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**ADMINISTRATIVE INFORMATION****Support** - NA.**Review Stage at time of this submission** - Completed but not published.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY202430076**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 18 March 2024 and was last updated on 18 March 2024.**INTRODUCTION**

**Review question / Objective** 1. How does parental Substance Use Disorder impact a child's cognitive functioning? 2. Does the time of exposure to parental Substance Use Disorder generate differing consequences on a child's cognitive functioning? 3. Does the density of Substance Use Disorder in one's family create a differing impact on their child's cognitive functioning?

**Rationale** The Diagnostic and Statistical Manual of Mental Disorders (5th Edition) (DSM-V) (American Psychiatric Association, 2013) defines substance use disorder (SUD) as 'a cluster of cognitive, behavioural and physiological symptoms which indicate an individual's continuous use of a substance despite experiencing significant substance-related problems. The use of addictive substances may harm an individual's physical and mental well-being and adversely affect those in their environment. Research suggests offspring of parents having SUD may be at risk of maladaptive

developmental outcomes such as psychiatric disorders (PD), cognitive functioning (CF) deficits, dysfunctional behaviours and SUD (Belliveau & Stoppard, 1995; Lynskey, Fergusson, & Horwood, 1994; Nichtern, 1973;). Regardless of the substance being abused, risk factors associated with SUD may result in parents lacking the ability to provide a safe environment and respond adequately to their family's emotional and physical needs (Christensen & Bilenberg, 2000; Kumpfer, Alvarado, & Whiteside, 2003;). According to Roy (2013), CF is defined as 'the development of internal mental processes' underlying how individuals perceive, think, make decisions, speak and solve problems. The term may also be used to express different functions of the mind such as memory, attention and emotional thought. These functions of the mind are integral to academic learning, therefore, an impact on these could fluctuate one's academic functioning (Tarter, 1990). Heterogeneity in previous studies investigating Cognitive Functioning (CF) of substance users' offspring remains inconsistent (Bountress & Chassin, 2015; Poon, Ellis, Fitzgerald, & Zucker,

2000;). Majority of the studies are still unclear about what aspect of parental substance use disorder (SUD) (behavioural problems or adverse home environments) has a stronger influence on CF. Further, since previous studies typically focus on overall childhood wellbeing instead of specifically viewing CF difficulties, aspects such as cognition lack definitive understanding and need to be reviewed on a symptomatologic basis. Exploring CF through its various symptomatologic or related variables may be able to strengthen the findings of it. In comparison to independent findings from previous studies, it can be suggested that attributes such as the gender of the parent with SUD (Whipple, Parker, & Noble, 1988), either one or both of the parents having SUD (Blackson, Tarter, Martin, & Moss, 1994; Lipari & Van Horn, 2017;), the gender of the child (Bennett, Bendersky, & Lewis, 2007) and the type of substance being abused (Wilens, Biederman, Bredin, Hahesy, Abrantes, Neft, Millstein, & Spencer, 2002), may need to be explored on a more considerable magnitude.

Since CF is a large term covering various developmental characteristics, identifying specific aspects that parental SUD impacts may be favourable to find homogenous results. Exploring the severity of exposure and impact of variances in parental SUD would be fundamental to understanding this topic better. This topic has not been reviewed previously, thus emphasizing the need for a synthesis to be conducted.

Since an individual's childhood experiences mould their psychological and social abilities as adults, this review would provide insight into the trajectory between parental SUD related to CF difficulties and negative outcomes in offspring. Reviewing this topic would incorporate a range of co-existing elements in understanding the basis of CF difficulties, thereby helping future researchers in recognising the most effective coping interventions or therapies. Associations such as Adult Children of Alcoholics and National Association for Children of Alcoholics could benefit from this SR. Several systematic steps will be taken to identify relevant research literature to highlight patterns rather than presenting an exhaustive review of contributing studies.

**Condition being studied** The Diagnostic and Statistical Manual of Mental Disorders (5th Edition) (DSM-V) (American Psychiatric Association, 2013) defines substance use disorder (SUD) as 'a cluster of cognitive, behavioural and physiological symptoms which indicate an individual's continuous use of a substance despite experiencing significant substance-related problems. The use of addictive substances may

harm an individual's physical and mental wellbeing and adversely affect those in their environment. Research suggests offspring of parents having SUD may be at risk of maladaptive developmental outcomes such as psychiatric disorders (PD), cognitive functioning (CF) deficits, dysfunctional behaviours and SUD (Belliveau & Stoppard, 1995; Lynskey, Fergusson, & Horwood, 1994; Nichtern, 1973;). Regardless of the substance being abused, risk factors associated with SUD may result in parents lacking the ability to provide a safe environment and respond adequately to their family's emotional and physical needs (Christensen & Bilenberg, 2000; Kumpfer, Alvarado, & Whiteside, 2003;). According to Roy (2013), CF is defined as 'the development of internal mental processes' underlying how individuals perceive, think, make decisions, speak and solve problems. The term may also be used to express different functions of the mind such as memory, attention and emotional thought. These functions of the mind are integral to academic learning, therefore, an impact on these could fluctuate one's academic functioning (Tarter, 1990).

## METHODS

**Search strategy** Four databases were used to identify peer reviewed studies: PubMed (Medline Database), Embase (Elsevier), APA Psyc INFO, Scopus (Ovid). APA PsycExtra was used to identify appropriate Grey Literature. PEO (population, exposure, outcome) framework was used when conducting the systematic review. Population Criteria: Parents with substance use disorder and their children below the age of 18 years (search terms: parental substance use disorder, parental substance abuse, substance dependence, drug abusing parents). Exposure Criteria: Impact of substance use disorder (search terms: child welfare, family systems theory, child abuse, child neglect, maltreatment, family function). Outcome Criteria: Cognitive functioning difficulties in children (search terms: child development, cognitive functioning, problem-solving, emotional intelligence, academic achievement).

**Participant or population** Parents with substance use disorder and their children below the age of 18 years. Studies where one or both parents have substance use disorder. Parents using substances which as classified as drugs in the DSM-V (APA, 2013). Studies published in the past 50 years (1971-2021).

**Intervention** NA.

**Comparator** NA.

**Study designs to be included** Quantitative Studies: Cohort Studies and Case-Controlled Studies, relevant grey literature.

**Eligibility criteria** Exclusion criteria: Parents who developed substance use disorder after their children turned 18 years old; Substance abusing parents with diagnosed co-morbid mental disorders; children with diagnosed co-morbid mental disorders; qualitative studies, reviews, editorials and meta-analyses.

**Information sources** Four databases were used to identify peer reviewed studies: PubMed (Medline Database), Embase (Elsevier), APA Psyc INFO, Scopus (Ovid). APA PsycExtra was used to identify appropriate Grey Literature. A Quality Assessment Tool, Critical Appraisal Skills Programme (CASP, 2019) was used to assess the research quality of the study, The CASP checklist for cohort and case controlled studies was used respective to the study to ensure uniformity, assess bias and prevent errors in synthesising.

**Main outcome(s)** As this topic has not been synthesized before, this review is a first in synthesizing 50 years of research into a cohesive review. Ten studies that were identified after extracting data using the PEO framework and PRISMA (Mohler et al., 2009). Overall, only one study did not find any effects in the SA+ (Substance Abusing Parents) and the SA- (Non-Substance abusing Parents) offspring group. This could be due to the sample size and the young age group (infants) of the offspring as compared to the other nine studies. Only 2 studies controlled for the offspring's mother misusing drugs during gestation. Since drug use during gestation can cause severe cognitive functioning deficits in the offspring (Jones et al., 1973), the findings of some studies may solely be due to uncontrolled maternal drug usage. Due to the age differences in offsprings across studies, aspects of time of exposure to substances could be influenced by adverse life experiences and underlying PDs in participants who are older. Overall, the studies did explore all the objectives of this review and had substantial validity throughout all studies (risk of bias). Majority of these studies also had large effect sizes which indicate a strong relationship between the tested variables, further research is required to gain a proper understanding of underlying factors that may affect this in different testing scenarios. Four studies were parts of a larger longitudinal study or from country specific registers, which could have an effect on the applicability of the study to a population as compared from studies having smaller sample

sizes. Whilst two studies found the severity of CF to be impacted greatly with more than one parent having SUD, one of the studies did not find any substantial differences and one of the studies did not directly evaluate this possibility.

**Additional outcome(s)** The results of these studies seem to have overall homogeneity and align with previous studies conducted. The review explored all the mentioned objectives and was able to find specific trends within the studies to explore them as well. This review would lead to a better understanding of the types of effective interventions or therapies that could be offered to offspring of SUD parents that have a high risk of future diagnosis. The findings of these studies seem to be homogenous and conclusive in supporting the mediation of offspring cognition by parental SUD. Nine out of ten studies found the SA+ offspring groups to have a negative impact on their CF (arithmetic skills, affective temperament-emotional thought, decision making, attention - therefore, academic functioning) as compared to the control groups. Although the studies express that parental SUD significantly impacts CF in offspring, they mainly focus on AU and paternal SUD, which could fail to factor in probable covariates and situational possibilities representative of the population. However, the findings of this review do align with previous literature investigating this topic (Christoffersen et al., 2011; Friedman et al., 1985; Kern et al., 1981; Kolar et al., 1994; McGrath et al., 1999; Mednick et al., 1983; Tarter et al., 1989;).

**Data management** EndNote and Microsoft office systems.

**Quality assessment / Risk of bias analysis** A Quality Assessment Tool, Critical Appraisal Skills Programme (CASP, 2019) was used to assess the research quality of the study, The CASP checklist for cohort and case controlled studies was used respective to the study to ensure uniformity, assess bias and prevent errors in synthesising.

**Strategy of data synthesis** The data was synthesized in the form of a narrative analysis. The narrative synthesis explored ten studies ( using the objectives and research questions mentioned in the methods section.

**Subgroup analysis** NA.

**Sensitivity analysis** A Quality Assessment Tool, Critical Appraisal Skills Programme (CASP, 2019) was used to assess the research quality of the study, The CASP checklist for cohort and case

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controlled studies was used respective to the study to ensure uniformity, assess bias and prevent errors in synthesising.

**Language restriction** Yes, Language was only inclusive of English.

**Country(ies) involved** United Kingdom.

**Other relevant information** This systematic review was conducted in 2021 as a part of the author's Masters of Science degree in Mental Health: Psychological Therapies from Queen Mary University of London. As this topic has not been synthesized before, this review is a first in synthesizing 50 years of research into a cohesive review. The author looks to publish this systematic review at some point as she strongly believes it would support future research into this topic.

**Keywords** parental substance use disorder, parental substance abuse, substance dependence, cognitive function, child development, child welfare.

**Dissemination plans** Potentially publish the systematic review in a peer reviewed journal such as the British Journal of Developmental Psychology.

**Contributions of each author**

Author 1 - Tanisha Diggikar - Author wrote the entire dissertation under the supervision of Dr Sania Shakoor, Queen Mary University of London. Email: tanisha.diggikar@gmail.com