Mapping Research Trends In Conduct Disorder: A Bibliometric Analysis

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Abstract

Conduct disorder is one of the most common behavioural disorders among children and adolescents. Since the prevalence rate of the disorder is increasing swiftly, research to understand different parameters related to conduct disorder is also mounting. The present study is aimed to identify the research trends in the field of conduct disorder using bibliometric analysis. For this purpose, SCOPUS database was explored, wherein a total of 1199 documents related to conduct disorder were identified. The different aspects of the obtained data were analysed such as year-wise, journal-wise, author-wise, institute-wise, and country-wise number of publications using normative bibliometric technique. VOSviewer software was used to find out the collaboration of countries on conduct disorder research and co-occurrence of authors key words which highlighted the research trends in the area of conduct disorder. The findings of the study revealed that most of the research studies have been conducted on the co-morbidity of conduct disorder with other disorders; risk factors related to conduct disorder; key behavioural tendencies of person having conduct disorder i.e., aggression, impulsivity, antisocial-behaviour, psychopathic traits and violence; relation of conduct problems with callous-unemotional traits; role of cortisol and amygdala in conduct disorder. The study also identified areas pertaining to conduct disorder which need considerable attention but have been less focused by researchers.

Keyword: - Aggression, Children and Adolescents Conduct Disorder, Impulsivity.

Introduction

The continuous enhancement in the prevalence rate of mental disorders, became an issue of global concern. The cruciality of the issue c[1]an be estimated from the data provided by National Institute of Mental Health (2022) regarding the prevalence of mental disorders. It identified that one adult from every five and one adolescent from every six is suffering from some diagnosable mental health disorder. The most common mental health problems which disrupts the emotional and behavioural outcomes of an individual include attention deficit hyperactivity disorder (ADHD), Conduct Disorder (CD), Oppositional Defiant Disorder (ODD) etc.

Conduct Disorder is one of the most common behavioural disorders among adolescents and children after the ADHD. It includes long-lasting behaviour patterns of

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disruptive and anti-social activities. The results of meta-analytical study revealed that the overall prevalence of CD is 8%. It is more commonly related to male (11%) as compared to females (7%) (Mohammadi et al., 2021). The vulnerability of developing CD is five times more in pre-adolescent period (around the age of 11 years) as compared to adolescent period and it is also high in children belonging to low-income families as compared to children from high income families (Patel at al., 2018). The symptoms which are more frequently present among both children and adolescents are physical aggression, bullying, truancy, lying, stealing, lack of tolerance, moody behaviour, drug abuse, and destruction of public property (Frick, 2016). Other problematic behavioural tendencies of children and adolescents with CD includes disrespectful attitude towards others, cruelty towards animal or people, mis-interpretation of the intentions of others and unpredictable behavioural tendencies (Mack, 2004). As the individual with CD tend to high on impulsivity, they lack sensitivity towards the positive or negative outcomes of a particular action (Matthys et al., 2012). Besides this, presences of callous-unemotional traits (Frogner et al., 2018; Pisano et al., 2017), inability to solve problems and make wise decisions are commonly related to adolescents having CD (Matthys & Schutter, 2021).

The onset of CD basically occurs in two stages i.e., childhood and adolescent. When the child shows the symptoms of CD before the age of 10 years it comes under childhood onset and when the symptoms start after the age of 10 years is considered as adolescent onset. Childhood onset of CD often results in serious disruptive behavioural problems in adolescent period. It is significantly related to impairment in verbal learning and memory (Johnson et al., 2015). There exists high co-morbidity of childhood onset of CD with ADHD and adult anti-social behaviour (Silberg et al., 2015), depression and anxiety (Johnson et al., 2015). The children with childhood onset of CD are prone to high on aggression, violent offences and have lower level of education (Johnson et al., 2015). The dysfunctional families, depression of parents (Silberg et al., 2015) and racial discriminations (Blakey et al., 2021) are sone of the strong predictors of childhood onset of CD. Whereas, involvement with gangs and anti-social activists are the strong precursor of adolescent onset of CD (McCabe et al., 2001).

A proper diagnosis of a person having conduct disorder is still an issue of concern. Diagnostic and Statistical Manual-V (DSM-V) developed by American Psychological Association (APA) presents comprehensive criteria for identifying a person having CD. In DSM-V, conduct disorder refers as a set of reoccurring and persistent disruptive behavioural tendencies which can create significant harm to others and violate the major age-appropriate societal rules or norms. A total of 15 criteria are presented in manual. Along with this, it also describes the criteria for identifying the level of disorder i.e., mild, moderate, and severe.

Most of the studies conducted on CD are focused to understand different parameters of CD in context to males only. Some comparative studies highlighted that, there exists lots of differences in the behavioural tendencies of males and females having CD. The boys with CD are tend to exhibit externalized behaviour which includes hyperactivity, callous-unemotional traits, aggression, criminal activities, and impulsiveness (Baillargeon et al., 2007; Viding et al., 2009). Whereas, girls with CD shows internalized behaviour i.e., emotional bullying, spreading rumors, excluding someone from the group, and verbal aggression (NCCMH, 2017). The co-morbidity of CD with others disorders such as anxiety disorder, depression, ODD is highly present in males as compared to females (Viding et al., 2009). Although lots of discrepancies exists in the behavioural tendencies of males and females having CD but the poor parenting and family factors are more responsible for the development of CD in both male and females (Pajer et al., 2008).

Review of Literature

People with conduct disorder are mainly characterized by persistent or inappropriate recurring behaviour patterns that may disrupt the individual's personal, academic, and social life and create problems for other related persons. Taking into consideration the high prevalence and harmful effects of CD for both individual and society, lots of studies have been conducted on the various parameters of CD. But no one study have been conducted on the bibliometric analysis of CD. Bibliometric analysis is basically a way of exploring and analyzing large volume of scientific data available in a particular field. Ample number of bibliometric studies have been conducted in order to analysis the mental health perspectives of children and adolescents which highlighted the status of mental health of people during COVID-19 pandemic (Chena et al., 2021), effect of smoking (Metse et al., 2017); machine learning (Kim et al., 2021); occupational therapy interventions (Sharon & Ted, 2018) on mental health. Besides these, many studies have been conducted on some specific kind of emotional-behavioural and neuro-developmental disorders such as attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD), anxiety, bipolar disorders, obsessive compulsive disorders (OCD) etc.

Most of the bibliometric studies conducted on ADHD, explored the top productive countries, journals, and articles with highest citations (Lin et al., 2021; Lopez-Munoz, 2008). Additionally, Dort et al., (2020) conducted a bibliometric study to explore communication gap between the psychology/psychiatry and education fields with respect to classroom management strategies for children having ADHD. Autism is another most common disorder among children which specifically affect the social interaction and communication abilities of the victims. Feng et al., (2022) identified the top universities along with the cooperation among different countries in the field of research on autism. It also identified the focus themes such as 'social support' and 'health and physical fitness of people with autism'. Besides these, research on other areas such as parental aspects, early diagnosis and inclusion of children with autism in mainstream schools is increasing swiftly (Carmona-Serrano et al., 2020). The relation of autism spectrum disorder has been explored with context to gut microbiota (Martinez-Gonzalez & Andreo-Martinez 2022) and executive functions (Shekarro et al., 2021).

The prevalence of anxiety and bipolar disorders is also high among children and adolescents which emerges as a risk factor for the development of coronary heart disease (Zhou et al., 2021). In context to mathematic anxiety among students, the most highlighted fields of research are motivation, self-efficacy, self-esteem, mathematics performance, gender-differences, exam-anxiety, working memory, and numeracy (Ersozlu, & Karakus, 2019). The use of technological innovations in the field of curing mental disorders is trending among researchers and it is found that the application of artificial intelligence in the identification of clinical symptoms and treatment of bipolar disorders is very effective (Tran et al., 2019). Besides these, many bibliometric researches have been conducted on OCD among children and adolescents which have highlighted the year-wise publications, the most influential universities and journals, highly cited articles and relationship among countries with respect to authorship (Bashan, 2022; Grover & Gupta, 2022).

Oppositional Defiant Disorder (ODD), which works as a bearer of CD in most of the cases (Burke, Waldman, & Lahey, 2010) is also a common disorder among children and adolescents. There is lacuna of bibliometric studies on ODD. It is found from the review of literature that the bibliometric analysis can be done in two forms i.e., descriptive and relational. Descriptive analysis gives birds' eye view of large data in context to production of scientific literature in a particular duration; influential authors, institutes, journals, articles, countries etc. Moreover, relational analysis traces similarities and associations between authors and countries in context to the areas of research, results of studies etc. Hence, in this direction, the present study is aimed to explore:

1. The annual trends of research on conduct disorder from 2000 to 2022.

2. The influential or leading authors, universities, countries, journals, in context to CD.
3. The inter-relationship of key themes and trends, and countries collaboration with respect to research on CD.

Methodology

In order to conduct bibliometric analysis on recent research trends in conduct disorder, Scopus database was used. It is considered one of the frequently used databases for conducting bibliometric studies on multidisciplinary scientific literature (Gadd & Rowlands, 2018). In order to collect data, the term 'conduct disorder' was used in the area of 'title' only with the time limit of 2000 to 2022. In order to attain more precise data, only those research work was included which comprised of conduct disorder in title of the work. A total of 1347 documents were found in the first search. The documents in other languages rather than English were eliminated and a study was conducted on a total of 1199 documents. The obtained data were analysed to explore the most influential authors, universities, countries, journals, in context to research on CD. The software named VOSviewer version 1.6.18 was used to find out the collaboration among various countries in contest to research work on CD. It is also used to create co-occurrence network of authors' keywords which highlighted the most important research areas in CD covered by various researchers. A detailed account of results of the study is presented as follows;

Results and Discussion

A total of 1199 documents related to conduct disorder were found in Scopus database which have been published between the time-span of 2000 to 2022. On an average, a total of 52 documents were published yearly. It can be seen in Figure 1 that there exists gradual increase in the number of research studies conducted on conduct disorder from 2000 to 2022. The lowest number of documents were published in 2005 whereas the highest number of documents were published in 2016 and 2014. In the present year, a total of 42 documents were published till the last week of August.
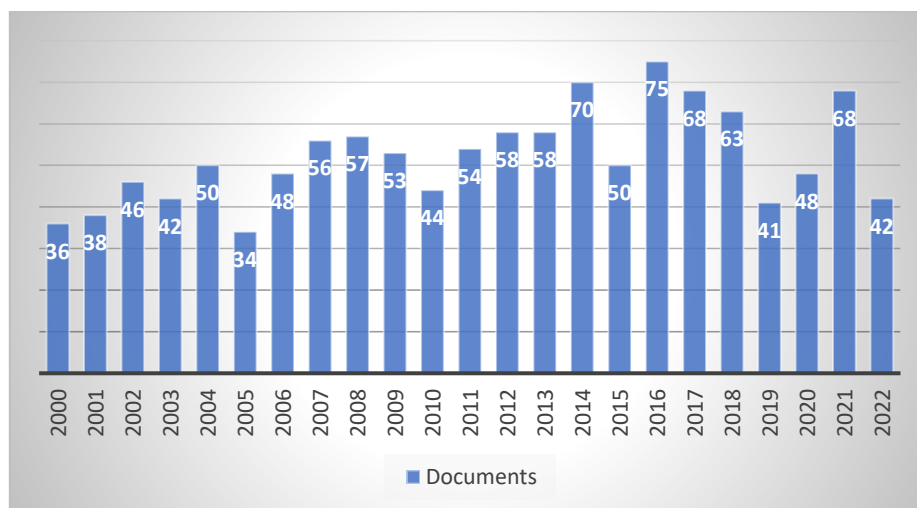

Figure 1: Annual Scientific Production of Literature on Conduct Disorder

Among the 1199 of total documents, 918 are articles which is 77% of the total 1199 documents. There is a total of 133 review (11%), 71 book chapters (6%) and 77 (6%) are others sources (preceding papers, editorial material etc.) as presented in Figure 2.
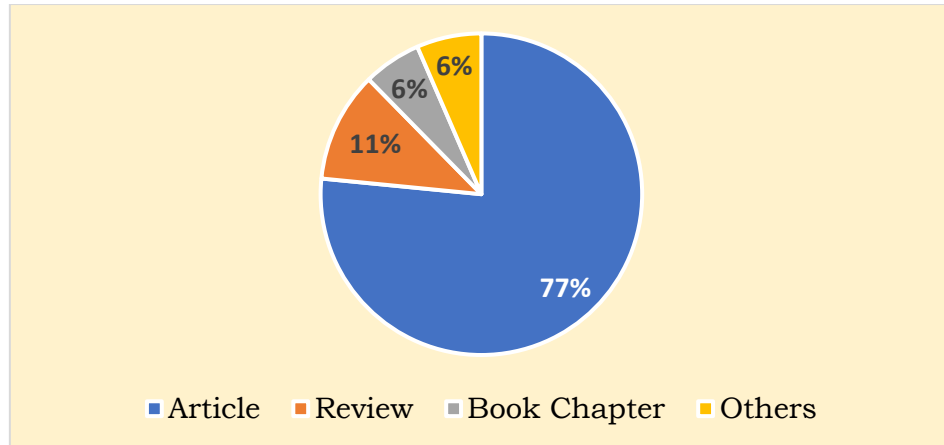
Figure 2: Distribution of Published Work by Type

A total of 3412 authors contributed for a total of 1199 documents on conduct disorder. Among the top ten influential authors, four are form Germany, two are from United States and one each from United Kingdom, Switzerland, Netherland and China. Fairchild, G. is the topmost author with 50 publications on conduct disorder. Followed by him, Stadler, C. and Konrad, K. authored 29 and 26 research works respectively as shown in figure 3.
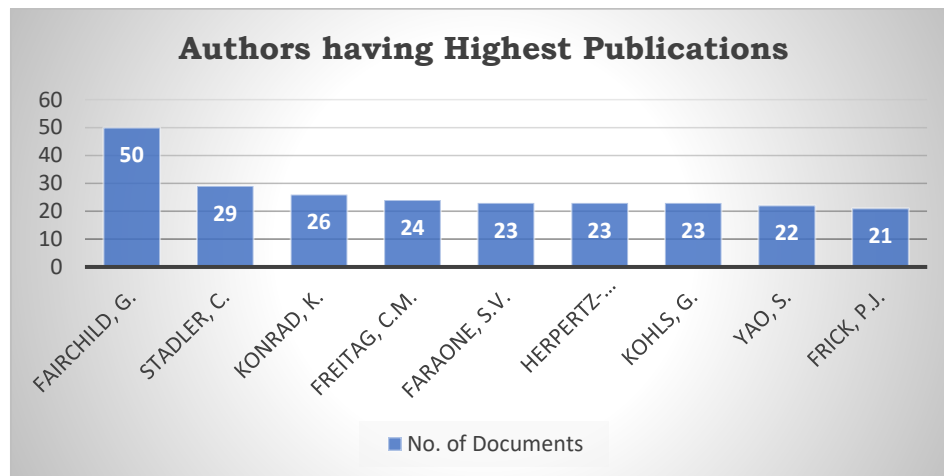
Figure 3: Most Influential Authors in the Field of Conduct Disorder Research

There are a total of 505 journals wherein a total of 1199 documents are published. The 5 most influential journals can be seen in figure 4. The 'Journal of American Academy of Child and Adolescents Psychiatry' is one of the most influential journals in which a total of 53 research documents on conduct disorder were published. A total of 47 documents were published in the 'Journal of Child Psychology and Psychiatry and Aligned Disciplines'. The 'European Child and Adolescent Psychiatry' journal includes a total of 42 documents. The sources named 'Journal of Abnormal Child Psychology' and 'Psychological Medicines' includes 32 and 25 documents respectively on conduct disorder.
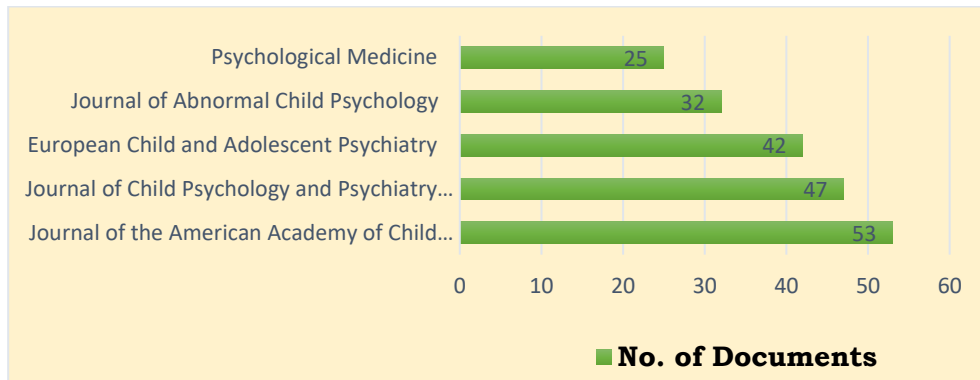
Figure 4: Most Influential Journals

A total of 160 institutes contributed in 1199 documents on conduct disorder. The highest ten institutes are presented in figure 5. Among highest ten institutes in context to number of publications, three belongs to England, two each are from China, Germany and US. The King's College of London is leading institute with a total of 80 publications on conduct disorder.
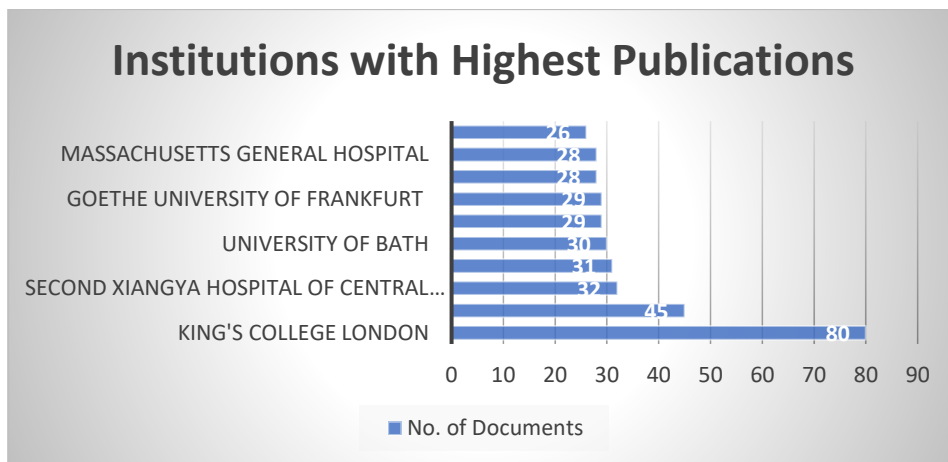
Figure 5: Top Institutes with Higher Number of Publications on Conduct Disorder

The 1199 document on conduct disorder are published by a total of 61 countries. The most influential 10 countries are presented in figure 6. Out of which 553 documents were published by the researchers of United States. The second and third most influential countries are United Kingdom and Germany. Followed by this, Canada, Netherlands, Australia, Switzerland, China, Sweden and Italy are the most influential countries among the 61 of total countries.
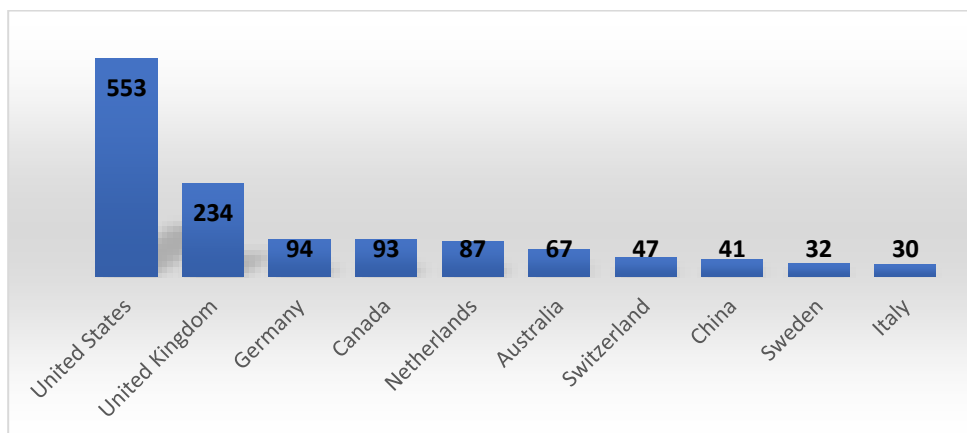
Figure 6: Most Influential Countries in the Field of Research on CD

Analysis of Countries' Collaboration Network

A total of 61 countries contributed research work on conduct disorder. An analysis of collaborative research works conducted by various countries on conduct disorder was conducted. Out of 61 countries, only those countries were included which had minimum number of 12 documents on CD. The network presented the cooperative research work on CD of the authors of 23 countries in 5 clusters. The size of the node reflects the total work published and thickness of the line between the nodes denotes the frequency of collaboration between the two countries. The countries that often collaborate with each other are presented in similar colour. It can be seen in Figure 7 that cluster red includes 6 countries i.e., United States, Australia, China, India, Taiwan, and Brazil. Green cluster includes 5 countries i.e., Canada, Germany, Iran, Switzerland and Hungary. The blue cluster encompasses 5 countries i.e., Belgium, Ireland, Israel, Netherland and Spain. The yellow cluster also includes 5 countries namely Finland, France, Japan, Norway, and Sweden. The last cluster which is purple in colour includes 2 countries i.e., United Kingdome and Italy. The analysis of the collaborative research between the countries revealed that the most significance collaboration exists between United Kingdom and United States; United Kingdome and Netherlands; Germany and Switzerland; Germany and Netherland; United Kingdome and Germany.

Figure 7: Analysis of Countries' Collaboration work on CD

Co-occurrence of Authors' Keywords

Co-occurrence of authors keyword analysis was used in order to map the research areas related to conduct disorder. Co-occurrence of authors' keyword analysis is an effective way to identify the strength of association between different terms included in keywords, titles, abstracts in a specific field of research. It basically highlights the co-occurrence frequency of words or terms linked to each other. Therefore, it is very useful for analyzing as well as describing the key research topics or areas. For creating the co-occurrence keyword network with respect to research conducted on conduct disorder, VOSviewer version 1.6.18 was used. Only those authors' key words were used to create network, which occur 15 or

more times in all the 1199 research documents. The analysis revealed that a total of 41 author keywords occur 15 or more times and these can be classified into eight clusters which are presented in figure 8.

Figure 8: Authors' Keywork Co-occurrence Analysis

The nodes presented in network represents the author keyword whereas the lines represent the co-occurrence of one keyword with other author keywords. The size of the node depends upon the frequency of occurrence of a particular keyword. The big size of the node depicts that the frequency of the usage of the keyword is high. Similarly, the thickness of the lines reflects the relationship strength of author keywords.

From the co-occurrence analysis of authors keywords presented in figure 7, a total of 41 keywords have been found which can be classified into eight clusters. These clusters represent the most highlighted areas or topics of research conducted on conduct disorder. Each cluster is denoted by different colour and labelled by the keyword which occur most of the time. The first cluster, which is red in colour consists of 10 author keywords i.e., anxiety, depression, oppositional defiant disorder, co-morbidity, conduct problems, longitudinal, epidemiology, DSM-5, ADHD and diagnosis. The second cluster which is green in colour comprised of 9 keywords i.e., adolescents, antisocial personality disorder, conduct disorder, delinquency, drug use, genetics, personality, risk factors, and antisocial. The third cluster is presented in blue colour which includes 8 keywords such as anti-social behaviour, callous unemotional traits, empathy, parenting, treatment, sex differences, psychopathy, and emotions recognition. The fourth cluster which is presented in yellow colour consists of 6 keywords i.e., adolescents, children, bipolar disorder, meta-analysis, prevalence and risperidone. The fifth cluster is shown in purple colour and includes 5 keywords such as aggression, impulsivity, antisocial-behaviour, psychopathic traits and violence. The neon blue colour represents sixth cluster which encompasses 2 keywords i.e.,

amygdala and FMRI. The sevenths cluster is presented in orange colour which includes 1 keyword i.e., cortisol and eights cluster consists 1 keyword i.e., gender which is presented in brown colour.

Research studies pertaining to first cluster are focused towards identifying or diagnosing conduct disorder and highlighting the co-morbidity of conduct disorder with other disorders such as ADHD, anti-social personality disorder, anxiety, depression, and oppositional defiant disorder. The cluster highlights that DSM-V is one of the majorly used criteria for defining the meaning of CD as well as identifying or diagnosing a person having CD. One of the possible reasons for it can be that the DSM-V presents very elaborative and reliable criteria for identifying a person having different mental disorders (Clark et al., 2017). Further, the cluster shows the research trends of co-morbidity among CD, ODD, ADHD and other disorders.

There exists lots of similarities between the symptoms of CD and ODD. ODD is basically considered as a precursor of adolescent onset of CD (Syed & Mullick, 2019; Rowe et al., 2010). The co-morbidity among CD and other disorders is very common which enhance the complicatedness of behavioural tendencies to greater extent. About 46% boys having CD are leaned to develop one or more disorders namely anxiety, depression, learning disorders, substance use disorder, etc. Likewise, 36% girls with CD exhibits the symptoms of anxiety, depression and substance use disorder (National Collaborating Centre for Mental Health, 2017). The other behavioural tendencies such as being segregated from the community and involvement in criminal activities is also common among person with CD. The vulnerability to develop Anti-Social Personality Disorder (ASPD) is also high among person with CD (Delisi et al., 2018; Goldstein et al., 2006). Additionally, greater co-morbidity can be seen between CD and ADHD. It is found that 60% adolescents having CD also exhibits the symptoms of ADHD (Gnanavel et al., 2019; Littman, 2022). The co-existence of CD and ADHD is more commonly found in boys as compared to girls (Gnanavel et al., 2019).

The second cluster reflects upon different conditions and risk factors that can enhance the probability of development of conduct disorder. These risk factors include genetics & hereditary factors, adolescent period, drug use disorder, personality, delinquency etc. Genetics, hereditary and neurochemical factors can be responsible for the development of CD in most of the cases. The result of meta-analytical study conducted on around 200 phenotypes, 147,974 monozygotic twin pairs and 192,651 dizygotic twin pairs shows that 50% of the variance in conduct problems can be caused by the genetic influences (Polderman et al., 2015). Besides the genetic factors, the head injuries are the significant predictors of conduct problems among children and adolescents. A huge number of studies evidenced that Traumatic Brain Injury (TBI), interplay to greater extent for the development of conduct problems (Brandt et al., 2022; Gerring et al., 2009; Schachar et al., 2015; Stefan & Mathe, 2016). Adolescents period is also a precursor of conduct disorder. In context to CD in Boys, it is found that the prevalence of CD increases 1.3% at the age of 9-11 years, 6% at age 12-14 years, 11% at age 15-17 years. Similarly with respect to girls, the adolescent period is closely related to the development of CD. The prevalence of CD among girls increases 0.5% at the age of 9-11 years, 3% at the age of 12-14 years and 4% at the age of 15-17 years (Murray, & Farrington, 2010). Besides this, substance use is positively corelated to the development of conduct problems among adolescents (Wymbs et al., 2014). Some of the personality tarits such as high neuroticism, lower agreeableness, and lower conscientiousness are the significant predictors of conduct problems among adolescents (Anderson et al., 2007; Chan et al., 2022).

The third cluster reflects the research studies conducted on callous-unemotional traits and emotion recognition with respect to person having CD. Many studies have highlighted that callous-unemotional trait, i.e., lack of empathy and emotional insensitivity is highly corelated with person having CD. As these people possess a high level of callous-

unemotional traits, they are inclined to display cruelty towards animals and people. There exists lots of studies which revealed the cruel behaviour of children with CD towards animals and people. On such case study conducted by Hirsch (2006) explored that a pre-adolescent girl with CD stole some cats of her neighbour and set them on fire after dousing them in petrol. She done this for her enjoyment as she wants to see the reaction of cats in that particular situation. Likewise, a boy diagnosed with CD badly beat his 9 months old brothers and he also killed around 20 animals like cats, dogs, rabbits etc. (Crider et al., 2018). These examples exhibit that, feelings of remorse and empathy are impaired to a significant level among children and adolescents with CD. Besides the callous-unemotional traits, this cluster also highlights parenting and treatment strategies for reducing conduct problems among people with CD. Various intervention programs have been developed by different researchers which evidenced fruitful results in context to the children and adolescents having CD. For example, FAST Track (Families and schools together) is a comprehensive intervention programe aimed to enhance social and cognitive skills. It also aware parents and teachers regarding the management strategies to help the children and adolescents with CD (Sagar et al., 2019). Similarly, there exists various school and home-based programs which focused on the multiple problematic areas of CD children such as impulsivity, anger, problem solving and decision making, cooperation, empathy, stress, drug use etc.

The fourth cluster shows that most of the conduct disorder research studies have been conducted on adolescents and children. The cluster also reflect that these studies are basically aimed to find the prevalence rate of CD among adolescents and children. Since, pre-adolescent and adolescent period are considered major risk factors for the development of CD, most of the studies have been conducted on pre-adolescents and adolescents. The results of meta-analytical study revealed that the overall prevalence of CD is 8%. It is more commonly related to male (11%) as compared to females (7%) (Mohammadi et al., 2021). The vulnerability of developing CD is five times more in pre-adolescent period (around 11 years) as compared to adolescent period (Patel at al., 2018).

The fifth cluster is highlighting the problematic behavioural tendencies or patterns that are most common among people having CD such as aggression, impulsivity, psychopathic traits and violence. Aggression is one of the most complicated behavioural constructs of person with CD. It is found that physical aggression i.e., hitting, pushing, and verbal attacks are more commonly related to boys having CD. On the other hand, girls are more leaned towards relational aggression i.e., harming someone's social identity or position and spoiling relationships by spreading rumors, gossiping etc. (Ackermann et al., 2019). Additionally, impulsive behavioural tendencies can also be easily traced among person with CD specifically among boys (Giannotta, & Rydell, 2016; Lier et al., 2007). 'Risk taking' is one of the widely exhibited impulsive behavioural tendency of people having CD.

The sixth cluster encompasses the research studies conducted on CD with respect to physiological parameters i.e., amygdala. Since, some of the causes of CD are related to the physiological dysfunctions of a human, the studies focused on finding the role of amygdala in conduct problems. The second important aspect of this construct is that the Functional MRI was used for measuring the neural functioning or responses to particular situations among people with CD. The seventh cluster includes one keyword i.e., cortisol. Many studies have been conducted for analyzing the levels of cortisol as a predictor of disruptive behavioural tendencies among people having CD. The eighth cluster also includes one keyword i.e., gender. A huge number of studies on conduct disorder have been conducted only on boys since, anti-social behaviour is more common among males as compared to females. (Hollingsworth, 2003). Males with CD are more dominated towards exhibiting physical aggression, destruction of public property, theft and serious violation of societal rules. On the other hand, girls with CD are tend to indulge in emotional bullying, rumor spreading, spoiling others relationships etc. (Holliday et al., 2017). In context to

risky sexual contacts, girls are more indulge in sexual relationship with many partners without any safety parameters as compared to boys (Delligatti et al., 2003; Holliday et al., 2017).

Conclusions

The present bibliometric study provides elaborative and deep analysis of the development and structure of research work on conduct disorder. A total of 1199 research documents in English language were retrieved from SCOPUS database, which fall under the duration of 2000 to 2022. The bibliometric analysis revealed that there was gradual increase in the studies on conduct disorder from 2000 to 2022. The majority of documents were published in an article form. Among the 3412 total authors, Fairchild, G. is the most influential author who published 50 research work on CD. Out of 505 journals, 'Journal of American Academy of Child and Adolescents Psychiatry' is most influential journal, wherein a total of 53 documents pertaining to CD has been published. With a total of 80 publications, 'Kings' College London' is one of the most influential institutes in the field of research on CD. Among total 61 countries, United States is the leading country in context to the number of publications on CD. The contribution of developed countries is more as compared to developing countries in context to the publications on CD. Besides this, the analysis of the collaborative research between the countries revealed that the most significance collaboration exists between United Kingdom and United States; United Kingdom and Netherlands; Germany and Switzerland; Germany and Netherland; United Kingdome and Germany

The analysis of co-occurrence of authors' key word reflects the most widely researched areas in the field of CD. It revealed that a huge number of studies have been conducted on identifying the co-morbidity of CD with other disorders such as anxiety, depression, ODD, ADHD etc. Further, it highlighted that risk factors are another important area wherein most of the studies have been conducted to explore risk factors of CD. It reflects that adolescent period, delinquency, drug use, personality, genetics and engagement in antisocial activities are the major responsible factors for developing CD. As the lack of empathy highly reflects in the behavioural tendencies of person having CD, huge number of studies have been conducted to explore different aspects related to callous-unemotional traits, emotions recognition and psychopathology among people having CD. Further, studies focused on examining the prevalence of CD on different levels such as childhood, pre-adolescents, and adolescent. Another highlighted area in the field of research on CD was the problematic behavioural tendencies and constructs of person having CD such as aggression, impulsivity, anti-social behaviour, violence etc. To deeply understand the role of different parts of the brain in developing CD is also an area of interest among researchers. Most of the researchers have studied the role of Amygdala in CD and also focused on the use of Functional MRI in order to understand the different functions of the brain of person having CD. Since, there exists lots of differences in the behavioural tendencies of males and females having CD, many researchers have focused on exploring such differences and reasons behind such differences.

The analysis of co-occurrence of authors' keywords is also helpful for identifying the areas which are important in context to students having CD, but not focused by most of the researchers. One such area is implication of comprehensive intervention programs which can help students to adjust with the classroom and school environment and also assist teachers to learn and apply classroom management strategies. Additionally, examination of the role of peer group and community members in the treatment process of person with CD is also an important area. Also, there exists lack of studies which can explore the significance of various techniques and therapies of counselling for reducing the disruptive behavioural tendencies among person having CD.

The overall analysis revealed that the area of research on conduct disorder is very wide. It is very harmful behavioural disorders for the victim, related persons and

community. However, lots of studies have been conducted to understand the different parameters of conduct disorder. Still there is great need to focus on more school, family and community-based intervention strategies so that the person having CD can be assisted to lead healthy life.

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