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Embodied Costs of Debt Bondage: Work Productivity and Health Outcomes Among Child Brick Kiln Laborers

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ABSTRACT

Debt bondage remains one of the most exploitative forms of child labor, yet limited empirical research has examined its psychological and physical consequences, particularly in relation to productivity expectations. This quantitative study investigates how work productivity moderates the relationship between debt bondage and three dimensions of health: physical, mental, and overall well-being among children employed in brick kilns. Survey data were collected from 383 children aged 5 to 15 years and analyzed using moderated regression models. The results show that debt bondage is significantly associated with declines across all health domains, indicating that increased financial dependence and labor coercion are linked to poorer child health outcomes. Work productivity significantly moderated the association between debt bondage and both physical health (B = 0.22, p = .029) and overall health (B = 0.15, p = .008), while the moderation effect for mental health approached significance (B = 0.08, p = .117). The negative impact of debt bondage on health was strongest among children with low productivity, less pronounced among those with average productivity, and weakest among children with high productivity. These findings suggest that younger, weaker, or malnourished children, who are least able to meet forced labor demands, bear the greatest physical and psychological burden. The study highlights the need for interventions that address systemic exploitation while acknowledging the heightened vulnerability of children who are unable to maintain expected productivity levels.

Keywords: *Brick Kilns, Child Labor, Debt Bondage, Mental Health, Physical Health, Work Productivity*

INTRODUCTION

Despite decades of international advocacy, debt bondage continues to represent one of the most pervasive and insidious forms of child labor worldwide (Masterson, 2021; Sovacool, 2021; Dutta et al., 2020). The International Labor Organization (ILO, 2023; Canton, 2021; Ullah, 2021) identifies bonded labor as a form of modern slavery in which individuals, including children, are compelled to work to repay debts incurred by themselves or their families (Yagci et al., 2023; Altay, 2023; Saqib et al., 2022; Edmonds, 2008). Such debts are often illegitimate, inflated, or structured in a way that makes repayment impossible, perpetuating a generational cycle of poverty and exploitation. While estimates vary due to underreporting, South Asia, particularly India, Pakistan, Bangladesh, and Nepal, remains one of the most affected regions, where bonded labor is deeply entrenched within industries such as agriculture, carpet weaving, and brick manufacturing (Sabrina, 2022; Hammond, 2021; Kara, 2021; Human Rights Watch, 2022).

Within this system, children's labor is not merely an economic contribution but an enforced survival mechanism**.** Families bound by debt often involve their children in physically demanding and hazardous work, both to meet production targets and to reduce the financial burden imposed by kiln owners or contractors (Masterson, 2021; Edmonds, 2022; Gabrielli, 2022; Wondimu, 2022). These conditions expose children to a host of physical and psychological risks, including malnutrition, respiratory illness, fatigue, injury, anxiety, and depression (Kabeer, 2021; Ahmad & Jafri, 2022; Iqbal et al., 2023). However, despite the abundance of descriptive reports on bonded child labor, empirical research quantifying its effects on child health, especially within a psychosocial framework, remains limited (Dutta et al., 2020).

Brick kilns exemplify the structural violence inherent in debt-based labor systems. These kilns rely heavily on seasonal, low-cost labor recruited from impoverished rural areas. Advances or loans are extended to families before the production season, ostensibly as an incentive but effectively as a mechanism of control (Siddiqui, 2020). The debt then binds the entire family, including children, to the kiln until the borrowed amount is repaid. In reality, through deductions, inflated interest, and manipulative accounting, the debt rarely diminishes (ILO, 2021; Kataria et al., 2020).

Children in these settings often start working as early as age seven, engaging in tasks such as clay preparation, brick molding, drying, and stacking that require intense physical exertion under extreme temperatures and poor safety conditions (Feeny et al., 2021; Ndukwu et al., 2021; Yaseen & Khan, 2023). Their workdays may extend from dawn to dusk with minimal rest, and absence from work due to illness or exhaustion frequently results in wage deductions or increased debt (Edmonds, 2022; Mohammad, 2025; Ma, 2025). Effect of clay brick powder and recycled fine aggregates on properties of 3D printed concrete after high temperature exposure. Such exploitative mechanisms render the brick kiln not merely a workplace but an ecosystem of coercion, where debt serves as both an economic instrument and a psychological weapon of control (Butt & Raza, 2025; Khan & Shehzadi, 2021; Evans & Whipple, 2013).

Empirical studies (e.g. Usman et al., 2020) consistently demonstrate that child labor harms both physical and mental health. Physically, children working long hours in tough conditions face stunted growth, chronic fatigue, musculoskeletal pain, and respiratory issues (Mehta, 2023; Safdar & Kataria, 2024). Pawar et al., 2021). The nutritional deficiencies linked to poverty and limited healthcare access worsen these risks. Psychologically, ongoing stress from financial strain, harsh supervision, and lack of autonomy can cause anxiety, low self-esteem, depression, and feelings of helplessness (Riaz et al., 2022; Sharma & Patel, 2023).

From a theoretical perspective, the stress-vulnerability model (Ingram & Luxton, 2005) offers a framework for understanding how exposure to chronic stressors like debt bondage can weaken physical and mental resilience. Extended stress results in dysregulation of physiological systems (e.g., cortisol imbalance, immune suppression) and raises vulnerability to mental health issues. Likewise, the effort-reward imbalance model (Almeida; 2021; Siegrist, 2016) suggests that environments with excessive effort and insufficient reward, such as exploitative labor, cause ongoing strain and negative health effects. Both frameworks highlight how structural exploitation leads to embodied distress among children.

While debt bondage creates an environment of extreme labor pressure, work productivity introduces a paradoxical element. In most occupational contexts, higher productivity is positively associated with reward and recognition. However, within systems of coercion, productivity may reflect endurance rather than empowerment (Kara, 2021). Among bonded children, productivity often depends on physical

strength, stamina, and tolerance to harsh conditions. As such, productivity may serve as a moderating factor**,** influencing how severely debt bondage affects health (Usman et al., 2020).

Children with low productivity, often the youngest, weakest, or least nourished, may be subjected to more punishment, scolding, or intensified work expectations, exacerbating both physical and psychological distress (Jafari et al., 2024; Ahmad et al., 2023). Conversely, those who exhibit higher productivity might experience slightly less punitive treatment, potentially buffering some negative health outcomes. Yet this "buffer" is ethically troubling, as it implies that harm is merely redistributed rather than alleviated (Siegrist, 2016). In this sense, productivity functions as a coping mechanism within a coercive system**,** not as a source of resilience (Heady, 2003).

Moderation analysis allows researchers to examine whether the relationship between debt bondage and health changes depending on the level of another productivity. Theoretically, work productivity could moderate this link because it determines a child's experience of labor intensity, punishment, and perceived worth within the kin hierarchy. Drawing on social stratification and power-dependency theories (Emerson, 1962; Blau, 1964), children who are more productive occupy slightly more favorable positions within the exploitative structure; they may be less frequently punished and granted marginally better treatment (Yaseen & Khan, 2023). Thus, productivity could dampen the health consequences of bondage without reversing them.

However, such moderation is not expected to eliminate harm. On the contrary, the interaction between exploitation and performance pressure may compound physiological exhaustion and emotional suppression (Siegrist, 2016). Productive children might internalize self-worth based on output, masking distress rather than alleviating it. Hence, productivity's moderating role must be interpreted within a broader sociocultural and ethical context; it reflects differential exposure to harm, not true resilience.

Despite the theoretical plausibility of this moderating mechanism, few studies have empirically tested it. Most research on child labor and health has examined direct effects, neglecting how individual differences such as productivity or endurance might shape these associations. Moreover, prior investigations often rely on qualitative or case-based evidence, leaving a gap in the quantitative modeling of the interaction effects between economic exploitation and work performance.

To address this gap, the present study investigates how work productivity moderates the relationship between debt bondage and health outcomes, including physical health, mental health, and overall health among children employed in brick kilns. Building on prior theoretical models, we posit that while debt bondage exerts a uniformly negative influence on health, the magnitude of its impact varies by productivity level. Specifically, less productive children are expected to experience the most severe physical and psychological deterioration, whereas those with higher productivity may experience comparatively less decline.

METHODOLOGY

This study employed a quantitative, correlational research design to examine the moderating role of work productivity in the relationship between debt bondage and health outcomes among child laborers working in brick kilns. The sample was selected through a non-probability purposive sampling strategy, and it comprised 383 child laborers (N = 383) employed in brick kilns located in rural and peri-urban areas of Punjab Province, Pakistan. Participants' ages ranged from 5 to 15 years (M = 10.4, SD = 2.4)**.** The sample

included 64% boys (n = 243) and 36% girls (n = 140)**.** Most of the children belonged to families engaged in kiln work for multiple generations, with 78% reporting that at least one parent was also employed at the same kiln. Educational attainment was low across the sample; approximately 64% of participants had never attended school, while 27% reported irregular attendance due to labor demands. The average daily working time was 10.6 hours (SD = 2.3)**,** with minimal breaks. The majority of participants lived in temporary settlements or brick kiln compounds without adequate sanitation or healthcare facilities. The study protocol adhered to ethical standards for research involving vulnerable populations and received approval from the Ethical Review Committee of the Institute of Social and Cultural Studies (ISCS), University of the Punjab, Lahore**.** Informed consent was obtained from the children's guardians or parents, and assent was secured from the participating children themselves. Researchers emphasized the voluntary nature of participation, confidentiality of responses, and the right to withdraw at any time without repercussions. Data were anonymized, and pseudonyms were used in all documentation. To minimize distress, questionnaires were administered in an interview-based format in the local language (Punjabi and Urdu). Following completion, participants received refreshments and brief psychoeducation about children's rights, safety, and access to local child protection services.

Measurement

Debt bondage was measured using a Bonded Labor Scale (adapted from Kara, 2017; Siddiqui, 2020)**,** designed to capture perceived financial and coercive dependence on kiln owners. The scale consisted of 10 items rated on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Items assessed perceptions of indebtedness ("My family cannot leave the kiln until the debt is repaid"), coercion ("I am forced to work even when I am sick"), and restrictions on mobility or pay. Higher scores indicated greater debt bondage severity. In the current sample, the scale demonstrated satisfactory reliability (Cronbach's α = .82). Work productivity was assessed using a self- and supervisor-rated composite measure adapted from ILO's Child Labor Productivity Index (ILO, 2022)**.** The measure included 6 items evaluating efficiency, endurance, and output per working day (e.g., "I can make more bricks than most other children my age"). Responses were rated on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). The scale captured both perceived and observed productivity relative to peers. Reliability for the measure was acceptable (α = .78). Physical health was measured using a Child Physical Health Inventory (CPHI) developed for field assessment among working children (Ahmad et al., 2023). The 12-item scale covered somatic symptoms such as fatigue, muscle pain, appetite loss, headaches, and respiratory issues (e.g., "I often feel tired or weak while working"). Items were rated on a 5-point scale (1 = *never*, 5 = *always*), with higher scores indicating poorer physical health. For interpretability, scores were reverse-coded so that higher scores represented better health. Cronbach's α = .84 in this study. Children's mental health was evaluated using the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) short form, validated in South Asian samples (Khan et al., 2021). The SDQ includes 25 items across emotional symptoms, conduct problems, hyperactivity, peer problems, and prosocial behavior. A total difficulty score was derived, and higher values reflected greater psychological distress. For consistency with the physical health variable, this score was also reverse-coded, so higher values indicated better mental health. The SDQ demonstrated strong internal consistency (α = .86).

Overall health was computed as a composite z-score averaging standardized scores of physical and mental health, producing a single indicator of general well-being (as recommended by Hayes, 2018). This

composite reflected an integrated measure of both physical and psychological functioning, enabling more comprehensive testing of the moderation model.

Data collection occurred between March and July 2024 in three major kiln clusters near Lahore, Kasur, and Sheikhupura districts. Data were collected through structured interviews, typically conducted in shaded outdoor areas adjacent to the kilns. Each session lasted approximately 35–45 minutes. Given participants' limited literacy, questions were read aloud in their native language, and responses were recorded by the interviewer. Supervisors provided information regarding each child's average daily output, which was cross-verified with the child's self-report to construct the productivity index. Health-related items were phrased carefully to avoid medical jargon, focusing on children's subjective experiences. At the end of each interview, participants were debriefed and given child protection helpline contacts.

Data were analyzed using IBM SPSS Statistics (Version 27**)** with the PROCESS macro (Model 1) developed by Hayes (2018).

RESULTS

Table 1.

Moderating Effects of Work Productivity between Debt Bonding and Physical Health (N= 383)

Predictor / Condition	**B**	**SE**	***T***	***p***	**95% CI (LL, UL)**
Model Summary					
$R = .184$, $R^2 = .034$, $F(3, 379) = 4.44$				.004	
Main Effects and Interaction					
Constant	3.99	0.99	4.03	.000	[2.04, 5.93]
Debt Bondage (DB)	-0.57	0.25	-2.30	.022	[-1.06, -0.08]
Work Productivity (WP)	-0.77	0.40	-1.94	.054	[-1.56, 0.01]
DB × WP Interaction	0.22	0.10	2.19	.029	[0.02, 0.42]
ΔR^2 for Interaction	.012	—	4.80†	.029	
Conditional Effects of DB at Levels of WP					
Low WP (2.14, 16th percentile)	-0.10	0.04	-2.60	.010	[-0.18, -0.03]
Medium WP (2.43, 50th percentile)	-0.04	0.02	-1.92	.056	[-0.08, 0.00]
High WP (2.86, 84th percentile)	0.05	0.04	1.27	.207	[-0.03, 0.14]

Table 1 presents findings from a moderated regression analysis that examined whether work productivity influences the strength of the relationship between debt bondage and physical health among child laborers. The results show that the overall model is statistically significant, explaining approximately 3.4% of the variance in physical health scores ($R^2 = .034$, $F(3, 379) = 4.44$, $p = .004$). While the explained variance may seem modest, it highlights the meaningful role that economic and labor-related factors play in shaping children's physical well-being.

Debt bondage was found to have a significant negative association with physical health ($B = -0.57$, $p = .022$), suggesting that as the level of debt bondage increases, children's physical health tends to deteriorate. Although work productivity showed a negative relationship with physical health ($B = -0.77$, p

= .054), this effect was only marginally significant. However, it suggests that more productive children may be overworked, leading to physical strain or exhaustion.

The most critical aspect of this analysis lies in the significant interaction between debt bondage and work productivity (B = 0.22, p = .029). This indicates that the negative effect of debt bondage on physical health is not uniform but varies depending on the child's productivity level. Specifically, the harmful impact of debt bondage appears to weaken as productivity increases. Conditional effect estimates further clarify this relationship: at low productivity levels (16th percentile), debt bondage significantly predicts poorer physical health (B = −0.10, p = .010), whereas at average productivity (50th percentile), the effect becomes marginal (B = −0.04, p = .056). At high productivity levels (84th percentile), the effect reverses and becomes non-significant (B = 0.05, p = .207), indicating no meaningful harm at this level.

Table 2. Moderation Analysis Predicting Mental Health from Debt Bondage and Work Productivity (N = 383)

Predictor / Condition	**B**	**SE**	**T**	**p**	**95% CI (LL, UL)**
Model Summary					
$R = .376$, $R^2 = .141$, $F(3, 379) = 20.81$	—	—	—	.000	—
Main Effects and Interaction					
Constant	2.45	0.51	4.81	.000	[1.45, 3.46]
Debt Bondage (DB)	-0.28	0.13	-2.18	.030	[-0.54, -0.03]
Work Productivity (WP)	-0.27	0.21	-1.32	.189	[-0.68, 0.13]
DB × WP Interaction	0.08	0.05	1.57	.117	[-0.02, 0.18]
ΔR^2 for Interaction	.006	—	2.47†	.117	—
Conditional Effects of DB at Levels of WP					
Low WP (2.14, 16th percentile)	-0.10	0.04	-2.60	.010	[-0.18, -0.03]
Medium WP (2.43, 50th percentile)	-0.04	0.02	-1.92	.056	[-0.08, 0.00]
High WP (2.86, 84th percentile)	0.05	0.04	1.27	.207	[-0.03, 0.14]

Table 2 showing that work productivity moderates the relationship between debt bondage and mental health among children working in brick kilns. The overall model is statistically significant, accounting for approximately 14.1% of the variance in mental health outcomes ($R^2 = .141$, $F(3, 379) = 20.81$, $p < .001$). This indicates that the combined influence of debt bondage and work productivity contributes meaningfully to understanding the mental well-being of child laborers.

The main effect of debt bondage on mental health was significant (B = −0.28, p = .030), suggesting that higher levels of debt bondage are associated with poorer mental health among children. This relationship reflects the psychological burden of being trapped in exploitative labor conditions, where financial obligations imposed on families severely impact children's emotional and cognitive well-being. However, the direct effect of work productivity on mental health was not statistically significant (B = −0.27, p = .189), indicating that how productive a child is at work, in itself, does not have a clear-cut influence on their psychological health.

Of particular interest is the interaction between debt bondage and work productivity, which approached but did not reach statistical significance (B = 0.08, p = .117). While not strong enough to be conclusive, this result hints at the possibility that work productivity might slightly buffer or alter the effect of debt bondage on mental health, albeit in a less pronounced manner than it does for physical health. The conditional effects analysis offers further insights. Among children with low work productivity (16th percentile), debt bondage significantly predicted worse mental health outcomes (B = −0.10, p = .010), revealing that those who are less productive are more psychologically vulnerable under debt constraints. At average productivity (50th percentile), the effect was weaker and only marginally significant (B = −0.04, p = .056). For children with high work productivity (84th percentile), the effect was not significant (B = 0.05, p = .207), indicating that the adverse psychological impacts of debt bondage may lessen as children's productivity increases.

Table 3. Moderation Analysis Predicting Overall Health from Debt Bondage and Work Productivity (N = 383)

Predictor / Condition	**B**	**SE**	**t**	**p**	**95% CI (LL, UL)**
Model Summary					
R = .302, R^2 = .091, F (3, 379) = 12.69	—	—	—	.000	—
Main Effects and Interaction					
Constant	3.22	0.56	5.80	.000	[2.13, 4.31]
Debt Bondage (DB)	-0.43	0.14	-3.05	.002	[-0.70, -0.15]
Work Productivity (WP)	-0.52	0.22	-2.33	.020	[-0.96, -0.08]
DB × WP Interaction	0.15	0.06	2.67	.008	[0.04, 0.26]
ΔR^2 for Interaction	.017	—	7.15†	.008	—
Conditional Effects of DB at Levels of WP					
Low WP (2.14, 16th percentile)	-0.11	0.02	-4.73	.000	[-0.15, -0.06]
Medium WP (2.43, 50th percentile)	-0.06	0.01	-5.29	.000	[-0.09, -0.04]
High WP (2.86, 84th percentile)	0.00	0.02	0.10	.919	[-0.04, 0.05]

Table 3 reveals how work productivity moderates the relationship between debt bondage and overall health (a composite of both physical and mental well-being) among children working in brick kilns. The full model was statistically significant, explaining approximately 9.1% of the variance in overall health scores (R^2 = .091, F (3, 379) = 12.69, p < .001). This suggests that debt bondage and work productivity, together with their interaction, meaningfully contribute to understanding the health outcomes of these children.

The main effect of debt bondage was negative and significant (B = −0.43, p = .002), confirming that as children's exposure to debt bondage increases, their overall health deteriorates. This deterioration likely reflects both the physical exhaustion and mental stress that come with being forced into labor to help settle a family's debts. Similarly, work productivity had a significant negative relationship with overall health (B = −0.52, p = .020), suggesting that higher work demands or expectations, even among those who are more productive, take a toll on children's well-being. The adverse impact of productivity in this

context may stem from the increased physical strain and emotional burden placed on children to perform under exploitative conditions.

Crucially, the interaction between debt bondage and work productivity was significant (B = 0.15, p = .008), indicating a moderating effect. This means that the extent to which debt bondage harms a child's overall health varies depending on their level of productivity. Specifically, children with low productivity (16th percentile) experienced a pronounced negative impact of debt bondage on their health (B = −0.11, p < .001). At the median productivity level (50th percentile), the effect remained strong and statistically significant (B = −0.06, p < .001), although somewhat reduced. However, for children with high productivity (84th percentile), the effect of debt bondage on overall health was effectively null (B = 0.00, p = .919), suggesting that the health impact of debt bondage may be somewhat blunted in children who are able to meet or exceed productivity expectations.

DISCUSSION

The present study examined the moderating role of work productivity in the relationship between debt bondage and health outcomes among child laborers in the brick kiln sector of Pakistan. Grounded in ecological and occupational health frameworks, the study demonstrated that debt bondage significantly predicted poorer physical, mental, and overall health. However, work productivity moderated these associations, attenuating the strength of the negative effects. These findings illuminate both the profound harm of coercive labor conditions and the adaptive, though complex, function of productivity under constrained circumstances. Consistent with expectations and prior literature (Human Rights Watch, 2022; Khan & Ahmed, 2020), the results confirmed that debt bondage a hallmark of contemporary slavery has pervasive consequences for children's health and psychosocial functioning. High levels of bondage were associated with more physical complaints (e.g., fatigue, pain, injury) and reduced psychological well-being (e.g., anxiety, hopelessness, irritability). These outcomes are congruent with the cumulative stress model (Evans & Kim, 2013), which posits that chronic exposure to uncontrollable demands such as poverty, coercion, and physical overexertion depletes both physiological and psychological resources, increasing allostatic load and health vulnerability. However, the moderating role of productivity provided an intriguing nuance. Productivity functioned as a buffer, weakening the detrimental association between bondage and health. Children who maintained relatively higher productivity levels under bondage reported better physical and mental health than those with low productivity. While at first this finding may appear paradoxical, given that higher productivity usually entails greater workload it may reflect several psychosocial mechanisms (Kataria et al., 2020).

First, perceived competence and mastery experiences could contribute to resilience (Nadeem & Usman, 2022). Within the self-determination framework (Deci & Ryan, 2000), even minimal autonomy and competence in one's tasks can foster self-efficacy and psychological stability. Children who can meet or exceed production expectations may derive a limited sense of control and achievement, reducing feelings of helplessness. Second, social reinforcement from supervisors and family members may provide emotional validation. In bonded labor systems, productivity often earns temporary leniency or approval, potentially diminishing conflict and fear (Raza & Javed, 2021). Lastly, productive children may have better nutrition or physical strength due to family resource allocation or prior experience, indirectly protecting health.

Nonetheless, this buffering effect should not be interpreted as adaptive normalization of bondage**.** The moderation results reveal mitigation, not immunity; even high productivity does not eliminate the harmful impact of bondage it merely reduces its intensity. In other words, productivity functions as a coping mechanism within oppression**,** not a pathway to well-being. The persistence of significant main effects of debt bondage underscores the structural violence embedded in such labor systems (Bales, 2016).

These findings align with prior research documenting the link between exploitative child labor and poor health outcomes (Fassa et al., 2019; ILO, 2021). Studies in South Asia have consistently reported that brick kiln children suffer musculoskeletal injuries, chronic respiratory issues, malnutrition, and mental distress stemming from long working hours and social exclusion (Khan et al., 2021; Malik & Nafees, 2022). The current study expands on this by identifying work productivity as a psychological moderator, offering a more dynamic understanding of how children's behavioral engagement interacts with coercive contexts.

In contrast to studies focusing solely on external conditions (e.g., workload, exposure to toxins), the current research integrates psychosocial and behavioral dimensions. Productivity here is not merely economic output but a behavioral indicator of engagement, effort, and possible coping. This echoes findings from child resilience literature showing that goal-directed behavior and perceived competence can temporarily buffer emotional distress in adversity (Masten, 2014). However, the long-term sustainability of such compensatory resilience is questionable. When high productivity reinforces exploitative systems by reducing perceived urgency for reform, it may inadvertently perpetuate harm, a dilemma that demands ethical consideration (Usman, 2017).

The results also resonate with occupational health models**,** particularly Karasek's (1979) Demand-Control Model, which suggests that health outcomes depend not only on work demands but on perceived control and capacity to meet those demands. Within the kiln context, productivity may symbolically represent "control" or mastery albeit within constrained limits helping some children mitigate psychological strain. However, the structural reality remains one of high demand and negligible autonomy**,** indicating that such "control" is superficial and contextually distorted.

Implications

- The persistent association between bondage and poor health supports the urgent need for enforcement of child protection and anti-slavery laws in Pakistan, including the Bonded Labor System (Abolition) Act (1992). Monitoring mechanisms should incorporate psychological and health indicators, not solely economic criteria.
- Productivity should be redirected from kiln work toward skill-building and education**.** NGOs and governmental agencies might frame interventions to transform children's task engagement (e.g., brick molding) into transferable skills (e.g., craftsmanship, coordination) within vocational or school contexts.
- Mental health professionals working with rescued or at-risk children should recognize productivity behaviors as potential coping expressions**.** Therapeutic efforts can focus on rechanneling this drive into constructive self-efficacy, rather than guilt-driven compliance. Trauma-informed interventions emphasizing body awareness, emotional regulation, and self-worth reconstruction are recommended.

- Since brick kiln operations often involve intergenerational bondage, sustainable change requires family-level debt relief programs coupled with microcredit or livelihood support. Awareness campaigns targeting kiln owners should highlight the long-term economic benefits of humane labor practices, such as reduced turnover and improved quality of production.

Limitations

- First, the cross-sectional design precludes causal inference; longitudinal research is needed to examine how productivity and health trajectories evolve within bondage systems.
- Second, the use of self-reported measures, though adapted and orally administered, may be influenced by social desirability or comprehension limitations, particularly given low literacy levels.
- Third, contextual constraints restricted random sampling; thus, generalization beyond the sampled districts should be made cautiously.
- Fourth, productivity measures were based partly on supervisors' observational logs**,** which might be biased by labor hierarchies or favoritism. Future research could integrate direct observational and physiological data (e.g., wearable health monitors) to strengthen objectivity.
- Finally, cultural and gender differences in coping and productivity were not explored in depth; qualitative studies could uncover how children construct meanings around work, effort, and survival.

RECOMMENDATIONS

- Building on these findings, future investigations should explore the longitudinal dynamics of bondage, productivity, and health across developmental stages. Integrating biopsychosocial markers such as cortisol levels, sleep quality, or emotional regulation capacity could elucidate mechanisms underlying resilience and deterioration.
- Moreover, intervention-based research could test whether structured productivity redirection (e.g., supervised skill learning) enhances psychological recovery among rehabilitated child laborers. Mixed-methods studies combining ethnography and quantitative analysis would provide a deeper understanding of the subjective experience of "being productive" under coercion.

CONCLUSION

This study contributes novel evidence to the understanding of debt bondage as a determinant of child health, demonstrating that while productivity may temporarily mitigate harm, it does not neutralize the structural violence inherent in forced labor. Productivity's buffering effect reveals the paradox of resilience under oppression: it helps children survive but simultaneously maintains their entrapment. To address the physical and psychological toll of bonded child labor, comprehensive strategies are required, combining legal enforcement, psychosocial rehabilitation, education access, and economic alternatives. The findings underscore the moral imperative of shifting the discourse from productivity preservation to dignity restoration, ensuring that no child's health or humanity is sacrificed for the illusion of efficiency.

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