

REVIEW

Adverse Childhood Experiences & mental health – the urgent need for public health intervention in India

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Summary

Global evidence has demonstrated that Adverse Childhood Experiences (ACEs) up to age 18 significantly increases the risk of mental and physical health for an adult. The research linking ACE with health and well-being has confirmed a dose-response relationship between the number of ACEs experienced and the extent of the impact on wellbeing. The source of ACE is the family, community, and the immediate environment, and it causes long-term risk for mental health with the potential to carry it over beyond the present generation. The findings are consistent across the developed and developing countries, and the evidence highlights the

need for new elements beyond the 10 ACE elements in the path-breaking original study. India needs urgent intervention on ACE prevention and management with 0.4 billion children and adolescents, with one out of seven Indians with mental health issues. Firstly, this commentary reviews global research and summarizes the limited evidence available in India on ACE elements' impact on mental health. And, secondly, it proposes a multi-pronged approach to identify, manage and prevent the mental health implications of ACE in India to preempt a significant public health challenge.

Introduction

The last two decades of structured research, primarily in North America and Europe in Adverse Childhood Experiences (ACE), have articulated that exposure to ACEs is associated with an increased risk of mental illness and other chronic conditions, including cardiovascular, respiratory disease, and cancer. In addition, evidence has identified pathways that include neurological, hormonal, and immunological development and the association with increased biomarkers for inflammation and shortened telomeres [1]. The original study used 10 elements of ACE based on the categories of abuse, neglect, and household dysfunction and its role in overall health, well-being, and social function [2, 3]. Since then, accumulating evidence for the negative impact of ACEs on health outcomes in adulthood has highlighted this as a public health concern [4]. The article focuses on India's ACE and mental health implications based on the evidence that ACEs are associated with higher odds of mental disorders, risky behavior linked to poor quality of life, and chronic disease in adulthood after controlling for relevant demographic and socioeconomic factors.

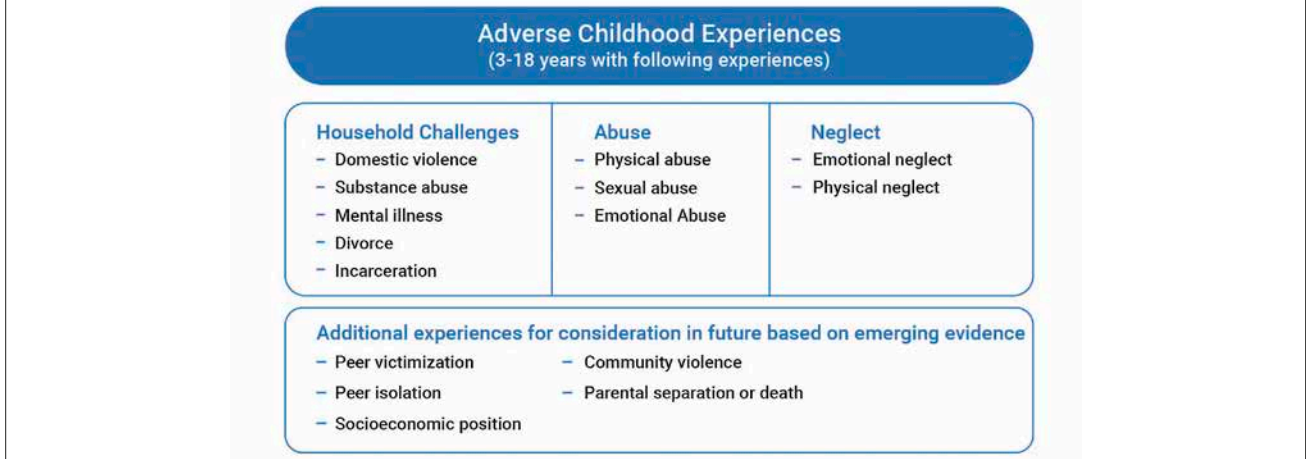
A 2017 study estimated that one in seven Indians was affected by mental disorders. The proportion of mental disorders to the total disease burden in India has almost doubled in 2017 as compared to 1990 and DALY (Disability-Adjusted-Life-Years) contribution due to mental disorders to total DALYs in India reaching 4.7% in 2017 vs 2.5% in 1990 [5]. Given the mental health implications of ACE, India's increasing

share in global disease burden, and the high prevalence of mental health challenges in the population, there is an opportunity to identify critical drivers of mental health in India. With multiple healthcare challenges and limited research on ACE in India, a new approach focused on prevention is necessary in public health to avoid a disproportionate increase in mental disorders.

Global evidence on the impact of Adverse Childhood Experiences on health and wellbeing

The original work, using the 10-point questionnaire (Fig. 1) developed in collaboration with the Center for Disease Control & Prevention, United States, identified a strong graded relationship between the extent of ACE exposure during childhood and the presence of multiple risk factors for several of the leading causes of death in the United States [6]. This questionnaire is validated across several continents for the impact of these 10 experiences on mental and physical health [1, 7]. Since then, newer versions are explored by adding several more adverse experiences such as: (1) peer victimization; (2) peer isolation or rejection; and (3) socioeconomic position (SEP) [8, 9]. WHO has also propagated a new questionnaire by adding two more new elements: (1) community violence; and (2) parental separation or death [10-13]. For the purpose of this review, we recommend focusing on the original 10-point questionnaire based on the established

Fig. 1. Adverse Childhood Experiences and their categories.



processes and scientific evidence of over more than two decades.

Specific research findings highlighted in Figure 2 are captured below:

- **ACE and overall health consequences:** a review of > 250,000 subjects indicated that if the individual experienced 4 or more ACEs, he/she is more likely to experience multiple health outcomes compared to individuals with no ACE. The more ACE elements the individual reports, the higher the risk of health-harming behavior (e.g., smoking, sexual risk-taking) and the likelihood of infectious and non-communicable disease [1, 7, 14];
- **higher risk of developing mental disorder:** the evidence indicates that the dose-dependent risk based on the number of ACE experiences is highest for depression followed by PTSD, borderline personality disorder, and substance abuse [15-17];
- **ACE and physical health implications:** ACE is also associated with obesity, diabetes, inflammatory bowel disease (e.g., ulcerative colitis, Cohn disease), and abnormal pain perception with or without the related body pathology [18];
- **implications beyond the present generation:** Specific outcomes such as violence, mental illness, and problematic substance abuse (correlated with multiple ACEs) can represent ACEs for the next generation through exposure to parental domestic violence, mental illness, and substance abuse [19]. This evidence confirms that the implications of ACE go beyond the present generation into a cycle that includes adversity, deprivation, and ill-health;
- **across developed and developing world:** The work has been extended into some developing and low-income countries, and the findings confirm a similar dose-response relationship between ACE and health outcomes and risk behavior [11, 20, 21]. Evidence estimates that about 319 million adolescents and adults across Europe and 172 million across North America are carrying the legacy of ACE. In addition, about 142 million in Europe and 103 million in North

Fig. 2. Implications of Adverse Childhood Experiences on health and wellbeing.



America are estimated to have multiple ACEs, and these individuals could carry the health-harming behaviors and eventually chronic disease [1];

- **linked to criminal behavior:** A 2015 study on more than 22,000 delinquent youth referred to the Florida Dept of Juvenile Justice indicated that for each additional adverse experience, the child experiences increased risk of becoming a serious, violent, and chronic juvenile offender by 35, while controlling for other risk factors for criminal behavior [22];
- **opportunity to integrate the limitations of existing ACE questions:** While exploring the evidence, it is essential to note the limitations of the existing ACE model that primarily uses 10 questions. Specifically, the model excludes exposure to community violence, lower socio-economic status - the two variables that have out-performed some of the ACEs-10 items [8]. There is also an opportunity to integrate exposure to poverty in the ACE model [23]. While the simplicity

of the ACE questionnaire has generated strong evidence, the experts also argue the need to integrate a more structured approach such as providing a preamble on sensitive questions, add a broader scale vs. just yes and no. However, as captured earlier, the recommendation is to focus on the original 10-questions.

Overall, the evidence confirms a clear dose-response linkage between ACE, adult health behavior, and outcome. The data also indicates that the outcomes extend beyond the present generation. These findings from the global research make a compelling reason to re-apply and create a more integrated approach for measuring and preventing adverse childhood experiences, specifically in mental health care management for India. In other words, the concept of the “inner child” phenomena (a psychosynthesis of all ages from childhood to old age) continues to impact human being’s overall expressions of themselves in the world [24].

Evidence of the work done on ACE or related categories in India

About 19% of the world’s children are in India, and these children constitute 42% of the Indian population (2011 census). 50% of these children are vulnerable and need care and protection [25]. The following points provide the context about the adverse childhood experiences research in India, with a specific focus on mental health:

STUDIES INTEGRATING ALL ACE ELEMENTS TO UNDERSTAND THE IMPACT ON MENTAL HEALTH

In India, very few studies integrate all the ACE parameters to understand its impact on health and well-being [25]. Expressly, the 2019 study in the state of Kerala indicated 91% prevalence amongst the youth who had experienced ≥ 1 ACE, and about 50% of them had experienced ≥ 3 ACEs [26]. Similar to the global studies, this study also found increased odds of having major depression in adulthood (4 times higher). In addition, the study also found that those individuals with family dysfunction had higher odds (2 times higher) of experiencing antipathy and sexual and psychological abuses confirming that the impact of ACE goes beyond the present generation.

STUDIES ON INDIVIDUAL ELEMENTS OF ACE

With limited studies on the impact of multiple ACEs on the individual, it is prudent to review the research about the impact of the ACE elements (Fig. 1) on mental health.

- *Physical abuse*: the first nationwide study in India in 2007 on Child abuse by the Ministry of Women and Child Development indicated a high prevalence among young children (5 to 12 years old). These children were at risk of abuse and exploitation. Specifically, 69% of the 55% abused individuals were boys, and the source of the abuse was parents in most cases. Juvenile justice institutions also have

similar evidence [27]. Physical abuse is the most common form of early trauma experienced in both males and females, leading to suicidal ideation [28]. Another study found that physical abuse at home, sexual abuse, and alcohol abuse were independently associated with suicidal behavior [29]. A cross-sectional study across five states in India of more than 5,000 subjects indicated that adults’ drinking is associated with physical abuse, psychological abuse, and neglect [30, 31]. Thus, physical abuse increases the risk of poor health outcomes and mental health challenges.

- *Childhood Sexual Abuse (CSA)*: a study done in India on CAS indicates that it is significantly associated with mood, substance use, and anxiety disorders in both genders. CSA victims have increased risks for temperamental problems, poor social adjustment, lack of trust, and insecure relations with parents. The literature of the same study indicates that 4-41% of the girls and 10-55% of the boys in school and college students have experienced one form (contact, non-contact, forced) of CSA in India. It also suggests that CSA does not necessarily occur individually but may also co-occur with other ACEs in the same child [32]. Another study on women with serious mental illness reveals that 18 out of 50 respondents reported a history of sexual abuse in their childhood. These abuses ranged from fondling to actual penetration [33]. Evidence has also confirmed the impact of CSA on family and the social function of the individual.
- *Emotional abuse*: a study across different states in India on college students from three different strata, namely medical, engineering, and arts and science college, on 936 subjects found that: (a) 42% of the participants reported that they were referred to as ‘idiot’ during their childhood; (b) around 48% were mocked because of their physical appearance, around 35.8% being called foul names; and (c) 32.6% were blamed for things that were not their fault. Humiliation without any justified cause was reported by around 18.2% of the participants [34]. A study was done on childhood maltreatment among adolescents with child work history on 132 adolescents from different cities like Delhi, Varanasi, and Jaipur. The results indicated that there was a higher proportion of emotionally abused participants compared to non-abused participants who met the criteria for the oppositional defiant disorder (17.5%), panic attack (19%), major depression (9.5%), and dysthymia (25.4%) [27]. Some studies highlighted under physical abuse earlier also included emotional or psychological abuse and confirmed that it is associated with a higher risk of mental health challenges in adulthood.
- *Neglect*: in a state-wide survey in Gujarat, around 30% of the children reported feeling ‘neglected’ [35]. Another study by the Ministry of women and child development (2007) found that around 27% of girls were getting less food than their brothers. Half of

them experienced emotional abuse, but most girls (71%) experienced neglect from their families, and all these maltreatments were associated with poor mental health. The same study on childhood maltreatment among adolescents with child work history indicated that participants with general neglect showed more significant hyperactivity than those who had no such experience. It was also observed that neglect was significant for ADHD (Attention Deficit Hyperactivity Disorder), major depression, dysthymia, bipolar disorder, and eating problems [27].

- *Household substance abuse*: a study on maltreatment among adolescents with child work history from different cities like Delhi, Varanasi, and Jaipur found that parental substance abuse was present in 12.9% of the total sample. The effect of parental substance abuse is significant for generalized anxiety disorder, and dysthymia and it also exhibited a trend for major depression [27].

While the above studies are limited in terms of sample size and geography, the outcome provides sufficient evidence consistent with global findings of the role of several ACE elements and their implications on mental health. In addition, the evidence includes the increased probability of extending the impact of ACE elements in the family to the next generation. Finally, when an individual experiences multiple ACEs, it increases the odds of experiencing long-term mental health challenges.

STUDIES IN THE AREAS NOT COVERED UNDER CORE ACE ELEMENTS

The studies highlighted below explored the elements beyond the original 10-point ACE questionnaire to validate a strong linkage between these elements and mental health. These elements are also part of the familial environment or the community.

- *Bullying*: bullying is reported commonly (70%) and mainly in schools. A study in Gujarat on 2,182 subjects found 199 as bullies, 406 as victims, 924 as bully-victims, and 653 as non-involved. Bullying happened in the classroom while the teacher was away (18.9%), during recess (26.6%), during the prayer session (7%), just after school (21%), and on the way home (12.6%) [35]. Another study found that out of the bullied students, 60.7% of them had significant mental health problems. About 26.1% had some borderline level of mental health problems; significant emotional problems (10.5%), conduct issues (20.3%), hyperactivity-inattention (6.2%), peer problems (16.9%), and low prosocial behaviors (5.7%) [31].
- *Post-Traumatic-Stress-Disorder (PTSD)*: PTSD is a likely outcome based on the ACE elements. A study on the prevalence of PTSD in the Indian context indicated that abuse scored the second highest in average prevalence, around 28%. Along with that, 15 other studies were additionally identified and compared to the prevalence rates of other trauma-related disorders. The most commonly reported prevalence rates of other disorders following exposure to traumatic events

other than PTSD include depression, anxiety disorder, adjustment disorder, and panic disorder [36]. In addition, a study in the northern region of Kashmir in India highlighted that depression and anxiety disorder are major co-morbid psychiatric disorders associated with PTSD [37].

- *Community violence*: despite the history of communal violence across India, there is not much work done in this area [37]. Based on insights from the global study, this area needs further work since community violence contributes significantly towards health outcomes as per the global research findings.
- *Other*: additional findings indicate that childhood maltreatment was linked to likely diagnosis of specific phobia (41.66%), conduct disorder (33.33%), social phobia (30.30%), dysthymia, obsession, compulsion, and so on. Generalized Anxiety, panic attack, and PTSD have been linked to childhood maltreatment.

Overall, the evidence reveals a significant impact on an individual's mental health based on the ACE elements and categories linked to family and the community. Childhood maltreatment or ACEs include physical abuse, sexual abuse, emotional abuse, neglect, and experiences like bullying, community violence, and post-traumatic stress disorder, which harm an individual's mental health.

The challenge for ACE and mental health in India

The evidence highlighted above captures most of the ACE elements from Figure 1. The global and Indian evidence discussed above confirms the significant increase in the odds ratio of health risk behavior and mental health implications as the number of ACE elements increases in the individual regardless of their demographics and geography. For India, while we have evidence on individual ACE elements, there is an opportunity to study the combined impact of multiple ACE elements on an individual's mental health. Several additional insights captured below provide the extent of challenge India is likely to face:

- India has less than 1% of the national healthcare budget allocated to mental health. According to recently published data, about 12% with depression (six states data) and only 40-50% with schizophrenia in India receive care [38].
- Individuals experiencing social and economic adversities have a high prevalence and risk for mental health issues, which adds to India's complexity and risk [39]. Thus, India does not have sufficient funds and professionals to reach out to individuals facing mental health issues today.
- The National Mental Health Survey (2016), the largest survey of mental morbidity in India, estimated that nearly 150 million individuals suffer from one or the other mental morbidity in the country [40]. As captured earlier, the proportional contribution of mental disorders to the total disease burden in India has almost doubled in 2017 compared to 1990 [5].

Despite improvements in various health metrics, India still contributes disproportionately to the global disease burden. For example, considering specific data for suicide rate, India, with 15.7 per 0.1 million population, stacks up higher than the regional average of 12.9 and the global average of 10.6 [41].

- About 10 million Indians aged 13-17 years suffer from severe mental illness, and this number could increase if the entire age spectrum of childhood and adulthood is considered [42]. With the implications of ACE on mental health and the fact that India has the highest number of children and adolescents (0.4 billion together), there is an opportunity to focus on primary prevention of ACE in such a large population [43]. In addition, the environment (family, community) that facilitates the creation of ACE also needs to be identified and addressed.
- Finally, as per the year 2017 data, mental disorders are one of the leading contributors in India to YLDs (Years Lived with Disability) at 14.5%, and its contribution to DALYs (Disability-Adjusted-Life-Years) has increased to 4.7% in 2017 vs 2.5% in 1990 [5, 44].

Together, the above points present a gloomy picture for India and its mounting mental health challenge linked to ACE.

The urgent need for prevention-focused approach

The high prevalence of individual ACE elements and their association with a broad-based negative impact on mental health, family, the social function of the individual, and finally, the DALYs indicate that India needs an aggressive prevention plan [45]. In addition, several factors in the Indian context, such as: (1) strong linkage between childhood adversities and mental health; (2) the increasing proportional burden of mental health; and (3) the complex interconnections between the individual, the family, the community, and the society, highlight a need for a multi-pronged, multi-level (i.e., across social, healthcare, and political levels) intervention focused on prevention.

The prevention approach must include: (a) primary prevention that attempts to prevent all possible ACEs so that children are less exposed to the adversity and are less likely to have their children experience the ACEs; (b) secondary prevention that aims to reduce the immediate and short-term consequences of the experiences; and finally (c) tertiary prevention that treats and reduces the long-term consequences of ACEs [46]. Amongst these ideas, primary prevention will have the most significant individual, and social impact and hence must be the focus for India [47].

Discussions and recommendations

India has a National Mental Health Program since 1982, and the National Mental Health Policy was introduced in 2014, followed by the rights-based Mental Health Care

Act in 2017. Specific programs such as Rashtriya Bal Swasthya Karyakram (RBSK) focusing on adolescent groups and Rashtriya Kishor Swasthya Karyakram (RKSK) covering children from birth to age 18 by the Ministry of Health & Family Welfare have identified mental health as one of the objectives. These platforms are presently available for mental health issues. India also has a strong presence of non-governmental organizations (NGOs) such as Childline, community-based setups, civic forums, etc. While these organizations can help, given many children needing help and the need to prioritize early childhood challenges such as mortality, quality nutrition, etc., there is an opportunity to have a more integrated approach specifically focused on prevention. The program must also include awareness at the grassroots level, education of the child, family, community, and research to drive prioritization and effectiveness. While there is a legal framework supporting the idea, the implementation and enforcement need to be strengthened. For example, a comparison of the number of child marriages in India (43% women aged 20-24 were married before they were 18) and the number of people prosecuted for anti-child marriage law (a few hundred per year, at best), it shows that the law is not enforced [48]. The extent of existing prevalence, inadequate coverage of mental health services, low awareness, and stigma attached to “mental” health conditions further complicate the challenges in ACE prevention. Despite these challenges, it is evident that this work needs to be integrated with existing programs in a multi-pronged manner, focusing on prevention across all levels.

The suggestions below highlight the key recommendations for India (vital elements captured in Fig. 3) to increase the probability of success in controlling the potential escalation in mental health disorders over the next few decades in India:

- *prevention focus*: at each stage of ACE, from occurrence to its implications, the focus must be on prevention as described below [49]:
 - primary prevention: focusing on prevention of the occurrence of ACE through parenting and community efforts,
 - secondary prevention: reducing the severity and acute outcomes of ACE through immediate intervention to prevent short term implications and finally,
 - tertiary prevention: preventing the long-term consequences through programs that can address chronic health implications;
- *public awareness campaign*: the three categories of household challenges, abuse and neglect (Fig. 1) and their implications need broad-based awareness and recall across the family and community level for actionability. Few specific suggestions are captured below [49]:
 - this needs to follow the branding model where the focus is: (a) awareness; (b) recall; and eventually (c) action. This will ensure each person, regardless of his/her role, is empowered to act for prevention. The awareness and recall could include several

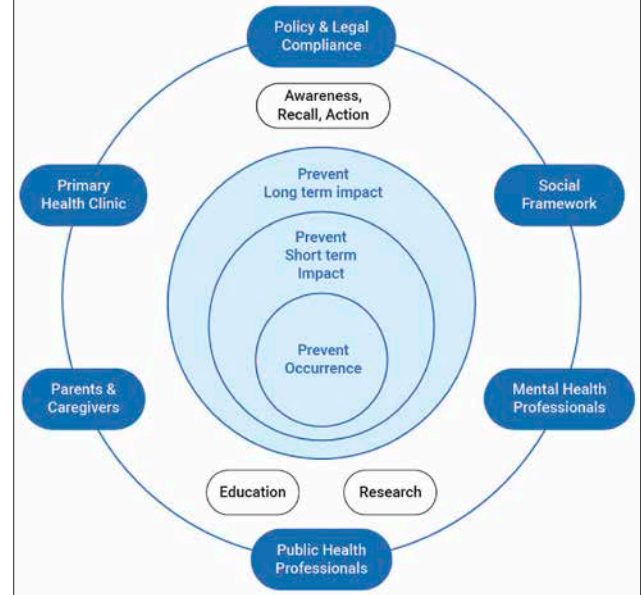
celebrity endorsements, and the action could be coordinated by NGO related social framework,

- the closest contact of the child, i.e., parents, school teachers, and primary health professionals, must be trained to identify and act on the potential subject through this campaign. Education across the cross-functional teams (see below), specifically for parents and teachers driving action, to prevent ACE, must be made mandatory through social media, celebrity, print campaigns, and inclusion in school textbooks. Research has also indicated that efforts to mobilize the men and boys as allies in prevention can help,
- a team consisting of health professionals, political leadership, and social health experts must lead this work, and we recommend enrollment of political leadership.

Given the limited funding for mental health in India and the perception of taboo for mental health, the effort needs to also focus on changing society's perception and belief systems. Despite these challenges, public awareness must form the core backbone of the intervention spanning the healthcare experts, social workers or scientists, the critical population, i.e., family/caregiver, the subject, and the political leadership. Needless to add, public awareness must happen in parallel to activities instead of waiting to get all the answers from the outcomes of other elements. Insights from successful public healthcare campaigns such as polio eradication or Childline could be incorporated into this program [50];

- *cross-functional teams*: the work in this area is complex, and the impact sometimes takes decades or generations to manifest. This complexity requires a holistic intervention involving several healthcare professionals, individuals, families, and communities. Figure 3 captures the list of professionals or individuals needed in the team that includes: (a) Mental Health Professionals; (b) Public Health Professionals; (c) Social Workers; (d) Parents and Caregivers; and finally (e) Primary Health Clinic. These teams must incorporate the primary, secondary and tertiary ACE prevention mindset and work together as one organization;
- *Govt policies and plan*: National Mental Health Policy must propagate the identification and prevention of ACE as a key element for the mental health prevention strategy. RBSK and RBSK frameworks should be modified to include ACE prevention as a core strategy with implementation plans;
- *research linking ACE and mental health*: this work needs to focus on ACE identification and highlight critical elements of the original 10 ACE elements (Fig. 1) with maximum impact on scale and intensity of mental health challenges. A multifunctional team involving public health professionals, mental health professionals, social health experts, and epidemiologists must drive this work. Similarly, learnings from region-specific programs linking poverty or socioeconomic health and mental health

Fig. 3. Proposed approach for integrating ACE framework to enhance the quality of mental health in India.



also need to be woven in [51].

The above points provide a set of ideas to begin a multi-pronged approach to understanding, identifying, managing, and preventing mental health linked with ACE. With more evidence and knowledge, this work could become the core foundation to transform India's mental healthcare scenarios significantly. ACE Prevention is not only essential for the mental well-being of future generations, but it also is critical for India's economic growth [52].

Conclusions

Identifying, addressing, and preventing the combined impact of multiple categories of adverse childhood experiences is a critical driver for reducing the mental health burden India is facing. Extensive global research and early findings from India on the dose-response relationship between ACE and mental health confirm this. With this background and mounting scientific evidence, the review has identified the urgent need for ACE prevention and highlighted the need to expedite the research in this area. India needs to prioritize ACE prevention and management and re-apply insights from work done across developing and developed nations. The recommendation includes a multi-pronged approach driving research, awareness, prevention, education, and management with strong collaboration among mental health, public health, and social health professionals.

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Conflict of interest statement

The authors declare no conflict of interest.

Authors' contributions

Idea generation, structure, global research and recommendations (GYT).

India specific research (NP).

Subject expertise, identification of additional 5 ACE elements, revision to integrate practical aspects.(RGT).

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