Applying systems theory to global mental health

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Perspective

Abstract

In recent years the evidence base for psychological interventions in low- and -middle-income countries (LMIC) has rapidly accrued, demonstrating that task-shifting models result in desired outcomes. Next, it is important to look at how this evidence translates into practice. In doing so, this paper argues that the field of global mental health might benefit from applying a system theory or system science perspective. Systems thinking aims to understand how different components are connected and interdependent within a larger emergent entity. At present much of the research efforts into psychological interventions in LMIC are focusing on single interventions, with little focus on how these interventions sit in, or influence, a larger system. Adopting systems theory and system dynamics tools can help in; (i) better analyzing and understanding the key drivers of mental health problems and services, (ii) optimizing mental health services; and (iii) understanding the organization of people, institutions and resources required for rolling out and scaling-up mental health services. This paper reflects on some of these merits of a systems perspective, as well as provides some examples.

Impact statement

The past decades of research in global mental health have roughly focused on demonstrating the burden of mental illness, the associated social determinants and the need for interventions, and subsequently demonstrating the effectiveness of psychological interventions adopting a task-shifting model. The evidence for these research questions has become widely accepted, while mental health problems are burgeoning globally. This paper argues that the research paradigm should shift towards the *architecture* of mental health services, especially in low- and -middle-income countries and low-resource settings. How are services organized? How to ensure that services are of adequate quality and scalable? How can mental health services embrace and address social determinants of mental health? These topics are addressed and advocated in several papers, including the Lancet Commission on Global Mental Health and Sustainable Development. The current paper argues that a system theory perspective can be beneficial in answering these questions, as it can help in better understanding the organization and optimization of mental health services. Systems science is the transdisciplinary study of systems, defined as interconnected and interdependent components that together make up the whole that is more than the sum of its parts. The utility of applying a systems lens can support future global mental health efforts by embracing and understanding the complexity of factors involved in sustainable mental health care, using systems dynamics tools like causal loop diagrams, process mapping and dynamic modelling to do so.

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Introduction

Global mental health has unmistakably received increasing attention among policymakers, funders and researchers in recent years (Patel et al., 2018; WHO, 2022). Following evidence of the burden of disease attached to mental health conditions in low- and middle-income countries (LMIC) (Whiteford et al., 2013), much of that attention has gone to the large treatment gap for mental health conditions (Lancet Mental Health Group, 2007; Thornicroft et al., 2017). This, in turn, has translated to advocating for task-shifting models of mental health care, with research largely demonstrating the effectiveness of such delivery models (Singla et al., 2017). However, the vast majority of published efforts in global mental health are focusing on evaluating single interventions, and often devoid of how such services should be organized in real-world practice. Although this growing body of literature is a positive trend, such a singular approach to interventions is problematic for several reasons. First, mental health care cannot rely on single interventions delivered in isolation, because of comorbidity and the complex constellation of risk and protective factors at play in developing mental health conditions. Single interventions increase the risks for condition-specific approaches and risk forcing policymakers to make

choices between mental health promotion, prevention or treatment intervention, rather than adopting a spectrum-of-care approach (Patel, 2023; Patel et al., 2018). Second, condition- or program-specific approaches are not easily adopted in sector-wide systems, as it risks a mismatch with root causes and capacities across the system that have to be addressed synergistically (Windisch et al., 2011). Third, in humanitarian contexts, guidelines explicitly recommend mounting a comprehensive multi-levelled mental health and psychosocial support response (IASC, 2007). Yet, descriptions of multi-intervention approaches in practice or research are scarce (e.g. Jordans et al. (2016). Fourth, multiple *combined* interventions, or a system of care approach, may have a bigger impact than multiple single interventions because of potential synergistic effects. As much of the current global mental health research focuses on the evaluation of interventions as component parts or single psychological interventions, outcomes are primarily demonstrated on the level of the individual. This does not allow for evaluating the multiplicative effects when bringing together a number of component parts and contributing to population-level changes. Transdiagnostic approaches are important in addressing the issue of comorbidity but are not designed to have synergistic effects beyond those participating in the intervention. Finally, implementation of any intervention, or combination of interventions, will require the involvement and coordination of a set of actors, processes and organizations, especially if it is to yield sustained service provision. This is especially salient given the burgeoning evidence base for psychological interventions, yet little large-scale or national rollout of these in LMIC, indicating a need to focus on systems change to make widescale adoption possible.

To move beyond single-intervention thinking and to explore how best to organize implementation, the field of global mental health can benefit from engaging with systems theory and system science. A system is a group of interacting, interdependent elements that form a complex whole (Montuori, 2011), also captured by the famous adagio: 'the whole is more than the sum of its parts' – going back to Aristotle's thinking. Systems theory emerged in the 1940's as a counterpoint to the dominant form of scientific thinking then, namely reductionism wherein the whole is explained from the knowledge of its parts. Systems theory aims to provide a convergent way of understanding the world by acknowledging the way relationships and interactions between elements form the organization (of life). In doing so, system theory promotes going beyond often arbitrary disciplinary boundaries, where classical scientific approaches operate from a single disciplinary approach (Midgley and Rajagopalan, 2020). Global mental health research has leaned heavily on epidemiological and evaluative research that has aimed to isolate associations and effects. Of course, classical reductionist approaches of inquiry have great benefits, and have been crucial in the furthering of the global mental health agenda, but real-world benefits are impeded by the complexity problem, learning failures and implementation challenges (Adam and de Savigny, 2012). Above all, this paper is therefore a plea to see how these perspectives can be simultaneously adopted – rather than antagonistic or opposing perspectives – to combine causal inference testing with more holistic approaches.

The original general systems theory (GST) stems from biology and describes how systems adapt to re-finding homeostasis or equilibrium (von Bertalanffy, 1968). This evolved in cybernetics, which entails for systems to evolve as a result of feedback, further evolving into complex systems that is characterized by many components interacting with each other to respond to the irreducible complexity of the changing nature of organizations, human

behaviors or processes (Lai and Huili Lin, 2017). Following Von Bertalanffy's GST many different iterations of systems theory have evolved, such as complex adaptive systems (CAS) which focuses on the system's ability to learn to adapt to its changing elements and context and chaos theory (CT) which is centered around the principle that order emerges out of chaos (Cordon, 2013). It is difficult to have one definition of system theory, and I therefore use the generic dictionary-based definition 'a regularly interacting and interdependent group of items forming a unified whole'. Non-exhaustive key characteristics of later systems thinking are; (1) *emergence*, in which the outcome of collective components cannot be produced by the individual components alone (i.e. totality is viewed as more than the sum of its parts); (2) *interdependence* and interconnectedness of component parts, meaning that changes to one part of the system can have ripple effects on other parts of the system; and (3) *dynamism* in that the system can adjust to, and learn from, the unpredictability of real world – a process that is captured by feedback loops. In short, it is about holistic thinking that embraces multiple component parts and the related complexity when understanding or addressing a challenge. In terms of (often interchangeable use of) system terminology, we will refer to systems thinking when referring to the approach that is overarching and stemming from distinct system theories (used to refer to,e.g. GST, CAS, and CT), and system science when referring to the research and research methodologies coming from system theories with a common goal understanding complexity (Sterman, 2002). Furthermore, in this paper, we limit the use of systems thinking to mental health care delivery, defined as a way of addressing mental health delivery challenges that recognize the multiplicity of elements interacting to impact an outcome – for example, improving population-level mental health – in a holistic way (Komashie et al., 2021). Ultimately with the objective of increasing the quality and efficiency of mental health care without the commensurate increase in resources (Clarkson et al., 2018). In fact, early evidence seems to provide support for a systems approach to addressing health delivery challenges to lead to significant improvement in patient and service outcomes (Komashie et al., 2021).

System theory can be applied to diverse fields of inquiry. It has been proposed as a paradigm shift for health systems strengthening in LMICs (Adam and de Savigny, 2012), for understanding global health governance (Hill, 2011), or for organizing chronic care models (Martin and Sturmberg, 2009). Systems methodologies have long been applied to a wide range of public health problems, from tackling obesity to tobacco control (Carey et al., 2015). Useful overviews of tools and methods stemming from systems theory applied to the field of global health already exist (Peters, 2014; Wilkinson et al., 2018). Yet a systematic review of case studies of adopting systems thinking in health practice reported few examples in LMIC, and not specifically to mental health (Wilkinson et al., 2018). At the same time, good examples of using systems thinking for global mental health have been published, following the WHO health system building blocks (Vallières et al., 2022).

Application of systems science in global mental health

Many of the global mental health challenges, related to the organization of services, ensuring treatment coverage, and ensuring quality of mental health care, are complex problems that need models that help understand the underlying dynamics (Jordans and Kohrt, 2020; Patel, 2023). Using a systems theory perspective allows for a common transdisciplinary language of science when developing solutions for these complex problems.

Why is it applicable?

In light of the mental health crisis globally, Patel et al. (2023) recommend a *redesign of the architecture of mental health care* to ensure a seamless continuum of care, which is integrated across health and other sectors, and addresses harmful social environments. Systems thinking and language can help onboarding different stakeholders to adopt a mental health focus and build in adaptiveness to the real-world context. Applying a systems lens avoids seeing mental health problems in isolation, and identifies a complex set of interactions and factors that need to be taken into account. Although at an individual clinical level, this can be taken into account by the clinician or case worker (Metzl and Hansen, 2014), at a program level this more holistic system thinking needs to be purposively planned for and monitored. In doing so, a systems approach and methodologies can inform and support; (i) the selection, organization and delivery framework for interventions (implementation), and (ii) the evaluation design of more comprehensive mental health care programs (research). This approach is relevant to address what are also called 'wicked' or 'complex' problems related to mental health care, especially in low-resource settings, namely; fragmented or disjointed activities, a combination of multiple demands- and supply side barriers, need to operate at multiple socio-ecological levels, addressing multiple social factors related to mental health etc. (Trani et al., 2016). Taking a singular approach of addressing one of these problems at a time in isolation is not likely going to improve the higher-order outcome of improved population-level mental health, and requires the holistic, non-linear and transdisciplinary approach that system thinking advocates.

Systems theory is applicable to global mental health efforts increasingly *embracing the importance of social determinants of mental health* (Lund, 2023). A focus on social determinants is all about the multiple associations between issues such as poverty, migration, marginalization and abuse and the mental health status of people. When intervening using that perspective, one is bound to take on a dynamic and multiple-component approach. For example, with poverty being a major social determinant, a recent program aims to prevent adolescent depression and anxiety by combining neuro-psychosocial intervention mechanisms (such as peer support and self-regulation), with poverty reduction mechanisms (such as cash transfers for adolescents and caregivers) (Lund et al., 2023). In essence, structural socio-economic inequities cannot be changed without addressing the myriad components that act together in a complex system. Global mental health initiatives taking this approach can draw from a review that has synthesized the literature on the places to intervene in a system (i.e. leverage points) to address social determinants of health (Carey and Crammond, 2015).

Similarly, systems thinking can be useful given the paradigm shift towards more *integration of mental health within other sectors.* In humanitarian settings for integrating mental health and psychosocial support in nutrition, water and sanitation and protection activities (Tol et al., 2023), all of which can easily be understood as systems. Also for tackling the complexity that is involved in the much-advocated strategy for the integration of mental health into primary health care (WHO, 2016). In line with the application for health systems strengthening, it helps in framing barriers in terms of a pattern rather than a particular event, in placing responsibility for behaviors on internal actors and processes rather than external forces, and in believing that overcoming barriers requires understanding of context and relationships rather than on stand-alone solutions (Adam and de Savigny, 2012).

Moreover, systems theory has been advocated as an *alternative perspective to current scaling models* that tend to follow a linear and predictable process that involves the replication of small-scale pilots to real-world roll-out (Paina and Peters, 2012). Using systems theory, the authors argue, better reflects the complex and changing nature of (health) systems, and creates opportunities for better planning, implementation, monitoring and evaluation approaches to scale up health services. With scaling being an explicit and urgent goal within the field of global mental health, applying complex systems phenomena may support that goal.

Incorporating the above points, a system science lens can also guide *global mental health research efforts.* In the field of public health, a systems science lens has long been adopted, though mostly as a post-hoc superimposed analytical perspective or using superficial or low-quality study designs (Carey et al., 2015). To date, as is overwhelmingly common in global mental health research and practice, interventions have been studied as separate and *closed systems*, which essentially means actively minimizing the interaction between the intervention and the environment. The next step is to implement and evaluate the (combined) interventions as an *open system*, wherein the different component parts interact, and respond to feedback. This means conducting research on how to optimize the services so that the best results can be obtained – especially salient given the scarcity of resources. This links to the system's notion of 'leverage points', which are places within a complex system where a small change in one part can produce big changes in the whole (Carey and Crammond, 2015). An example leverage point for mental health care in LMIC is the adoption of demand-side strategies, as demonstrated by a review of reviews (Greene et al., 2021). Moreover, systems science can support designing outcome studies, because it promotes a perspective that embraces complexity as opposed to isolating effect, for example by evaluating; (i) unintended effects and effects on life domains beyond improvement in individual mental health, and; (ii) the synergistic effects of a combination of interventions on population-level changes, that is, the sum of what parts contribute to a larger whole.

With evidence for the effectiveness of task-sharing approaches to psychological interventions in LMIC, the research agenda has increasingly highlighted the importance of implementation science, which is the study of methods and strategies that facilitate the uptake of evidence-based interventions into practice. Implementation science tries to answer how to successfully implement evidence-based interventions, so mostly characterized by intervention-level analyses. A systems science approach, as mentioned above, is a study that aims to understand and tackle complexity (dynamic interplay of multiple factors and components, operating at different levels), so mostly characterized by macro- or population-level analyses. Here again, I would plea for bridging these perspectives, wherein a combined implementation science and systems science approach has the potential for enhanced planning for and researching mental health programs – even if more evidence for that potential is needed (Whelan et al., 2023).

How is it applicable?

The above section aimed to outline *why* a systems perspective can be helpful in global mental health efforts. This translates to a few recommendations and examples on *how* it can be applied in practice (see also Box 1):

Box 1: Case studyBelow is an example of how systems thinking can be applied to both the implementation and research aspects of defining, evaluating and optimizing a mental health care delivery approach for children affected by armed conflict.In terms of implementation, the humanitarian organization War Child has developed a care system consisting of multiple interventions that are *interconnected* in such a way that children and adolescents can follow a pathway of care, and wherein multiple stakeholders surrounding the child or adolescent are supported to mitigate the impact of adversity (Jordans et al., 2018). This care system includes a largely non-verbal movement-based mental health promotion intervention (TeamUp) (Bleile et al., 2021), a strategy to pro-actively detect children and adolescents in need of treatment (van den Broek et al., 2023), a World Health Organization developed brief psychological treatment, Early Adolescents Skills for Emotion (EASE), for reducing severe emotional distress (Dawson et al., 2019). The caregivers are supported by a brief intervention (BeThere) that addresses their own distress as a result of adversity and daily stressors followed by a focus on increasing positive parenting strategies (Miller et al., 2022), and families experiencing multiple stressors and more severe distress can subsequently be offered a whole-family mental health intervention (Stronger Together) (Brown et al., 2024). A similar approach is applied to improving the well-being and social-emotional competencies of teachers, through an intervention called CORE. The care system includes addressing stigmatization, as stigma functions as a barrier to mental health services and exacerbates mental health problems. And, in line with the social determinants perspective, it puts communities in the driving seat to address child protection risks and concerns, following an approach called Seeds. A systems perspective is applied in the organization of this pathway to care, through clearly articulated interdependencies between components and by adopting a transdisciplinary approach. This allows for client journeys wherein a child is supported through these interconnected components, wherein it can flow from receiving mental health promotion to treatment, wherein the child's parents are supported, and their communities are involved in addressing barriers and risk factors.Another defining characteristic of a systems approach is the ability of the system to be *dynamic*, referring to the ability to respond to feedback and real-world inputs. Applying this principle to the bespoke care system, we have incorporated a quality of care framework that consists of routinely collecting data on the service providers' levels of competence and implementation fidelity, and participants' intervention attendance (Jordans and Kohrt, 2020). This data allows for (real-time) data-driven adjustments to the implementation of the interventions, through training and supervision mechanisms, thereby aiming to optimize the quality and, in turn, outcomes of the services. In a recent study, we demonstrated that competency-driven training, making use of competency assessment data, improved the training outcomes significantly over standard training (Jordans et al., 2022).In terms of research, we address the concept of holism, i.e. the whole as an emergent higher-order property of the interactions of the different component parts of a system (Lai and Huili Lin, 2017; Montuori, 2011). For example, does the above combination of interconnected interventions result in higher-order population-level improvements (such as improved quality of life and reduced prevalence rates), outcomes that can only be explained by the sum of its isolated parts. Furthermore, system dynamics methods, such as causal loop diagrams, dynamic modelling, process mapping, stock and flow diagrams, and stakeholder network analyses can be used to assess the drivers, functioning and outcomes of a system. For example, concerns the implementation of a digitalized personal learning intervention (Can't Wait to Learn; Turner et al., 2022), which is part of the above care system to promote children's learning outcomes. A system science approach was used to understand and adapt the system surrounding caregivers' engagement in children's learning. Group model building (GMB) is a methodology wherein participants generate a comprehensive understanding of a system and action ideas to solve the issue at hand. GMB workshops in refugee settlements in Uganda identified and addressed factors such as home-school communication, caregivers' knowledge of school activities, attendance of school meetings and the language barrier between caregivers and school staff.

First, to better analyze and understand the key drivers of mental health problems and services, system dynamics tools and methods can be used and help to formulate starting points for intervening – as it allows for embracing substantial complexity and multi-level interactions. A recent study by Greene and colleagues provides a rich example of how a tool such as causal loop diagrams can be applied to better understand the relationship between barriers and facilitators of mental health services in LMIC (Greene et al., 2021).

Second, to support the implementation of mental health services, systems theory notions of identifying leverage points (i.e. places in the system where a small change or intervention can have a large impact), and holism (i.e. thinking in terms of interrelated, interdependent components) can make for better mental health care. It helps identify how to improve the delivery and sustainability of mental health services. For example, Trani et al. (2016) employed community-based system dynamics, and group model building, to better understand factors that prevent people from accessing mental health services and thereby create a shared vision of how to overcome these barriers in Afghanistan. Equally, systems thinking can safeguard against unintended negative consequences, as it promotes monitoring and evaluation to assess the knock-on effects of an intervention – thereby looking beyond the individuals that an intervention is targeting. System thinking supports the organization and implementation of mental health care, for example, by using process mapping to illustrate the client journey to reveal bottlenecks and points of system failures. Moreover, it supports adopting an optimization lens, for example by mapping and using feedback loops to adapt a mental health care delivery framework. The integration of mental health into primary health care is a good example where systems dynamics tools such as actor mapping or client journeys can help understand the dynamic and complex interplay of people, institutions, and resources involved in delivering mental health services.

It is important to note that, as explained above, the conceptual boundary of the system's approach employed in this paper is 'mental health service delivery in low-resource settings'. This is of course a limited use of system theory. Other applications may equally be useful, for example, for the study of Global Mental Health as a field (Bemme and Kirmayer, 2020) or for understanding global mental health governance (Hill, 2011), or for tackling the complexity of mental health care being part of a network of systems (or system in systems) (Cordon, 2013). These are outside the scope of this paper but would merit further reflection.

Conclusion

Systems theory aims to understand how different components are connected and interdependent within a larger emergent entity. This paper argues that systems thinking can help in the conceptualization of the next phase in the field of global mental health, specifically related to mental health care delivery. Previous phases of global mental health research have emphasized the importance of investing in mental health given the high burden of disease and treatment gap, and subsequently developed and tested task-shifting models for mental health care through a suite of psychological interventions. We now need to focus on how to bring these together in a coherent and well-functioning system. Systems theory characteristics of interconnectedness, dynamism, leverage points and emergence can provide guidance for the development and evaluation of such mental health care approach. Systems theory can also support scaling efforts, as it better reflects the complex context of real-world implementation context and the adjustments that need to be made as a result. Systems thinking can be applied to maximize the impact of ongoing efforts and trends in the field of global mental health.

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