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Assessing the Effectiveness of Adverse Childhood Experiences (ACEs) Prevention Programmes in Low-and Middle-Income Countries: An Evaluation Review

Aldani Putri Wijayanti[1], Mirza Muchammad Iqbal[2]
[1] Universitas Diponegoro, Indonesia
[2] University of Glasgow, United Kingdom
Email: aldaniwijayanti@lecturer.undip.ac.id

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Abstract
Childhood adversity manifests in many forms, including inadequate nutrition, child neglect, domestic violence, and lack of parenting awareness. To prevent Adverse Childhood Experiences (ACEs), mental health practitioners have performed some programmes across many countries. However, an evaluation of how the programme is considered effective and feasible for the long term needs to be conducted. Objective: The purpose of the review is to examine the feasibility and effectiveness of all the programmes on ACEs prevention and interventions in LMICs and to think about how, for whom, and under what circumstances the approaches are effective. Setting: Three programmes from low- and middle-income countries (LMICs): Thinking Healthy Programme (THP) performed in Peru, Pakistan, India, Bangladesh, Vietnam, Nigeria, Rwanda, Bolivia, FUSAM in Nepal, and GROSAME from Haiti were carefully assessed. Methods: A critical literature review focused on identified programme characteristics, success and challenges, and critics of the programme. Results: ACEs prevention programs in LMICs settings need a comprehensive view of interventions, high response rates, quantification of eligible patients, and culturally acceptable intervention techniques. LMICs require a comprehensive policy framework to reduce ACEs to make preventative initiatives successful and sustainable. Conclusions: Findings suggest that collaboration and engaging with an extensive range of stakeholders on multiple fronts can reduce the impact of early adversity and trauma..

1. Introduction

Exposure to domestic violence, mental illness, alcohol, and other traumatic life events during childhood can affect individuals while growing up. The impact of this prior trauma is called Adverse Childhood Experiences (ACEs). Felitti et al., in 1998, were the first to carry out a number of investigations on what caused ACEs and categorise it based on the type of trauma, including being physically, emotionally, or sexually abused as a child. Furthermore, Felitti et al. (1998) found that ACEs can be formed through dysfunctional family environments, including substance abuse, mental health problems, criminal behaviour, and domestic violence among family members.

In High-Income Countries (HICs), ACEs prevention programmes have been created. Most low- and middle-income countries (LMICs) have a significant unmet demand for mental health care services.

1.1 ACEs patterns

Abuse, neglect, and other traumatic experiences can impact many domains. These experiences impact health, life well-being, and one's capacity to establish interpersonal relationships with others (Crouch et al., 2020; Huang et al., 2021; Dobson et al., 2020; Sciaraffa et al., 2018). Generally, there are different forms of ACEs', whether they be physical, emotional, or sexual; neglect, whether it be physical or emotional; and dysfunction in the household, whether it be parental absence due to mental illness or criminal activity, substance misuse, or domestic violence (Radford et al., 2022). All forms of maltreatment can occur to children, be it malnutrition (Mehta et al., 2021), school violence and conduct, bullying, or communal violence (Hamai & Felitti, 2022).

Additionally, the traumatic death of a loved one, sudden and frequent relocation, serious accidents, life-threatening illness or injury during childhood, exposure to or participation in pornography or prostitution, natural disasters, kidnapping, torture, war, terrorism, and living in refugee camps are some other types of adversity that have been described as new variations of ACEs (Inoue et al., 2019; Solberg & Peters, 2020). Other studies have focused on identifying ACEs in real-time and have found that growing up in poverty (Crouch et al., 2020), not having friends and being rejected by peers (Lampe et al., 2022), having poor academic performance (Agbaje et al., 2021), witnessing community violence (Lee et al., 2020) are among the significant childhood adversities that are associated with an increased risk of adverse life events and health outcomes throughout the lifespan. Examining short-term behavioural and emotional symptoms during childhood can better understand the association between ACEs and long-term health problems. This can be accomplished by measuring childhood adversity and designing appropriate prevention programmes.

1.2 Consequences of ACEs

Tucker and Rodriguez (2015) argue that ACEs may not only affect the individual who experiences them but also have a more lasting effect that can be passed down to subsequent generations and appear in dysfunctional interactions among members of a single familial unit. One of the most compelling ACEs effects is the potential risk of developing depressive symptomatology during pregnancy (Flanagan et al., 2018). The study's strength relies on rigorous diagnostic tools and confirms that ACEs among pregnant women will affect mother-child interaction. The authors reported the connection between attachment theory and how individuals perceive trauma-related events. This result is comparable to that Hardt et al., (2011) found on bonding that draws the importance of the prenatal 'mother-fetus' relationship.

Hardt et al.'s study also highlight that the presence of a father directly contributes to self-esteem. Both of the studies indicate the importance of early intervention for ACEs and parents to fulfil their role in the early years of their child. Additionally, the absence of a father's role due to drug or alcohol abuse linked to ACEs made participants "missing paternal warmth, directly increases the risk for suicidal ideation" (Hardt et al., 2011).

In another study, Huffhines et al., (2016) adequately conclude the outcomes of ACEs with a high risk of chronic diseases. Children with stress-filled childhoods are more likely to develop heart disease, diabetes, cancer, and other health and social problems throughout their adult life (Huffhines et al., 2016). The approach used in Huffhines et al.'s research is similar to Brown et al., (2010), who writes that ACEs are closely linked with lung cancer and chronic illnesses reported by particular participants who had experienced sexual abuse. Although Brown et al.'s research is likely to have selection bias and considerably has a high attrition rate, this research provides a clear link between the type of ACEs and poor health outcomes and other psychosocial problems such as household dysfunction. Likewise, the more types of ACEs someone holds, the greater biological health risk and consequences to the well-being for the rest of the individual's life (Dyer & Bhadra, 2012).

There is a high risk of multiple ACEs re-occurrence in the next generation and future health problems (Hughes et al., 2017). These precautions help distinguish the categories of ACEs to deliver effective target prevention. Therefore, identifying ACEs and their associated criteria by assessing a history of abuse may aid in the prevention of stress-related disorders.

1.3 Identification of ACEs in Low- and Middle-Income Countries

Identifying the prolonged effect of ACEs on adult health is particularly challenging in LMICs. Given that research about ACEs originated in the US, and most evidence-based interventions are popular in HICs (Thornicroft & Patel, 2014), there is a lack of reliable data available from LMICs. Ramiro et al., (2010) were the first to report ACEs

cases in a developing country, the Philippines, which is highly associated with malnutrition and household crowding. The study has been conducted with locally adapted ACEs Questionnaires, yet fails to address a standardised way to ask questions, as it reduces its objectiveness. Moreover, this research is also subject to recall bias and unwillingness to report past distressing experiences.

However, Engle et al.'s (2007) study reveals health sector has advocated early child development programmes for disadvantaged environments in LMICs, focusing on ameliorating the psychosocial risk factor, prospectively ACEs. While noting the success of some prevention programmes, areas of the standard should be developed by considering ethical constraints and feasibility because the client group of ACEs is considered vulnerable. The way prevention programmes are implemented in LMICs should cover evaluation criteria: availability coverage, accessibility, acceptability, contact coverage, and effectiveness (De Silva et al., 2014). Hamai & Felitti, (2022) argue that a crucial area of concentration is eliminating violent behaviour at home, in the classroom, and within the community. Primary prevention is of the utmost significance since it is so challenging to cure the effects of ACEs once they have already occurred.

1.4 Study Objectives

Research that has been done about ACEs appeared to be based on two broad focuses: (a) the effect of ACEs on mental health; and (b) factors affecting the survivors of ACEs and were conducted in HICs. Meanwhile, there is a lack of discussion on the prevention workforce and its feasibility to deliver in low-resource settings such as developing countries. In addition to health system services, prevention at the population and community levels is essential for ACE earlier detection. This indicates a need to assess effective, readily available, affordable ACEs treatment.

This study aims to discuss three ACEs prevention delivered in LMICs: Thinking Healthy Pilot (THP) in Peru, Pakistan, India, Bangladesh, Vietnam, Nigeria, Rwanda, and Bolivia, Follow-Up of Severely Malnourished Children (FUSAM) in Nepal, and GROSAME, a community mental health programme from Haiti. ACEs prevention programmes aim to reduce the likelihood of children experiencing trauma and adversity in their early years (Adhani et al., 2021). The researchers aimed to fill the gap of community-level ACEs that can be prevented in prevention programmes. These programmes have been proven effective in developed countries, but implementing them in LMICs requires careful consideration of the specific cultural and socio-economic contexts.

2. Materials and Methods

A search was conducted to identify papers and communities focused on ACEs prevention programmes. Researchers use PsycINFO, Web of Science, PsychARTICLES, PubMed, ERIC, PROQUEST, and Google Scholar. Search terms included from the first screening were: adverse child*, adverse childhood experience*, child* adversity, child* trauma, negative child* experiences, and versions or synonyms for each. Following the initial screening, we conducted a second search within similar databases using the term "prevention program*" to ensure both spellings were adequately included. Additionally, the researchers looked for the programmes promoted by Mental Health Innovation Network (MHIN) and applied the same search terms. Due to the type of the study, researchers focused on programmes delivered in LMICs only. We decided to assess some programmes, one of which had been performed a couple of times in different areas (Thinking Healthy Programme). The rest targeted one country, with the lead organisation from a developed country (FUSAM and GROSAME).

The programme must meet several inclusion criteria to be considered for this study. Firstly, they must cover the prevention of any ACEs, including but not limited to all types of ACEs form. Secondly, the studies must examine the effectiveness of primary prevention strategies for ACEs. Thirdly, the study must evaluate a prevention programme that includes children aged 0 to 18. Finally, literature reviews of such articles were included as well.

On the other hand, there are also exclusion criteria. Studies focusing on other types of abuse, such as physical, emotional, or neglect, are not included. Also, studies focusing on prevention programmes for parents, educators, or other professionals working with children are excluded. Lastly, studies that involve children with disabilities or learning difficulties are also not considered.

3. Results and Discussions

The current work critically analyses program design and delivery from the selected intervention program of ACEs in LMICs. The evaluation criteria primarily focus on its feasibility (the possibility of implementation in LMICs)

and its effectiveness (measuring whether or not an intervention does what it is intended to do in a specified population with the best available resources). We examine the prevention performed and assess its methodology. Methodological plurality in LMICs should relate to the sociocultural acceptability of the intervention (Hanlon et al., 2014). Given the various types of ACEs and their prevention rationale conceptualized in HICs, aspects that may enhance or hinder ACEs' prevention will be tailored based on the target population.

ACEs prevention diverged into two: primary prevention, which aims to prevent abuse or neglect of children before it occurs, and secondary prevention, which addresses risks among specific populations to limit the harmful impact of ACEs (Baglivio et al., 2014). This involves putting measures designed to lower the risk of an illness arising in the first place. In other words, preventing ACEs is the primary prevention, while strengthening resilience is secondary prevention. The example of primary prevention manifested in the THP programme and FUSAM, whereas GROSAME represents the type of secondary prevention.

3.1 Feasibility and Acceptability from Thinking Healthy Pilot

3.1.1 Program Design and delivery

Thinking Healthy Pilot (THP) continues the Thinking Health Program, an evidence-based intervention previously conducted in Pakistan, Rwanda, and Bolivia (MHIN, 2018). Additionally, this programme has also been performed in India, Bangladesh, Vietnam, and Nigeria. This intervention has been evaluated as one of the most extensive randomized trials for psychological interventions targeting LMICs. To cater to the issues of perinatal depression, THP was implemented with the help of "*socio en salud"* (Partners in Health). These village-based community health workers are trained to deliver the programme within limited-resources settings. It differs from what has already been done in Pakistan using the service of Lady Health Workers (LHW), non-specialists trained to give first-line psychological interventions. In Peru, LHW changed into Community Health Agents (CHA). The collaboration between CHA and the Ministry of Health of Peru ensures its sustainability through sessions in home-based delivery supervision (MHIN, 2018).

The prevention was monitored on an ongoing basis across houses. Starting from pregnancy until 12 months postnatal, participants received a total of 82 counseling sessions. This prevention of ACEs in pregnant women works in terms of reducing maternal depression and strengthening the mothers' emotional skills.

3.1.2 Successes and Impact

The outcome measures were selected and developed with a survey maternal depression set of questionnaires as primary tools, CHA monitoring the sessions of monthly meetings, respectively. The Ministry of Health also supervises each CHA. The other benefit is the time range of monitoring for pregnant women every three months. Meanwhile, the monitoring for the CHA is per month. This ensures that the service delivered is still under supervision. This program has an influential monitoring group and multi-stakeholder evaluation. A feature of language translation used by CHA also covers the language barriers for the practitioners to educate about maternal depression and help the functioning of mothers.

3.1.3 Challenges and Barriers to implementation

The report shows that none of the women screened for maternal depression showed signs of depression by the end of the intervention. This program ascertains whether or not the result is the direct outcome of THP interventions or general primary care. Some studies also questioned whether Western-pattern 'talking therapy' would fit into local groups (Rahman et al., 2014; Rahman et al., 2013). Some limitations appear in this programme, which may be affected by the funding, as it was the first Peruvian-setting intervention. The programme would have been more relevant if the more extended range of interventions had been delivered in Peru, not only in the northern area of Metropolitan Lima (MHIN, 2018). However, this programme does not conduct its estimated spending, given that the tools used are easily downloaded from useful online resources such as the WHO web, so it is challenging to consider cost-efficient in a developing country.

3.2 Feasibility and Acceptability from FUSAM

3.2.1 Programme design and delivery

Follow-Up of Severely Malnourished Children (FUSAM) is a combined nutrition and psychosocial intervention specifically targeting malnourished children and their mothers. This programme is classified as primary prevention due to its nature to anticipate the development of ACE and to cater current condition of Severe Acute Malnutrition (SAM) (MHIN, 2017). The psychosocial curriculum consisted of five sessions held every two months,

each linked to a visit to a health center every two weeks for an Outpatient Therapeutic curriculum (FUSAM, 2021). Sessions on communication and play, nursing and feeding practice, massage, bathing, sleep and relaxation requirements, and family sharing were all part of the psychosocial intervention. This highlights the need for comprehensive prevention that addresses both aspects to reduce the harmful impact these two factors can have on children's development and overall well-being.

3.2.2 Successes and impact

The programme is designed to equip mothers with the necessary skills and knowledge to identify and handle potential risks of malnutrition, thereby reducing the likelihood of adverse childhood outcomes (MHIN, 2017). The FUSAM programme involved a team of six trained psychosocial workers conducting 630 psychosocial sessions to benefit 211 children and their mothers. A remarkable 52% of the mothers and their children attended at least four or five of these sessions, indicating a high level of engagement. The programme was successful in helping mothers and caregivers improve their knowledge and awareness of proper childcare practices. The programme's effectiveness is currently being evaluated by assessing the percentage of children who have recovered from severe acute malnutrition and the percentage of mothers who have exhibited a decrease in symptoms of depression. This evaluation is critical for determining the success of the FUSAM programme and guiding future interventions in similar contexts.

3.2.3 Challenges and barriers to implementation

The FUSAM programme could not confirm that the inclusion of a psychosocial support intervention had the expected effect on nutritional outcomes for children suffering from SAM because of the substandard treatment protocol applied in Nepal and the lack of complete data on nutrition outcomes (FUSAM, 2021). Both of these factors contributed to the study's inability to determine its sustainability in the long term. As a primary prevention programme, it also requires consistent resources and support to ensure its long-term effectiveness. It is a well-established fact that prevention is always better than cure, and the FUSAM programme is one such initiative that focuses on preventing problems before they occur.

3.3 Feasibility and Acceptability from GROSAME

3.3.1 Programme Design and delivery

In contrast to the previous programmes, GROSAME is more likely to target the already screened population with adversity, classified as secondary prevention. Families that the community mental health workers reach are those who hold the values of parental authority (MHIN, 2015). Society tends to normalize the culture around them, allowing them to educate their children through violence or corporal punishment. This innovation aims to improve children's capacity to cope with adversity and support parenting skills by increasing mental health literacy (MHIN, 2015).

Originally developed in Canada with the name of TELUQ (MHIN, 2015), this project carried out individual and family assessments prior to education regarding the impact of violence on a child's mental health. There are several interventions under this programme. The radio broadcasting programme was considered adequate for knowledge sharing and effective in reaching large numbers of citizens, saving time and resources. Zippy's Friend, a school-based intervention to educate children to overcome their adversities, helps them identify their emotions. Belfer, (2013) analyses both approaches with technology use, and school-based care is the innovation of the 21st century. The emergence of social innovations will outweigh the investment in this era and shape common ground between LMICs and HICs: localizing ACEs prevention to make it contextually acceptable.

3.3.2 Successes and Impact

MHIN (2015) reported that outcomes of the programme, including training of trainers, thematic meetings, radio broadcasting, home visit, workshop, and school-based intervention reaching children 6-7 years old, are increasing mental health awareness. The fact that this programme successfully engaged with local mothers through long-distance training using Skype gave an insight into how technology can support care. This program also answers the significant problems of deliverability on mental health human resource strategies in LMICs by building competencies. Furthermore, this programme combined identifies cultural constructs for assessment and recommends the involvement of communities with particular uniqueness. Intervention for priority areas of violence indicates it has a focus on ACEs. This programme also highlights the importance of early experiences by conducting sessions at schools and home care visits for first-time mothers.

3.3.3 Challenges and barriers to implementation

Even though this programme is likely to be replicated in other regions, this program does not attempt to evaluate its cost-effectiveness. The use of internet technology seems adequate in a region with internet connection problems. This programme also evaluates the lack of policies, funding and services (MHIN, 2015). Therefore, it is difficult to reinforce sustainability. The scarcity of primary resources like housing and food made people focus on covering their primary needs first instead of mental health needs. It is essential to cater to these socioeconomic domains to equip the target population fully. However, these flaws do not reduce its scalability to be implemented in another Haiti region prone to ACEs. Psychosocial well-being can be maintained by reducing environmental vulnerabilities and increasing mental health literacy.

The current work critically analyses program design and delivery from the selected intervention program of ACEs in LMICs. The evaluation criteria primarily focus on its feasibility (the possibility of implementation in LMICs) and its effectiveness (measuring whether or not an intervention does what it is intended to do in a specified population with the best available resources). Moreover, methodological plurality in LMICs should relate to the sociocultural acceptability of the intervention (Hanlon et al., 2014).

Firstly, our research aimed to evaluate the efficacy of three separate programmes and provide a comparative analysis of various prevention options. In light of this, we were able to evaluate the multiple programmes, determine the advantages of each and draw conclusions about how they could be improved in the future. Second, our investigation was carried out in settings with limited resources. We discovered successful techniques for programme implementation that are practicable and sustainable in resource-constrained environments by focusing on these settings. This allowed us to identify effective strategies for programme implementation in LMICs.

Proper nutrition and psychosocial stimulation are crucial for a child's growth and development. The FUSAM program aims to tackle these issues and improve the health outcomes of children. The THP also emphasises the importance of mother literacy and education on child care, which can have long-term benefits for families. Additionally, the GROSAME program aims to reduce household violence by educating and supporting parents on childcare practices.

Given the various types of ACEs and their prevention rationale conceptualized in HICs, aspects that may enhance or hinder ACEs' prevention will be tailored based on the target population. ACEs prevention diverged into two: primary prevention aimed to prevent abuse or neglect of children before it occurs, and secondary prevention addresses risks among the specific population to limit the harmful impact of ACEs (Baglivio et al., 2014). In other words, preventing ACEs is the primary prevention, while strengthening resilience is secondary prevention. The example of primary prevention manifested in the THP program, whereas GROSAME represents the type of secondary prevention.

As discussed above, reasonable evidence supports local efforts to prevent ACEs in primary and secondary prevention schemes. The THP and FUSAM programme works to prevent the multiple ACEs re-occurrence by establishing an excellent nurturing environment for the mother and delivering adequate nutrition for the children. Meanwhile, GROSAME acts as secondary prevention on specific populations prone to domestic violence and produces awareness of ACEs' consequences among participants. Despite the increased effort made by local government and community health workers, ACEs remain increasing. Therefore, the notion of evidence-based care of ACEs should adapt vastly with appropriateness to apply in LMICs, and it cannot gauge solely from the HICs' results. In the future, there is an increasing demand to make a more sustainable effort that serves as early recovery and long-term support for vulnerable children.

In LMICs, ACEs prevention programmes may face several challenges, such as limited resources, inadequate infrastructure, and cultural barriers. However, several strategies can be employed to overcome these challenges and effectively implement ACEs prevention programmes, for example, culturally sensitive approaches. LMICs have different cultural norms and values. Therefore, developing ACEs prevention programmes sensitive to the local culture is important. This can be achieved by involving local communities in the planning and implementation of the program and adapting the program to fit the local context. Additionally, multi-sectoral collaborations. ACEs prevention programmes require collaboration across different sectors, including health, education, social services, and law enforcement. Developing partnerships among these sectors is important to ensure the program's success.

To ensure the sustainability of ACEs prevention programmes, it is essential to build the capacity of local organizations and communities to deliver and manage the program. This includes providing training, resources, and technical assistance. ACEs prevention programmes should be integrated into existing systems and structures, such as schools, health centers, and social services. Monitoring and evaluating ACEs prevention programmes are essential to determine their effectiveness and identify areas for improvement. This should include regular data collection, analysis,

and feedback to stakeholders. In other words, developing a shared perspective among diverse actors is critical to successful collaboration.

Although our study only assessed three programmes, all were carefully performed within low-resource settings. All three programs entailed engagement with diverse stakeholders across multiple levels and were directed towards the foreign governing body as the primary overseer. All three programmes have been specifically formulated to accommodate non-specialists and specialists, such as community workers, health workers, social workers, protection workers, and specialists. Furthermore, they have been strategically designed to function on various platforms, including health and protection systems, and can be implemented by non-governmental organizations or governments. The programmes have also been developed with the ability to adapt to multiple countries, ensuring that they can cater to diverse populations and contexts. The programme generally suggests that modified and educated service providers can deliver psychological therapies remotely. In-person delivery requires trust, rapport, confidentiality, and close monitoring, making these factors crucial for successful remote delivery. Adequate training for remote delivery, access to technology like mobile phones, and maintaining confidentiality are additional considerations when offering remote interventions.

Due to the limited scope of our investigation, one of the most significant drawbacks of the study is the sample, which was only three programmes. As a consequence of this, it is possible that our findings cannot be generalized to other situations or programmes. Our study focused on low-resource settings, so our findings may not apply to higher-resourced settings.

Implementing ACEs prevention programmes in LMICs requires a tailored approach sensitive to the cultural and socio-economic context. By adopting a collaborative, capacity-building, and integrated approach, these programmes can effectively reduce the impact of childhood adversity and trauma. Affordability and cost of care are crucial for interventions in LMICs. It is important to take a broad view of ACEs interventions, collect a high response rate from the participants, quantify eligible patients for ACEs' inquiry, and provide intervention tools that are culturally accepted before implementation is considered. Although ACEs' categories are currently based on Western countries' analyses, this does not cover the possibility that new categories will be found from a different culture in low-resource settings. Otherwise, it is clear from the three programmes discussed previously that many efforts are taken in LMICs using different approaches that will need a comprehensive policy framework to reduce the burden of ACEs.

4. Conclusion

ACEs comprise many categories. Inadequate nutrition, inadequate housing, child neglect due to postpartum depression or lack of parenting skills, and domestic violence are critical issues affecting different populations and countries. All of these cases were covered in ACEs prevention programmes that we studied: THP, FUSAM, and GROSAME. Certain adaptations have been shown to be effective in addressing these challenges. Our research shows that a significant majority of participants experienced positive outcomes from preventive interventions. Efforts to address these challenges have shown promising results in specific populations and countries. Tailored adaptations of interventions have effectively mitigated the impact of ACEs on individuals and families. However, further research in the form of longitudinal studies is essential to ensure the sustained effectiveness of ACEs programs. Long-term evaluations are needed to assess prevention efforts' lasting benefits and potential limitations, allowing for evidence-based adjustments and improvements. In addition to highlighting the importance of addressing ACEs, this evaluation provides a conceptual framework and rationale for a multisectoral approach. Recognizing that addressing these issues requires collaboration and coordination across sectors, integrating global resources and targeted strategies is imperative. By combining the efforts of health, education, social services, and other relevant sectors, a comprehensive response to ACEs can be developed and implemented, maximizing the potential for positive outcomes and long-term impact.

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