Towards a Relational Understanding of Vulnerability in Global Health

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Abstract
Global health scholarship has increasingly recognised the importance of social determinants in shaping health outcomes. Yet vulnerability is still commonly understood either as an individual condition or as the effect of broad structural disadvantage. Comparatively less attention has been devoted to the relational processes through which vulnerability is produced and experienced. This article proposes the concept of relational vulnerability, defined as a condition shaped by the density, quality, asymmetry and absence of social ties. It develops a parsimonious analytical framework based on these four dimensions and introduces relational epidemiology as a complementary perspective for examining how health inequalities emerge through relational contexts. Rather than replacing existing approaches, this perspective extends them by showing how vulnerability is constituted, mediated and reproduced through social relations.

Keywords
Global Health, Relational Vulnerability, Relational Epidemiology, Health Inequalities, Social Determinants of Health, Relational Sociology.

1. Introduction

Global health has increasingly moved beyond a strictly biomedical paradigm, giving greater attention to the social and economic conditions that shape health outcomes. Sociological research has contributed significantly to this shift by showing how inequalities, stigma and institutional arrangements influence patterns of disease, access to care and experiences of illness [1,2]. At the same time, longstanding sociological traditions have emphasised that health and illness are embedded in social relations and interactions rather than reducible to individual characteristics alone [3]. More recent contributions have also called for renewed attention to relational and ecological dimensions within epidemiological thinking [4,5,6].

Within this broad literature, the relevance of social relations for health is well established. Research shows that social integration, support, isolation and relational stress significantly influence morbidity and mortality [7,8]. Other studies have examined the effects of loneliness, social disconnection and network

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structures across different populations [9,10,11]. However, although relational factors are widely recognised, they are often treated as secondary variables within broader explanatory models rather than as a central lens for understanding vulnerability.

In dominant global health frameworks, vulnerability is still commonly conceptualised either as an individual condition or as the outcome of structural disadvantage. Even in influential approaches to the social determinants of health, factors such as income, education and housing are typically analysed as distinct variables [12,13]. While this perspective remains essential for identifying patterned inequalities, it often leaves less visible the relational processes through which health risks are mediated and experienced in everyday life. Debates in social epidemiology and population health have increasingly questioned the limits of variable-based approaches and called for more integrative, process-oriented frameworks [5,6].

This article develops that line of reflection by proposing the concept of relational vulnerability. Drawing on relational sociology [14,15], it argues that vulnerability should be understood not only in terms of individual attributes or structural locations, but also through the configuration, quality, asymmetry and absence of social ties. In this sense, vulnerability is approached as a relationally constituted condition, shaped by patterns of interaction, dependence, support and disconnection.

On this basis, the article advances a parsimonious analytical framework organised around four interconnected dimensions: relational density, relational quality, relational asymmetry and relational absence. It also introduces the idea of relational epidemiology as a complementary orientation for examining how health inequalities emerge through relational contexts. Rather than replacing existing approaches, this perspective extends them by making more explicit the relational mechanisms through which vulnerability is produced, mediated and reproduced across different settings.

2. Relational Vulnerability: A Conceptual Framework

Sociological work on health has consistently shown that illness and well-being are shaped by social conditions and interactions [3]. At the same time, a substantial body of research has demonstrated that social ties, networks and forms of integration play a significant role in influencing health outcomes [7,8,11]. However, these insights have not always been translated into a framework that systematically captures how vulnerability itself takes shape through concrete relational contexts. Much of the existing literature focuses on describing social conditions or identifying correlations, while paying less attention to how such conditions operate through everyday relational processes [5,6].

The concept of *relational vulnerability* is introduced here as a way of systematising these insights. It refers to a condition in which exposure to health risks is shaped by the configuration, quality and imbalance of social relations, as well as by their absence. In this sense, vulnerability is not approached as an individual attribute, nor solely as a structural position, but as a relationally constituted condition emerging through interactions, dependencies and disconnections over time [16].

In this view, individuals are not simply "vulnerable" in

themselves; rather, they become more or less vulnerable depending on how they are positioned within networks of relationships. This helps explain why individuals with similar socio-economic characteristics may experience different health trajectories depending on the relational environments in which those characteristics are lived. Such a perspective is particularly relevant in global health research, where populations are often treated as relatively homogeneous groups defined by socio-economic indicators, while internal differentiation linked to relational configurations remains less visible.

To clarify this approach, four analytically distinct but empirically interconnected dimensions can be identified.

1. *Relational density* refers to the extent and frequency of meaningful social ties through which individuals are embedded in networks of interaction. Higher levels of density may facilitate access to emotional, informational and practical support, whereas sparse or fragmented networks may limit such access, increasing exposure to risk. However, density alone is not necessarily protective and must be considered in relation to other dimensions.
2. *Relational quality* concerns the affective and interactional character of relationships. Supportive, trusting and cooperative ties may have protective effects on both physical and mental health, while conflictual, stressful or ambivalent relationships may contribute to vulnerability [10]. This dimension highlights that not all social ties are beneficial, and that the content of relationships is as important as their presence.
3. *Relational asymmetry* refers to structured imbalances of power, dependence or control within relationships. These asymmetries may shape access to resources, decision-making capacity and autonomy, thereby producing forms of vulnerability that are not always immediately visible. Such dynamics are particularly relevant in contexts such as caregiving, economic dependence, institutional settings or migration processes, where unequal relations may significantly affect health outcomes.
4. *Relational absence* captures the lack, erosion or breakdown of meaningful social ties. Conditions such as social isolation and loneliness are increasingly recognised as significant determinants of health [9], yet they are not always fully integrated into global health frameworks. This dimension emphasises that vulnerability may arise not only from the presence of problematic relationships, but also from their absence.

These dimensions are analytically distinct but often empirically intertwined. High relational density does not necessarily imply protection if relationships are conflictual or strongly asymmetrical; conversely, limited networks may intensify vulnerability through relational absence. Vulnerability thus tends to emerge from the interaction between these dimensions rather than from any single relational condition.

Relational vulnerability should also be understood as a dynamic process. Social ties are not static; they are formed, maintained, transformed and sometimes eroded over time. Processes such as the gradual weakening of support net-

works, prolonged exposure to conflictual relationships, or increasing dependence within asymmetrical ties may produce cumulative effects on health [5]. This temporal dimension highlights how vulnerability can develop progressively, rather than appearing as a fixed or pre-existing condition.

From a global health perspective, this framework suggests a shift from viewing populations primarily as aggregates defined by socio-economic indicators to recognising the internal differentiation produced by relational configurations. It does not replace established approaches based on social determinants, but complements them by making more visible the relational mechanisms through which vulnerability is lived, negotiated and reproduced within everyday social contexts.

Figure 1 illustrates how vulnerability emerges through social relations and is structured across four relational dimensions – density, quality, asymmetry and absence – which jointly shape health outcomes. The model highlights the importance of analysing relational processes in global health, in line with recent efforts to reintroduce relational and contextual awareness into epidemiological thinking.

The dimensions outlined above highlight vulnerability as a dynamic process emerging through ongoing relational interactions rather than as a fixed individual condition. From this perspective, vulnerability develops through patterns of interaction, support, dependence and disconnection that unfold over time. Health outcomes, therefore, cannot be fully explained without considering how individuals are positioned within networks of relationships, and how these positions shape access to resources, exposure to risk and opportunities for support. In this sense, a relational approach helps account for variations in health that remain difficult to explain through socio-economic indicators alone.

To synthesise, relational vulnerability can be understood as the combined effect of four interconnected dimensions: density (the extent of social ties), quality (the affective and interactional character of relationships), asymmetry (power and dependency imbalances), and absence (the lack or erosion of meaningful ties). Considered together, these dimensions provide a parsimonious framework for analysing how vulnerability emerges through relational configurations.

From an operational perspective, each dimension can be translated into measurable indicators that allow empirical investigation. Relational density may be assessed through network size, frequency of interaction or measures of network centrality. Relational quality can be explored using validated scales of perceived support, trust or relational strain. Relational asymmetry may be captured through indicators of economic dependency, decision-making power or caregiving imbalance, while relational absence can be measured through indicators of social isolation, loneliness or network fragmentation. These dimensions can be analysed both independently and in combination, allowing researchers to examine how different relational configurations shape exposure to health risks across contexts.

3. Toward a Relational Epidemiology

If vulnerability is understood as relationally constituted, it follows that the analytical frameworks used to study health

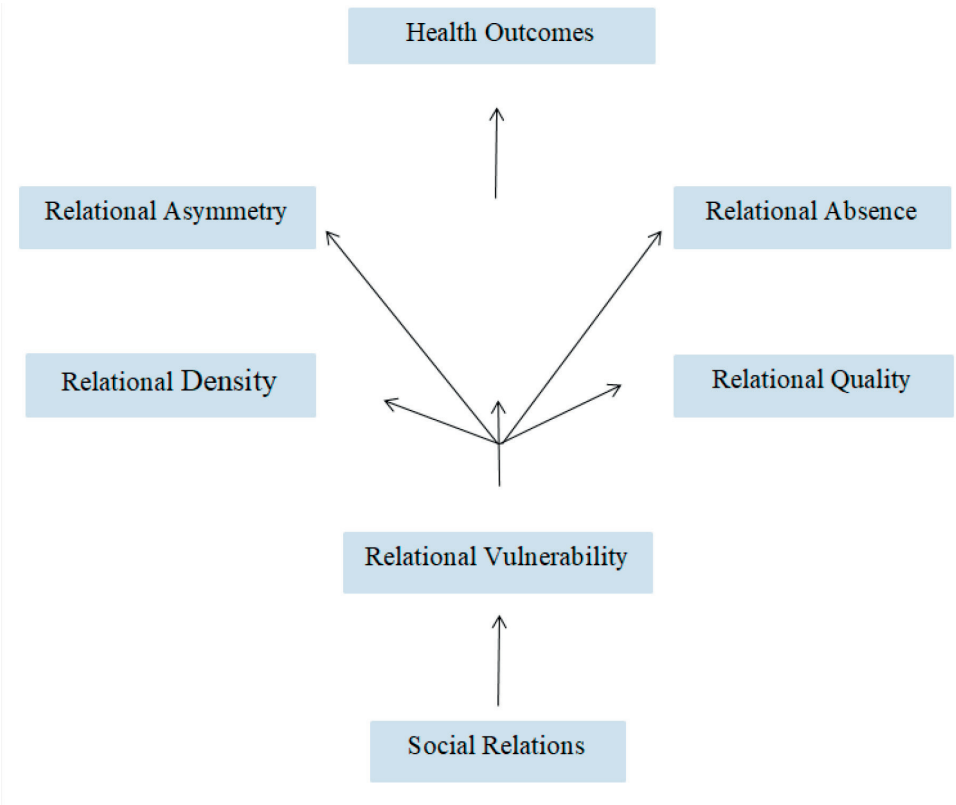

Figure 1. *A relational model of vulnerability in global health. Source: Author's elaboration.*

risks must also be reconsidered. Existing approaches in global health, including social epidemiology, have made important contributions by identifying patterned associations between health outcomes and social factors such as income, education and living conditions. These approaches have been highly effective in documenting inequalities and making them visible at population level [12,13].

At the same time, a growing body of scholarship has pointed to the limits of approaches based primarily on analytically separate variables, highlighting the need for more integrative and process-oriented frameworks capable of capturing interdependence and contextual embeddedness [5,6]. In this context, the relational dimension of health has increasingly been recognised, but often remains conceptually secondary or operationalised through proxy indicators such as social support or network size.

Against this background, the notion of *relational epidemiology* can be understood not as a new subfield, but as a complementary analytical orientation. Relational epidemiology is defined here as an approach to the study of health and disease that places the structure, quality and dynamics of social relations at the centre of explanation, rather than treating them as contextual or secondary variables. This perspective resonates with recent calls for a more relational and ecologically grounded epidemiology, which emphasises interdepen-

dence, care and situated forms of vulnerability [4,5].

From this perspective, the key question is not only how social factors correlate with health outcomes, but how such factors become consequential through concrete relational processes. While social epidemiology typically examines associations between variables, a relational approach directs attention to how individuals are positioned within networks of relationships, and how these positions shape exposure to risk, access to resources and capacities for response. This includes not only the presence or absence of ties, but also their quality, stability and asymmetry [11].

Such an orientation makes it possible to analyse how vulnerability develops over time through relational dynamics. Prolonged exposure to conflictual relationships, the gradual erosion of social ties, or increasing dependence within asymmetrical relationships may generate cumulative effects on health that are difficult to capture through standard indicators [10,9]. More broadly, relational configurations can mediate the impact of structural conditions, helping to explain why similar socio-economic contexts give rise to different health outcomes. This becomes particularly evident in the case of migrant populations, where vulnerability often arises not only from structural disadvantage but also from disrupted or fragmented social networks. The loss of family ties, combined with dependence on asymmetrical relationships with employers or institutions, may increase exposure to both physical and mental health risks. At the same time, the gradual reconstruction of supportive networks within migrant communities can mitigate such vulnerabilities.

These dynamics illustrate how the interaction between relational density, quality, asymmetry and absence produces differentiated health outcomes even within comparable socio-economic conditions.

This perspective is particularly relevant in contemporary global health contexts characterised by mobility, migration, institutional fragmentation and changing family structures, where relational ties may be unstable, unevenly distributed or subject to rapid transformation. In such settings, vulnerability is often produced not only by structural constraints, but also by disruptions, gaps or asymmetries in relational networks.

From a methodological point of view, a relational epidemiology suggests the need to combine different types of data and approaches. Quantitative methods may help identify patterns of association, while qualitative and network-based approaches can provide insight into how relationships are formed, maintained and experienced [7,11]. This does not imply replacing existing methods, but rather extending them to better capture relational processes.

From a clinical and policy perspective, this orientation also has implications. It suggests that individuals should be understood not only in terms of their individual characteristics, but also in relation to the social environments in which they are embedded. It also highlights the potential relevance of interventions aimed at strengthening social ties, reducing isolation and addressing relational asymmetries, alongside more traditional structural and biomedical interventions [17].

These considerations suggest that a relational epidemi-

ology can complement existing frameworks by bringing into focus mechanisms that are often difficult to capture through variable-based approaches alone. Rather than adding complexity for its own sake, it contributes to a more precise understanding of how health inequalities are generated and sustained across different contexts. In this sense, it aligns with broader efforts to develop more context-sensitive and relationally grounded approaches within global health [4].

At the same time, a relational epidemiological approach raises specific methodological challenges. The collection of relational data may be affected by recall bias, cultural variability in the meaning of relationships, and difficulties in capturing dynamic processes over time. In global health contexts characterised by mobility and institutional fragmentation, relational ties may be fluid and difficult to map using standard instruments. Addressing these limitations requires combining longitudinal designs, mixed methods approaches and culturally sensitive tools capable of capturing both the structure and the lived experience of relationships. Network analysis, qualitative interviews and participatory methods may be particularly useful in this regard.

4. Conclusions

Despite the growing attention to social determinants, global health research still tends to frame vulnerability in individual or aggregated terms. These approaches remain essential, but they do not fully capture how health risks take shape within everyday social relations.

This article has proposed the concept of relational vulnerability to address this limitation. The four dimensions outlined – density, quality, asymmetry and absence – offer a way of analysing how vulnerability develops through patterns of interaction, dependence and disconnection, rather than as a fixed condition.

The notion of relational epidemiology places social relations at the centre of analysis and calls for closer attention to how relational configurations shape exposure to risk and access to support over time.

A relational approach does not replace existing frameworks in global health, but complements them by making more visible the processes through which vulnerability is formed and experienced in concrete social contexts. This perspective may help to better account for variations in health outcomes that remain difficult to explain through socio-economic indicators alone.

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