boys) high school students from 13 randomly selected schools in Bizkaia (Spain) completed the measures at both Time 1 (T1) and Time 2 (T2) one year later. The participants' age between 14 -18 years old (Mean = 15.43 \pm 1.09 years). Most of the participants were Spanish (90.1%) or South American (7.9%). Remaining 2% were from various countries. The socio-economic levels were low (12.1%), low-medium (17.7%), medium (32.7%), high-medium (29.9%), and high (7.6%).	Self-report questionnaire developed by Little, Henrich, Jones, and Hawley (2003), which differentiates the forms and functions of the aggressions as proactive overt, proactive relational, reactive overt and reactive relational aggression. Fair to good reliability test (Cronbach's $\alpha = 0.67 - 0.76$)	<ul style="list-style-type: none"> • T1 CU traits predicted T2 proactive overt ($b= 0.07$; $p<0.05$) and proactive relational ($b= 0.10$; $p<0.05$) aggressive behavior. • T1 GM dimension predicted T2 proactive overt ($b= .14$; $p<0.05$) and reactive overt ($b= 0.10$; $p<0.05$) aggressive behavior. • T1 II dimension predicted T2 reactive overt ($b= 0.09$; $p<0.05$) aggressive behavior.

Note.

- RAP = Rural Adaptation Project
- COPAL= Constryendo Oportunidades Para Adolecentes Latinos
- ESOL= English for Speakers of Other Languages
- CU = callous unemotional
- GM = grandiose-manipulative
- II = impulsive irresponsible

Jambroes et al., 2018; Lui et al., 2017). Finigan-Carr et al. (2015) investigated on how perceived behavioural control (self-control and decision making) influenced the overall framework of risk and protective factors for aggressive behaviour, whereas Lui et al. (2017), Barry et al. (2018), and Jambroes et al. (2018) examined the association between psychopathic traits (i.e., callous-unemotional traits, narcissism, impulsive irresponsible) and adolescent aggression. Other assessed individual factors which can be associated with adolescent aggression are emotional components such as anger, hostility (Rosenbaum et al., 2018), and lack of empathy (van Hazebroek et al., 2016). Social predictors investigated included bad peer influence (Lui et al., 2017; Wang et al., 2017) school climate (Wang et al., 2017), parental factor (Finigan-Carr et al., 2015), and substance abuse (Kivimaki et al., 2014).

As for the cohort studies, there were seven selected articles with sample size ranged from 302 (Forster et al., 2015) to 8,333 (Stalker et al., 2018) participants. All the studies were conducted in developed countries: United States (Forster et al., 2015; Reyes et al., 2015; Sittner & Hautala, 2016; Smokowski et al., 2016; Stalker et al., 2018) and Spain (Calvete et al., 2015; Orue et al., 2016). Nevertheless, most of the participants' characteristics comprised those who were in marginal and vulnerable group such as those who live in rural area of developed countries (Sittner & Hautala, 2016; Smokowski et al., 2016), lower education background (Reyes et al., 2015), and Hispanic immigrants (Forster et al., 2015). Self-reported continuous measures were primarily collected in all studies by the participants except for one study that categorised aggressive delinquency (Sittner & Hautala, 2016). Psychological predictors looked into including personality traits (Orue et al., 2016) and emotional components (Calvete et al., 2015). As for social predictors, peer influence (Smokowski et al., 2016; Calvete, 2015; Forster et al., 2015), school climate (Sittner & Hautala, 2016; Smokowski et al., 2016; Stalker et al., 2018), substance use (Reyes et al., 2015; Sittner & Hautala, 2016), and parent-adolescent conflict (Sittner & Hautala, 2016; Smokowski et al., 2016) were investigated in aggressive behaviour among adolescents. Apart from that, religion and cultural factors also are being observed among school students in rural area (Smokowski et al., 2016) and immigrants (Forster et al., 2015).

Predictors of Adolescent Aggression

The elicited adolescent aggression predictors from selected articles can be mainly divided into psychological predictors (Table 4) and social predictors (Table 5). Both consist of risk and protective factors.

The psychosocial predictors of adolescent aggression were described across different study designs of cross-sectional and cohort studies. Psychological predictors that were most highly reported by four articles were on the personality traits, mainly callous unemotional (Barry et al., 2018; Jambroes et al., 2018; Lui et al., 2017; Orue et al., 2016). Callous-

Table 4
Summary of psychological predictors of adolescent aggression

Factors	Predictors	Author/years	Main findings
Risk Factors	Personality traits	Barry et al., 2018; Jambroes et al., 2018; Lui et al., 2017; Orue et al., 2016	Callous unemotional, grandiose-manipulative, impulsive-irresponsible, narcissism
	Emotional factors	Calvete, 2015; Rosenbaum et al., 2018; Smokowski et al., 2016	Anger, hostility, internalizing symptoms
	Motive	van Hazebroek et al., 2017	Agentic goals (desire to be dominant)
Protective Factors	Self-control	Finigan-Carr et al., 2015; Rosenbaum et al., 2018	Self-control skills

Table 5
Summary of social predictors of adolescent aggression

Factors	Predictors	Author/years	Main findings
Risk Factors	Peer influence	Finigan-Carr et al., 2015; Forster et al., 2015; Sittner & Hautala, 2016; Smokowski et al., 2016; Wang et al., 2017	Problem with friend influence, delinquent peer association and affiliation, peer pressure, friend rejection, early dating
	Substance use	Kivimaki et al., 2014; Reyes et al., 2015; Sittner & Hautala, 2016	Ever tried substance, alcohol use, hard drug use
	Negative school climate	Smokowski et al., 2016; Stalker et al., 2018	School hassles
	Neighbourhood influence	Forster et al., 2015; Smokowski et al., 2016	Less educated residents, context of reception, openness/hostility
	Parent-adolescent conflict	Smokowski et al., 2016	Parental rejection
Protective Factors	Positive school climate	Sittner & Hautala, 2016; Smokowski et al., 2016; Wang et al., 2017	High quality school climate, positive school adjustment, school satisfaction
	Parent and Family factors	Smokowski et al., 2016; Wang et al., 2017	Parental disapproval of fighting, two-parent family structure
	Religion and culture	Smokowski et al., 2016	Religious orientation, ethnicity identity

unemotional dimension of psychopathy predicted reactive ($\beta = .26$; 95%CI= 0.02-0.36) and proactive aggression ($\beta = 0.25$; 95%CI= 0.02-0.36) among adolescents in Amsterdam (Jambroes et al., 2018), supported by other research evidence in different population (Barry et al., 2018; Orue et al., 2016). Other personality components of aggressive adolescents include grandiose-manipulative (Orue et al., 2016), impulsive-irresponsible (Jambroes et al., 2018; Orue et al., 2016), and narcissism (Barry et al., 2018). Emotional factors such as anger ($\beta = 0.08$, $p < 0.01$), hostility ($\beta = 0.14$; $p < 0.001$), and internalizing symptoms ($\text{Exp}B = 1.013$, $p < 0.001$) are also being reported by three articles (Calvete et al., 2015; Rosenbaum et al., 2018; Smokowski et al., 2016) to be significantly predicted adolescent aggression.

As part of social goal, agentic goals as one's desire to be dominant predicted aggressive behaviour among adolescents in single study conducted in Netherland (van Hazebroek et al., 2016). Despite the above-mentioned psychological risk factors, self-control among adolescents can prevent aggression development by empowering self-control skills ($\beta = -0.07$; $p < 0.05$) as evidenced from two studies (Finigan-Carr et al., 2018; Rosenbaum et al., 2018).

According to the most commonly reported social predictors based on number of articles in this review, peer influence is the highest (five articles), followed by school climate (four articles), substance use (three articles), neighbourhood influence (two articles), family and parent factors (two articles), religion and culture factors (one article). All included studies' outcome measurements include physical and/or verbal aggression with sex-adjusted data analysis in predicting adolescent aggression.

The influence of friend with problematic behaviours like smoking and drinking alcohol as perceived norm factor was found to be a significant predictor of aggressive behaviours among those with medium (AOR= 2.61; 95%CI= 1.68-4.07) and high levels (AOR= 5.05; 95%CI= 3.03-48.39) of problem friend influence (Finigan-Carr et al., 2015). Selective affiliation of adolescents with peers who show serious problematic behaviour such as fighting also predicted aggressive behaviour among this age group (Wang et al., 2017). Early dating (RR= 2.65-2.76; $p < 0.05$) and delinquent peer association (RR= 2.05-2.94; $p < 0.05$) increased the risk of aggressive delinquency among North American Indigenous adolescents almost three times across different group-based trajectory (Sittner & Hautala, 2016). Delinquent peers are also being supported by Smokowski et al. (2016) (ExpB= 1.124; $p < 0.001$) and Forster et al. (2015) ($\beta = 0.1024$; $p = 0.047$). Additionally, friend rejection (ExpB= 1.023; $p < 0.001$) and peer pressure (ExpB= 1.018; $p < 0.01$) also predicted aggression in disadvantaged adolescents (Smokowski et al., 2016).

Ever tried substances (tobacco, alcohol, and marijuana) can be as high as almost five times likely among the chronic aggressive adolescents (RR= 4.78; $p < 0.001$) and almost three times likely among moderate desistor, those who stopped from offending actions (RR=2.45; $p < 0.05$), in trajectory groups of aggressive delinquency (Sittner & Hautala, 2016). Other substances used which can predict adolescent aggression in physical dating violence include heavy alcohol use ($\beta = 0.17$; $p < 0.001$) and hard drug use ($\beta = 0.05$; $p = 0.01$) such as cocaine, heroin, and ecstasy as described by Reyes et al. in 2015. Alcohol use and its level of consumption are also found to be associated with aggressive behaviour among both male and female school students in Finland (Kivimaki et al., 2014).

School climate and parent factors can be both promotive and protective factors. School hassles as proxy to school climate were shown to predict adolescent aggression in several studies (Smokowski et al., 2016; Stalker et al., 2018). On the other hand, higher quality of school climate by teacher, student-student support, and opportunities for autonomy in

school factor had negatively predicted aggression among Chinese adolescents (Wang et al., 2017). Positive school satisfaction (Smokowski et al., 2016) and adjustment (Sittner & Hautala, 2016) also act as protective factors against adolescent aggression development. As for parental factors, parent-adolescent conflict predicted adolescent aggression ($\text{Exp}B=1.013, p<0.001$) as described by Smokowski et al. (2016). However, parental disapproval of fighting (Finigan-Carr et al., 2015) and two-parent family structure (Smokowski et al., 2016) prevented aggressive behaviour development among school students in United States.

Other minimal social predictors of adolescent aggression include neighbourhood influence of less educated residents (Smokowski et al., 2016). However, this negative predictor can be buffered by protective factors of religious orientation and ethnicity identity. As for the development of aggressive behaviour among new immigrant adolescents in United States (Forster et al., 2015), context of reception by means of social supports and economic opportunities and openness or hostility by the local community also play significant role ($\beta=0.184; p=0.021$).

DISCUSSION

This systematic review assessed on 15 observational studies (cross-sectional and cohort) in determining adolescent aggression predictors. Though causal relationship effect can be described more effectively from cohort study, such association can also be predicted in cross-sectional studies with appropriate statistical analysis application. The highly reported psychological predictors of adolescent aggression elicited from selected articles were personality traits, emotional factors, and self-control. As for social predictors, peer influence factor was the most frequently stated in affecting aggressive behaviour among adolescents. This is followed by substance use, school climate, parent and neighbourhood influence.

Each study article involved different adolescent with the age range of 10 to 19 years old, which comprised of middle/secondary school students. As the age of onset and peak aggression among adolescents can vary in their subtypes and nature (Clow, 2016), the different adolescent age range in the selected study articles may somehow affect the findings of the review. For example, delinquent peer associations can be a significant risk factor for aggressive behaviour among chronic desistor, who started off at a moderate level of aggression, increased and peaked at a high level of aggression at approximately 15 years of age, and decreased in later adolescence. As for adolescent-limited offender who started off at low level of aggression and peaked at moderate level of aggression before subsided, this factor can be a significant protective factor when compared to those who were chronic desistors (Sittner & Hautala, 2016).

Callous unemotional personality trait was the highest psychological predictor of adolescent aggression from the systematic review. The callousness (inflicting harm and lack of empathy) and uncaring (general disregards for rules, performance or norms) dimensions

of CU traits are the most strongly linked to aggression (Berg et al., 2013; Roose et al., 2010). As these two dimensions are connected to both hostility and general approval of aggression (Lui et al., 2017), CU traits are also exceptionally related to more severe types of aggressive behaviour of proactive overt and proactive relational (Orue et al., 2016). CU traits are also found to have stronger prediction for proactive aggression in adolescents with high verbal-intelligence scores (Jambroes et al., 2018), which can be more established in adolescents as compared to younger children.

Social predictors were found to be more common and higher in the strength of evidence presented as compared to psychological predictors from the review. Bad influence from problematic friend and ever trying substances were among the highest predictors of adolescent aggression, which could increase the risk by three to five times more likely compared to those non-offenders (Sittner & Hautala, 2016). Early antisocial influences among adolescents might increase their opportunities to learn pro-delinquent beliefs (Haynie & Osgood, 2005) as most of them spent their entire childhood and adolescence within the same peer groups (Whitbeck et al., 2014). As for the result, peer influence was one of the salient predictors in adolescents' behavioural development, which can be difficult to control.

Negative proximal processes of school, parents, and neighbourhood predictors were found to be minimally affected by the development of aggressive behaviour with less than 10% of risk (Smokowski et al., 2016). One of the reasons could be due to the drawback of the study articles that did not differentiate between proactive and reactive aggression or between direct (overt) and indirect (relational) aggression. Adolescents' response towards their social environment might vary based on the context and situations, which could also influence the purpose of their actions. Furthermore, the relationship of social predictors such as family violence and neighbourhood social control with aggressive behaviour among adolescents might not be directly associated but as moderating effect (Reyes et al., 2015). Findings from local evidences in Malaysia, reported some researches showed on family problem environment and functioning influenced on adolescent aggression (Azmawati et al., 2015; Zainah et al., 2011), while some researches showed that individual factors including self-esteem (Arokiaraj et al., 2011) and increase desire to try new things and freedom of action (Sharif & Roslan, 2011) played more important role as compared to family environment.

The limitations of reviewed articles that were selected can be derived from the quality of research methodology, which resulted in some risk of selection and information bias. Most of the researchers did not reveal the sample size justification, which might affect the statistical power of the study. The statistical methods that were used in the included studies were also heterogenous, with lack of effect estimates and 95% confidence interval information. Hence, meta-analysis conducted might not be feasible in this review. As for the

limitations of search strategy of this review, only five-recent years published journal articles in English were included. The initial search process and articles screening were conducted by single author within limited time frame, which may result in selection bias during data extraction and possibility of related articles not being included in the final review.

Based on the United States Preventive Service Task Force guidelines, the strength of evidence for the selected observational studies were moderate. The available evidence was sufficient to determine the predictors of aggression but constrained by main weaknesses of non-generalized study population, social-desirability bias from self-reporting, and limited participants' information for potentially important variables of interest. Though most of the study participants were school students, some articles focused on school drop-out adolescents with problem misconduct, who received military programmes and closed treatment closed treatment setting for adolescents with severe conduct problems (Lui et al., 2017; Jambroes et al., 2018). Their age ranges were older compared to other study participants (15 to 19 years old), which was assumed to have more developed and stable socio-cognitive processes compared to younger sample (Lui et al., 2017). Findings among these school drop-outs also stressed on the individual factors including callous unemotional personality traits (Lui et al., 2017) and impulsive irresponsible psychopathy (Jambroes et al., 2018). However, their findings may not be generalized to those attending public schools as they were mainly selected by purposive sampling and might differ in their previous beliefs and perceptions in regards to hostility and approval of aggression (Lui et al., 2017). Findings from several articles which looked into specific ethnicity groups in rural region (Sittner & Hautala, 2016) and vulnerable groups of immigrants (Forster et al., 2015) and undersiege people (Rosenbaum et al., 2018), also limit their generalizability of findings to general population of adolescents.

As for self-report measure, it has potential bias due to same source, selective memory and social desirability of respondents (Forster et al., 2015; Lui et al., 2017; Reyes et al., 2015). They also might be influenced by the presence of their peers while responding to the questionnaires as they were conducted during school sessions (Smokowski et al., 2016). However, evidences had suggested that self-report was better compared to peer-reports in determining aggressive behaviour predictors (Little et al., 2003) and yielded reliable results (Bradburn et al., 1987; Rutherford et al., 2000).

Psychosocial treatments were shown to be effective in aggressive adolescents with conduct disorder (Brestan & Eyberg, 1998), which might include problem-solving skills training, parent management training, functional family therapy and multisystemic therapy (Kazdin, 1997). The retrieved psychosocial predictors of adolescent aggression from this review can be important information for the stakeholders namely parents, educators, psychologists, and policy makers in their efforts to reduce the social misconduct in the community. This warrant for more practical and holistic approach in dealing with aggressive

adolescents by incorporating the important psychosocial predictors so they can be applied in more targeted and updated intervention strategy deliveries publicly.

More researches that further explore these significant predictors could also provide further in-depth understanding to explain this complex and myriad processes of adolescent aggression development. Future studies may also incorporate various data sources in investigating adolescents' aggressive behaviour by cross-validating self-reports with parent, teacher or peer reports, especially for psychopathic traits that can be most susceptible to socially desirable response (Lui et al., 2017; Rosenbaum et al., 2018).

CONCLUSION

From the systematic review of related articles, the main psychosocial predictors of adolescent aggression include personality traits, emotional factors, peer influence, and substance abuse, which all need to be focused in preventive strategies against adolescent aggression.

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