

Natural Language Processing Techniques for Cyberbullying Analysis and Prevention

Namrata*

Bhumika**

Aishlay***

Abstract

The increased rate of development of cyberbullying has a great impact on mental health and has an issue that affects both adolescents and children. The paper Literature review on cyberbullying has a high portion of 20% in the United States of America in 2019 and issues raised by bullying. Based on this organized review of the last five years the relevant aspect of the mental health problem “bullying”, is cyberbullying among college children, having an age above 18 years, which is a major problem all over the world. This research analyses children’s mental health difficulties such as depression, anger, violence, anxiety, and even suicidal behaviour. Cyberbullying has a substantial detrimental impact on Children’s mental health, making it a significant health concern during childhood and adolescence. Therefore, more efforts to increase children’s self-perceived social competence and optimism may reduce their depression among adolescents, Teenagers, and Cyberbullying.

Highly raised mental health problems that build among teenagers include anxiety, depression, panic attacks, stress, low self-confidence, suicidal thoughts, loneliness, and nervousness. Adolescents and children are mainly targeted by social media online cyberbullying harms have increased the report in behalf of aggression and disruptive behaviors.

Namrata, Assistant Professor, Gateway Institute of Engineering and Technology, Delhi-NCR, Sonapat, India, Email Id: namrata.gaur@gateway.edu.in

Bhumika, MCA Ist Year Student, Gateway Institute of Engineering and Technology, Delhi-NCR, Sonapat, India

Aishlay, BCA 3rd Year Student, Gateway Institute of Engineering and Technology, Delhi-NCR, Sonapat, India

The study aims to look at the impact of cyberbullying and their mental health of children. The impact of cyberbullying is very bad. Most of the children especially school and college students are facing this problem. The term bullying is related to harming the victim mentally, socially, and physically. Bullying is a form of violence which is increasing day by day. When it is connected with electronic devices then it is called cyberbullying. In recent years, no school and college students have remained untouchable.

Cyberbullying among college children, having age above 18 years, is a major problem all over the world. This research analyzes children's mental health difficulties such as depression, anger, violence, anxiety, and even suicidal behavior. Cyberbullying has a substantial detrimental impact on Children's mental health, making it a significant health concern during childhood and adolescence. Therefore, more efforts to increase children's self-perceived social competence and optimism may reduce their depression ^[1].

Keywords: adolescents, children, risk measures, cyberbullying, stress.

1. Introduction & History

With the evolution of new emerging trends and technologies, human life has changed. With the vast use of the internet and social media, the cases of cyberbullying are increasing. Bullying consists of harassment, abuse, shame, and violence that is carried out frequently. The effect of bullying has a serious impact on victims and most of the time it leads to death. Bullying has a substantial detrimental influence on teenagers' mental health, making it a significant health concern during childhood and adolescence. Cyberbullying occurs when it is combined with technological equipment and gadgets such as a mobile phone or a laptop.



Fig. 1: Attributes of Cyberbullying

Cyberbullying occurs through SMS, Text, and online social media platforms like Facebook, Twitter, and Instagram (Table I). Cyberbullying is a criminal activity that hurts victims' health. The internet or the web plays an important role in performing cyberbullying.

The analysis of the review metadata sheds light on the factors that contribute to victims' adverse experiences and explores best practices and intervention strategies for supporting them. Some risk factors have come into view particularly such as misjudge of cyber behavior and risky behavior among victims, along with reflections of gender, age, mental health, personality, and previous face-to-face victimizations.^[10]

In July 2021, 4,80 billion people worldwide were on social media, almost 61% of the world's total population depicting an annual growth of 5.7% as 7 lac new users had joined per day according to (Digital Around the World, 2021).

Table I. Types of Cyberbullying

- 1) **Cyberstalking:** It involves monitoring, making up allegations, and threatening. It is said to be a severe instance of cyberbullying. Threats to the targeted victim's physical safety could also be used.
- 2) **Trolling:** The bully's only goal is to psychologically damage the victim; they do not share a personal bond. To hurt the victim, they post or comments the texts or emails.
- 3) **Trickery:** This type of cyberbullying involves the bully gaining the victim's trust by making false security promises, then abusing that trust to divulge personal information to a third party.
- 4) **Fraping:** When someone obtains access to the victim's social media account and impersonates them in an effort to make light of the situation or damage their reputation, it's known as framing, which is a serious violation.
- 5) **Doxing:** The term "doxing" refers to the act of a cyberbully intimidating and threatening a victim via the internet in an attempt to exact revenge and invade their privacy. Doxing exposes private information to the public, including credit card numbers, phone numbers, Social Security numbers, and other sensitive information.
- 6) **Dissing:** Dissing is the act of spreading derogatory information about a person online in an attempt to destroy their reputation or sour relations with others. Posting private images, movies, and screenshots is part of this. The victim's buddy or acquaintance can be the one disclosing this information.

Over the past 15 years, the literature has debated semantic distinctions between cyberbullying and cyberstalking (Durkin and Patterson, 2012; Kamali, 2015; Li, 2007). In response to this online threat, the Indian Government launched different helplines, especially for children and

women who need assistance, various complaint boxes, and cyber cells, and made strict legal provisions to curb online offenses.^[11]

According to NCRB, 50,035 cases of cybercrime were reported in India in the year 2020, among which 1614 cases of cyberstalking, 762 cases of cyber blackmailing, 84 cases of defamation, 247 cases of fake profiles, and 838 cases of fake news were investigated. NCRB data¹ reported that cybercrimes in India increased by 63.48% (27248 cases to 44548 cases) from 2018 to 2019, which upsurged by 12.32% in 2020 (44548 cases to 50035 cases). Due to cyberbullying, these youngsters face many issues related to their health like depression, low self-esteem, suicidal thoughts, and even it leads to low academic performance, etc.

According to the World Health Organization's (WHO) report on Health, Behavior in School-Age Children Surveillance (HBSC). This condition is becoming more common in boys and girls between the ages of 11 and 13 but becomes less common as students get older.

Bullying is not a recent occurrence, and it is typically linked to marital abuse. Similarly, Youngsters who observe their parents violently against one another are more prone to bully other children. Bullying is a purposeful action that lasts for long ages of time. cyberbullying is a fairly recent miracle, and it is well organized as a severe public health issue affecting both adolescents and children.

It can be related to sending and posting cruel texts or images with the help of social media and other digital communication devices to harm a victim.

Due to cyberbullying, youngsters, face many issues related to health like depression, low-self-esteem, and suicidal thoughts, and even it leads to low academic performance, criminal activity, deviant sex, infidelity, and other social practices.

Several platforms like Facebook, Twitter, and Instagram, became more popular sources and extremely prompt fast word od maw (David vitch & Yavich, 2016, 2023 Wallbridge 2009).

In the cycle of analysis, the data that can completely grow the use of the internet and online social media has changed the impact throughout the whole life. The result is that the wide use of online social networks, and the potential offer attempt to uncomfortable, social-life problems

among young adolescents. Basically “Cyberbullying is an individual as a fact of embarrassing, harassing and bullying someone, but it comes a factor of general bullying crime. The online appearance of tools like blogs, chat, and social media apps is our mode of interacting with each other, like relatives, friends, and colleagues.

The range vacancy of social media on the internet and its tools, and features, are the specific attractions for today’s young adolescents, who spend their most of time on their daily schedule and waste social media networks. They were not aware of online harm, fraud, or threats that were present in the virtual space.

Let’s take the example of Facebook, which has set guidelines to not register a profile at the age of 13, but many users and youngsters try to create fake profiles above 13 age to build a profile on the FB page. These youngsters or teenagers are mainly concerned about FB to interact with friends or to watch videos and communicate with fellows. In the US Scenario the range of 60-75% of lower age as 9-years old uses the social life. India also found that only 42.9% of school-going have created their social media account.

Accordingly, we found that 19.2% of children among adolescents are bullied through social networks and online programs while 7.9% of children are bullied through electronic video games. Most of children approach the internet or the web with no supervision, or adult control on them. And Specially parents need to alert and aware of on-going online dangers, they need to discuss with the children how to protect yourself from these online dangers, and set the limit no of duration of children can usage on social media platforms.

At the same time, the study establishes that the users mainly communicate with each other colleagues, friends, and relatives, whom they know personally or outside the internet in the real world (AC QUISTI & Gross 2006).

Data on the Prevalence of Bullying and Cyberbullying in Children and Adolescents

Bullying has little effect on high school students, according to the World Health Organization's (WHO) Report on Health Behavior in School-Age Children Surveillance (HBSC). This condition is becoming more common in boys and girls between the ages of 11 and 13 but becomes less common as students get older^[4].

2. Method

After studying, the researcher used a narrative systematic review (NSR) to synthesize existing literature comprehensively. Thematic analysis identified many key factors such as risk factors, impacts, and protective factors. They used many techniques like the Likert scale were used to analyze responses and find correlations between cyberbullying and demographic or behavioral factors. 27 March 2024 Copenhagen, Denmark WHO/Europe has published the second volume of the Health Behavior in School-aged Children (HBSC) study, which examines the trends of bullying and peer violence among young people in 44 countries and regions. While the overall rates of school bullying have remained consistent since 2018, there has been an uptick in cyberbullying, exacerbated by the growing digital interactions among youth, which could have significant effects on young individuals. Some of the main findings are outlined below.

Engaging in bullying others at school. On average, 6% of adolescents participate in bullying their peers at school, with this behavior being more common in boys (8%) than in girls (5%).

Experiencing bullying at school. Approximately 11% of adolescents report being bullied in school, with no noticeable difference between boys and girls.

Engaging in cyberbullying. Around 12% (1 in 8) of adolescents admit to cyberbullying others, with boys (14%) being more inclined to report this behavior than girls (9%). This marks an increase since 2018, with boys rising from 11% and girls from 7%.

Experiencing cyberbullying. About 15% of adolescents (approximately 1 in 6) have encountered cyberbullying, showing nearly equal rates among boys (15%) and girls (16%). This is an increase from 2018, moving from 12% to 15% for boys and from 13% to 16% for girls.

Involvement in physical fights. One in ten adolescents has participated in physical altercations, revealing a notable gender disparity: 14% of boys compared to 6% of girls.

The other factors like:

Depression

Depression is one of the most common factors in the world, with its prevalence steadily growing over time. Depression makes a person feel lonely, hopeless, and like nothing matters. It also affects your daily lifestyle.^[2]

Anxiety

Anxiety is a human emotion commonly characterized by feelings of worry, shivering while speaking, cramps, increased heart rate, unable to stay calm, and sweating. It is a natural response to stress such as before a job interview or before the exam.

Suicidal behavior

Suicidal behavior includes a variety of actions that reflect an individual's desire to inflict harm upon themselves or to take their own life. This can appear in several forms, such as suicidal ideation (considerations of suicide), suicide attempts, and completed suicide. Suicidal ideation refers to thoughts regarding death or self-injury, which can range from brief considerations to comprehensive plans. Suicide attempts are actions taken to end one's life that ultimately do not result in death. Completed suicide is defined as the successful act of taking one's own life.

Anger

Anger is a multifaceted emotion that emerges when people sense a threat or unfairness. It is a natural human feeling that can vary from slight annoyance to extreme fury. When expressed constructively, anger can drive positive transformation and assertive behavior. However, if it becomes persistent or unmanaged, it can have detrimental effects for the individual and those in their vicinity.

3. Literature Review

Various study shows that cyberbullying among students is very common. It can happen at any time. During the COVID-19 pandemic, cyberbullying harmed the mental health of adolescents [5]. Cyberbullying may have increased as a result of increased internet usage for educational purposes, which could have been impacted by the COVID-19 pandemic. The study shows that males were more engaged in cyberbullying. This is consistent with research done on 1917 high school students in industrialized nations, which showed that male students were more likely to bully and be victimized online^{[6][7][8][9]}.

With the widespread availability of personal computers in the 1990s, traditional bullying made its way onto the internet. Children and teenagers have been the victims of cyberbullying from classmates and even strangers, whether it takes place in open chat rooms or private messaging apps. Cyberbullying is also popular in special needs children. Students with disabilities are also affected by it. They should also need safety, but they are also bullied by their classmates (Saylor & Leach, 2009).

In recent years, cyberbullying has become more common among children. It occurs through social media, chats, text, and many more factors are included in it. Cyberbullying has become a major concern for college students, with extensive effects on their mental well-being, academic success, and general health. Recent studies have highlighted the harmful consequences of cyberbullying on this susceptible group. Key Insights from Recent Research: Mental Health Effects: Elevated Levels of Depression and Anxiety: Research consistently indicates a strong correlation between experiencing cyberbullying and increased depression and anxiety levels among college students. Risk of Suicidal Thoughts and Attempts: Studies show that individuals facing cyberbullying are at a higher risk of developing suicidal thoughts and attempting suicide, especially those who endure severe and ongoing victimization. Diminished Self-Esteem and Confidence: Cyberbullying can undermine self-worth and self-assurance, resulting in feelings of inadequacy and worthlessness. Academic Performance: Lower Academic Achievement: Encountering cyberbullying can adversely affect academic performance by disrupting focus, drive, and class attendance. Challenges in Socializing and Building Relationships: Victims of cyberbullying may face social isolation and find it challenging to form meaningful relationships, which can obstruct their academic and personal growth. Physical Health: Physical Repercussions: Cyberbullying may lead to physical issues such as headaches, stomachaches, and problems with sleep. Substance Abuse: Some research has indicated that victims of cyberbullying may resort to substance abuse as a way to cope.

4. Limitation

- Bullying may have a detrimental impact on child physical, social, emotional, academic and mental health bullied children are more likely to Target in schools, colleges.
- Social gap that is observed or perceived.

- Anxiety and depression as well as feelings of sadness and isolation shifts in sleep and daily dietary habits and a lack of interest in previously enjoyed many sports these problems can last well into adulthood.
- Lower student achievements (gap and standardized exam scores) as well as school attendance they have a higher likelihood of missing skipping or drooping out of school.
- Cyberbullying is the use of the internet, electronic and emerging technologies or cell phones to intimidate, warn, harass, humiliate embarrass or otherwise target anyone one of every five (9 to 12-year-old) tweens has been cyberbullied others or has been cyberbullying.
- While analyzing the data on behalf of bullying at school and Cyberbullying, it is important to keep in mind which type of cyberbullying experiences were collected.
- Lack of Awareness: Parents, children, educators, and many people may not be fully aware of the dangers of cyberbullying and know how to address it.

5. Future scope

The future of cyberbullying is closely tied to the swift progress of technology. As digital platforms develop, so will the methods and tactics used by cyber bullies. Below are some anticipated trends and difficulties: Future Trends in Cyberbullying AI-Driven Cyberbullying: Artificial intelligence may be utilized to craft more intricate and tailored cyberbullying attacks, making them more challenging to identify and address. Deepfakes and Synthetic Media: Malicious individuals could produce deepfakes to disseminate damaging rumors or humiliating content about victims, potentially causing significant emotional harm and damage to their reputations. Dark Web and Anonymous Forums: Cyberbullying could migrate to the dark web, complicating tracking and prevention efforts. Metaverse and Virtual Reality: As virtual reality and augmented reality gain traction, new forms of cyberbullying may arise within these immersive digital spaces. Protecting Young People from Cyberbullying To tackle the escalating threat of cyberbullying, a comprehensive approach is essential:

1. Education and Awareness:

Digital Literacy Initiatives: Schools and community groups should introduce thorough digital literacy initiatives to teach young individuals about online safety, responsible use of

social media, and the consequences of cyberbullying. Bystander Intervention Education: Equipping young people to take action when they observe cyberbullying can foster a more supportive online atmosphere.

2. Technological Solutions:

AI-Enhanced Detection Tools: Creating sophisticated AI algorithms to identify and avert cyberbullying on social media platforms. **Enhanced Privacy Features:** Advocating for social media platforms to offer strong privacy features to help users safeguard their data. **Efficient Reporting Systems:** Establishing effective and easy-to-use reporting systems for victims to report cyberbullying incidents.

6. Preventive Measures

Cyberbullying has emerged as a major issue among young people, adversely affecting their mental health and overall wellness. Here are several preventive strategies to tackle this problem:

Education and Awareness Digital Literacy Initiatives: Educational institutions and community groups should establish thorough digital literacy initiatives that inform youth about online safety, responsible social media engagement, and the possible repercussions of cyberbullying.

Bystander Intervention Training: Equipping young individuals with the skills to intervene when they see cyberbullying can foster a more supportive online community.

Parental Involvement and Monitoring Open Dialogue: Parents ought to maintain transparent and sincere conversations with their children regarding their online behavior and the dangers associated with cyberbullying.

Parental Controls: Implementing parental control software to oversee and limit children's online activity.

Digital Family Engagement: Engaging in quality online time with children can enhance trust and provide chances to discuss internet safety.

Technological Solutions Enhanced Privacy Settings: Advocating for social media platforms to offer strong privacy features that assist users in safeguarding their personal information.

Effective Reporting Systems: Creating efficient and user-friendly reporting systems that enable victims to report instances of cyberbullying.

AI-Driven Detection Tools

Advancing the development of sophisticated AI technologies to identify and address cyberbullying on social networks.

1. **Mental Health Support Counseling and Therapy:** Offering access to mental health specialists to aid victims in dealing with the psychological effects of cyberbullying.
2. **Crisis Hotlines and Support Networks:** Setting up crisis hotlines and support networks for victims to seek assistance and connect with others who have faced similar situations. **Community and Policy Efforts Collaborative Approach Among Stakeholders:** Promoting cooperation among schools, parents, tech companies, and policymakers to comprehensively address cyberbullying.
3. **Tougher Legislation:** Passing more stringent laws to hold individuals who engage in cyberbullying responsible for their actions. **Global Collaboration:** Partnering with international organizations to develop worldwide standards and best practices for combating cyberbullying. By taking these preventive actions, we can help cultivate a safer and more positive online atmosphere for young people

7. Conclusion

Now we have to stop Cyberbullying and the most effective measures should be taken to reduce cyberbullying. Parents will play a vital role in reducing or stopping cyberbullying, but there should also be many anti-bullying associations established in schools, colleges, and other institutions. We should call the parents in case of an emergency. This information is vital if you choose to report the bully to the authorities. Sometimes, Bullies frequently use their real names, making it easier for you to identify them. A simple web search can reveal a lot about a person. This data may also include additional information such as social media profiles, residences, employment location, and relationships. Let's work together to stop cyberbullying and make a better future. So, we need to put an end the cyberbullying. **Indian Government Initiatives on Cyberbullying (Paper 1)**(s10639-022-11168-4): This paper highlights the rising issue of cyberbullying in Indian higher education, driven by the widespread use of digital platforms. The authors evaluated Indian government initiatives such as helplines, legal provisions, and complaint mechanisms. Despite these efforts, the increasing prevalence of

cyberbullying indicates the need for more effective policies and awareness programs to address this societal issue.

Cyberbullying **Detection in Roman Urdu (Paper 2)**(s40537-021-00550-7 (1)): This study addresses the lack of research on detecting cyberbullying in Roman Urdu, a linguistically complex language. The authors achieved significant accuracy in identifying aggressive behaviour in online texts by implementing advanced preprocessing and hybrid deep learning models, such as RNN-LSTM and CNN. The findings emphasize the importance of tailored solutions for resource-poor languages to combat cyberbullying effectively.

Cyberbullying and Cyberstalking Victimization Among University Students (Paper 3) (bussu-et-al-2024-cyberb...): Through a narrative systematic review, this paper explores the risks and impacts of cyberbullying and cyberstalking among university students. It identifies significant risk factors, such as prior victimization and mental health issues, and highlights the role of social support as a protective factor. The study calls for comprehensive institutional policies and evidence-based interventions to safeguard students and mitigate the adverse effects of these behaviors.

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