Special Issue on The Deepening of Disciplinary Content: Public Health in Post-COVID India

RESEARCH

Critical Holism as Public Health Theory: Towards a Unifying Framework for Research, Policy and Planning

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DIALOGUE
Science, Scientists, and Society

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Abstract. The wide range of subject matter Public Health (PH) incorporates makes it a synthesizing science that draws upon very many disciplines of the natural, applied and social sciences. The sub-fields of research and application in PH, epidemiology, health systems research, policy studies, health education and further sub-fields within each of these, draw from the theories of their relevant base disciplines and thereby tend to think in silos rather than make the interlinkages between them. This paper argues for Critical Holism (CH) as an overarching theoretical framework that can provide PH and its sub-fields a unifying structure within which they can locate themselves in relation to each other. Thereby CH would remind PH researchers about attending to interlinkages between elements of a health problem and across problems, their multi-level and multi-dimensional complexity. Policy, planning and implementation require such unifying thought processes in order to ensure coherence between the various elements of PH action for a common objective such as policy formulation for improving the health of populations, health system strengthening, designing of programmes, pandemic response strategies and so on. PH research that generates knowledge to inform these politico-administrative processes, has also to provide them with the comprehensive lens with which to perceive the complexity of health problems, assess the resources at hand and design interventions. The paper presents an outline of what PH

research adopting the Critical Holism theoretical frame would look like, as an invitation to further developments of the theoretical frame and its application.

Introduction

Public Health (PH) has classically been contrasted with clinical medicine, even when regarded as a sub-discipline within it as 'preventive medicine,' or as a distinct field of medical and social enquiry. Being population-based as against the individual-centred clinical medicine, and being at the interface of medicine and its interactions with the social and environmental context, PH emerged over the 19th century as a distinct component of governance. It grew with the increasing responsibility of the state in ensuring the health and wellbeing of its citizens, informed by a growing body of knowledge (Rosen 1958). As negative health consequences of industrialization and colonialism were experienced by populations in Europe and the USA as well as the colonized countries, and internationally epidemics and pandemics had to be dealt with, PH grew rapidly as a scientific discipline over the 19th century and into the 20th century.

The very mandate of PH, ensuring the health of societies, led to attention to conditions that created ill-health, and to focus on the sections with the most ill-health. It was able to point out, not only to environmental conditions leading to ill-health, but also to the social inequalities leading to them, and the political context which allowed the inequalities to continue and perpetuate—the direct causes of ill-health and the 'causes of causes.' As the technological content of biomedicine increased in the 20th century, with a demonstration of its powerful benefits, lack of access to healthcare became an important component of what explained the inequalities. These causal explanations of health status and disease provided the scientific, epidemiological basis of designing public health measures, from sanitation and safe water supply to occupational health, minimum wages and nutrition, psychosocial support, behaviour change communication for lifestyle changes, and access to health care for all.

All these dimensions of PH, from the biological, environmental and technological to social, economic, cultural and political, require a detailed understanding of which effective measures can be designed and implemented well. Therefore, PH is a synthesizing science, drawing its concepts and methods of research from a number of natural and clinical sciences, social sciences, humanities and applied sciences such as medicine, management and science-technology policy studies. It is broadly divided into two scientific spheres. One of epidemiology, that studies the patterns of occurrence, the natural history and causality of health and disease. The second of Health Systems Research (HSR), which deals with knowledge generation for designing interventions for improving population health, health service systems, disease-specific programmes, implementation monitoring and evaluation and policy studies. Within each are several sub-disciplines.

Need for an Overarching Theory for PH

Given the deep roots it has acquired as a discipline over the past two centuries, it is indeed surprising that there is no overarching theoretical frame that provides Public Health the bulwark for binding all the dimensions into a coherent whole. The negative implications of this are evident in PH programmes and planned health services development, analyses of which, over the years from Tuberculosis to COVID, Bhore Committee to the National Health Mission and Ayushman Bharat, have revealed major gaps in their conceptualization. Diagnosis of the problem of reductionist approaches in PH policy and practice has placed the dominance of biomedical technocratic approaches as the cause. These have been shown to arise from the asocial, ahistorical, atheoretical knowledge base that has largely been adopted. (Banerji 1981; Banerji D 1999; Baum 1995; Diez Roux 2011; Qadeer et al. 2001; Rao 1999; Priya and Mehta 2008; Walt et al. 2008).

This is not to say that there is no theory developed for PH studies, but that the theoretical approaches are fragmented by the various sub-disciplines and their specific contours. They are also varied by the theories drawn from positivist, interpretivist or realist philosophies of knowledge generation, making interlinkages and coherence difficult. However, major advances have been made in moving from the positivist roots to adopting the interpretivist/ constructionist and the realist approaches. Yet, policy formulation still relies more on the reductionist findings of positivist research, and thereby limits the gains of PH, sometimes consequently even losing the battle for people's health.

The 'PH perspective' is a term that has been extensively used for combining: an epidemiological approach to understanding and solving population/community health problems, choice of appropriate technology and social intervention measures, along with optimization of health and social service systems. Also laid out have been the principles of PH, understood as addressing health issues at the population level, through collective societal action, with social justice, people's involvement and empowerment (Muntaner 2013). These inherently require a holistic approach to health and health care. However, translation of these in knowledge generation has varied based on theoretical and ideological approaches. In the past three decades, the PH perspective has also given way to the 'Global Health perspective' (Beaglehole and Bonita 2010).

Two broad approaches have co-existed to understand and address issues of population health. One is the biomedical, disease and medical technological interventions focused approach that claims the universal application of its solutions, as exemplified by the germ theory of disease, the Selective Primary Health Care approach, and the current handling of the COVID-19 pandemic (Loewenson et al. 2021; Prasad et al. 2020). The other is a more ecological, socially-oriented and contextually rooted approach, as seen in the multi-causal, multi-level and multi-dimensional explanations of health and disease (Susser and Susser 1996; Krieger 2001), the social determinants of health (WHO 2008a), and in the health systems approaches of comprehensive

Primary Health Care (1978), the Ottawa Charter (1986) and Healthy Cities (1986). The more recent formulations of Health in All Policies (WHO 2008b), Planetary Health, One Health (Mackenzie and Jeggo 2019), Complementary and Integrative Health (NIH 2021) continue the legacy of addressing interlinkages.

The biomedical approach has, over the past two centuries, tended to be the dominant one even while the more ecological and social has been constantly recognized as the ideal but set aside by technocratic considerations as 'not feasible' (for instance, WHO-UNICEF 1978a; WHO-UNICEF 1978b; Walsh and Warren 1979). Yet, the ideal remains alive and re-emerges periodically, especially in times of global crisis (WHO 2008b; WHO-UNICEF 2018). The biomedical asserts its supremacy by highlighting detailed knowledge of more proximate individualized causes of ill-health and targeted technological measures to deal with them. Its dominance allows for commodified solutions for health that have also been easier for technocracies to implement through top-down systems and interventions. This biomedical dominance and commodification have been made possible by the siloed way of perceiving health and of organizing health care as exclusively an expert domain. The reductionist bio-medical approach also tends to exclude the consideration of other causal explanations and measures that are less amenable to universal application, more accommodative of social diversity and more culturally pluralist. They do so by denying the validity of any other method of knowledge generation but the positivist. Even when the social science contributions have been incorporated, they have largely tended to be those shaped by the dominant 'methodological individualism' in economics, political science and psychology (Yadavendu 2003; Arrow 1994).

The ecological and social approach requires a more holistic way of perceiving health and disease, accommodating the diversity of human experience and conditions of life, and addressing health care as a societal enterprise. It relates the collective health of populations and sub-groups within them to macro-structural determinants, to meso-level institutional arrangements and the micro-level biological and individualized determinants and the processes linking across these levels of social organization. It does not exclude but draws upon the bio-medical, positivist understandings, and relates them to other knowledge. Health and disease in individuals and collectives are viewed as an outcome of the balance or imbalance between the various multi-dimensional determinants, biological, environmental, social, psychological and emotional, political and cultural. This is the 'default' way of humans perceiving health. It is evident in the holist traditions of health knowledge, the experiential 'common sense' of laypeople's perceptions of health, and the informed 'common sense' of the contextually grounded and socio-politically aware PH (Rosenberg 2012; Galea and Annas 2017; Murphy 2021). The mechanistic imagination generated by the Cartesian body-mind divide, the increasingly siloed specialization of medical and health knowledge and practice, and the delegitimization of other knowledge including laypeople's/patient's knowledge of their own body, has overlaid this gestalt in the present times. This marginalization of a more holistic perception and practice of how people give meaning to and evolve ways of handling health problems has been termed as social and cultural iatrogenesis (Illich 1977), i.e. the negative effects of the 20th-century conventional medical establishment.

What prevents the application of more holistic approaches in PH even when they are considered desirable? This paper argues that the epistemological roots of PH i.e. the philosophy of the science of PH, and the larger politics of knowledge in contemporary research and policymaking, that are dominated by reductionist approaches provide a large part of the answer.

Let us examine the epistemological roots of PH, relating to the sub-disciplines of epidemiology, HSR, health behaviour studies and health policy studies. The diverse philosophies of scientific enquiry, the diverse disciplinary bases of PH, and their contributions to the various sub-fields in PH are relevant for this discussion. Also discussed as an important issue is the inter-relationships of the sub-fields in contemporary times, where it is argued that increasing specialization is fragmenting the holism of the PH perspective.

A. Positivist, Interpretivist, Realist Roots

The roots of PH were significantly influenced by the positivism of the 19th century, and this has not allowed an adequate theory to be constructed or adopted for the discipline that has to address multi-level and multi-dimensional phenomena simultaneously. Positivism, as the philosophy of science that posits it as a way of knowledge generation that provides objective, value-neutral, universal truths emerging from observable and measurable phenomena, has provided a rich body of bio-medical knowledge. But its mechanical adoption has also restricted the study of contextual diversity, interlinkages and processes, thereby prescribed one-size-fits-all solutions to be applicable universally across the world. Its proponents argue that all other forms of health knowledge were no longer valid, were either obscurantist or proto-sciences that must be done away with to give way to this 'modern science.'

Critiques of the science and technology emerging from this knowledge base and its utilization in 'modern' medical practice emerged strongly in the 1960s and 70s. The social sciences, as well as social movements, identified a 'hegemony' of such centralized, reductionist knowledge and its expert, the medical professional (Engel 1980; Illich 1977). Social identities by gender, race, class, caste, became important in the social analysis of societal phenomena. This led to the philosophy of 'post-modernism', recognizing the presence and validity of multiple ways of viewing reality. 'Interpretivism' became an approach to research that studied the meanings and worldview of diverse communities and population groups. But this also meant that the multiple 'truths' had no criteria of validation, each one had the right to their own truth. How then was any societal perspective to be built to address shared dimensions of life? At the same time, as another scientific response to the critique of reductionism was the systems approach (WHO 1976).

'Scientific realism' or 'critical realism' was proposed as a philosophy for understanding reality by bridging the divide between the positivist and interpretivist approaches. As a way of attempting to understand 'the reality out there' and the epistemologically constructed 'reality generated by the researcher,' it brought out the limitations of the positivist approach and

proposed that social science methods could assist in explaining the observed reality and its transformation. Considering health services as social systems, applied to HSR, scientific realism brought 'context' and 'mechanism of intervention' into the assessment of PH measures (Pawson and Tilly 2008). Instead of universal solutions, the diversity of context and of perceptions of the various actors involved in any intervention became subjects of the examination. This provided the tools to think of and design more contextually suited interventions. Increasingly, this is the theoretical approach that HSR is attempting to adopt (Gilson et al. 2011; Sheikh et al. 2011; Bennett et al. 2018). It is also being proposed as the preferred approach for Social Epidemiology (Muntaner 2013; Wemrell 2016).

B. Fragmented thinking due to Sub-discipline specific theoretical moorings

There have been theoretical formulations for various components of PH, drawing upon relevant disciplinary moorings. For instance, epidemiological theory has been postulated based on the causality of health and disease in populations, understood by synthesizing evidence from clinical medicine, demography, medical geography and sociology (Lilienfield 2015). It has evolved from the miasma theory to the germ theory, uni-causal to multi-causal theories (Pearce 1996). It has moved from environmental or social determinants to a linking of the two in the well-established eco-social epidemiology theoretical frame where the concept of 'embodiment' of the environmental and social location of population sub-groups in the biology of their health indicators has been very effectively theorized (Krieger 2001). The WHO highlighted the 'social determinants of health' (SDH) approach through its wide-ranging Commission on SDH (WHO 2008a). Such frameworks have undergirded the vast literature that has evolved over the past four decades on 'inequalities and inequities in health' and in Social Epidemiology (Berkman and Kawachi 2000). The biopsychosocial model of disease proposed within clinical bio-medicine as corrective to humanize the overly biological explanations and over-reliance on technological tools (Engel 1980), relates well with such eco-social epidemiological understandings. It has been widely accepted but yet remains marginal in practice (Fava and Sonino 2008; Wade and Halligan 2017). And in epidemiology too, the more holistic multi-causal explanations such as the eco-social have tended to remain marginal in practice, with the uni-causal germ theory and the multi-causal explanations reduced to 'risk factors' still being the dominant approaches (Pearce 1996; Klement 2020).

Similarly, HSR has learned much from organizational theories of management and health/development economics theories and methods, and to some extent from medical anthropology and sociology. Expanding as a distinct field of Health *Service* Systems Research in the high-income countries, it has developed markedly in the past two decades globally, with an assertion of the field and increasing recognition of evidence-based policymaking (Remme et al. 2010; Mills 2011; Bennett et al. 2018). It has had to go beyond the health services to adapt itself to the needs of Health Systems research that the low and middle-income countries required due to their necessity of focusing on other conditions of life that affected the health of their

populations (Bennett et al. 2018). HSR has come to be segmented into Operational Research for improving direct providing of services, Implementation Research for programme managers and health policy research at the level of policy formulation (Remme et al. 2010).

Health Policy Analysis, as distinct from the dominant stream of HSR, draws from political theory, for instance of welfarism, liberalism, capitalism and socialism, representative and deliberative democracy, governance processes and so on. It also draws upon sociology's discourse analysis, for instance, the Foucauldian conception of bio-politics and governmentality (Lupton 1995). Health education, an early component of PH, has drawn upon theories of communication and applied psychology to move from the classical top-down health education (HE) to information, education and communication (IEC), to behaviour change communication (BCC), with health behaviour models shifting the understanding from individual psychology to the social context and milieu in which the individual is embedded (Taylor et al. 2006). Each of these vital components of PH thus remains bounded by such discipline-based conceptual boundaries and researcher expertise and thereby tends to not relate to the other components.

What the development of these fields in recent decades has also encountered is enhanced globalization, the growth of Global Health, with a decline of the more grounded, shoe-leather epidemiology and public health and a return to the reductionist and top-down colonial perspectives (Holst 2020; Beaglehole and Bonita 2010; Horton 2013). Theoretical bases of public health have, thus, been developed from diverse disciplinary perspectives in a manner that tends to remain fragmented and the inherent challenges of this complex task of designing coherent PH interventions not adequately addressed.

With the growth of each of these fields, they have further tended to emphasize their own distinctiveness and thereby break away from the classical 'PH perspective.' Practiced even without an explicit complexity theory, the PH perspective drew upon epidemiological morbidity and mortality indicators, local environmental, economic and social context, people's cultural context and health services to identify PH priorities and design programmes. Approaches to assess technologies for technical efficacy, cost-effectiveness and appropriateness based on health service status and human resources, had been developed even as necessity in situations of resource constraints and as PH rationality (Banerji 1981; Almond 2009; Jacob 2019).

The break from this classical PH perspective is evident, for instance, in the development of Disability Adjusted Life Years (Priya 2001) for estimation of global disease burden using Priya 2001 since the 1990s, that ignores much of the advances in epidemiological complexity to fit the method (Jit and Brisson 2011; Reidpath et al. 2003; Priya 2001). The experience of modeling of the COVID-19 pandemic and its responses are the most recent example of this form of PH research and policy guidance, revealing limitations of its reductionist approaches as well as its hold over the international and national policymaking and planning processes (Klement 2020; Priya 2020a; Priya 2020b; Priya and Das 2020).

Recent attempts at defining the field of Health Systems Research also reflects the break, as by the Alliance for Health Policy and Systems Research, at its second symposium in Beijing in 2012:

"Health systems research is a multi-disciplinary field of health research which studies governance, financial and delivery arrangements for health care and public health services, implementation considerations for reforming or strengthening these arrangements, and broader economic, legal, political and social contexts in which these arrangements are negotiated and operate. The purpose of health systems research is to improve the understanding and performance of health systems. Health systems research includes all of health services research, most health policy research, and some clinical and population health research, but does not include any biomedical research."

Breaking away from epidemiology, which has been recognized as the basic science of PH, while developing HSR that is to inform health planning and policy again indicates the influence of economics and management or organizational theory rather than the moorings of PH itself. Such a techno-managerial organizational approach does not generally engage with population epidemiology or the social dimensions of health problems, except as relevant to the functioning of a health institution (Stevens et al. 2020). Epidemiological considerations would relate policy and planning to the contextual health needs on the ground, without which it becomes more of a top-down, technocratic health service management tool.

The negative implications of dissociating epidemiology from consideration in designing programmes and health education messages became evident, for instance, in the case of the HIV pandemic even in the 1980s and 90s. International projections made of the evolving pandemic in the 1980s generated doomsday predictions for all developing countries based on the data from a cohort of homosexual men in the USA and the Sub-Sahara African experience. It was only in 2007 that UNAIDS conceded that their estimates were too high for many Asian countries including India and halved its estimates (UNAIDS 2007; Kaiser Foundation 2008). This was something that several PH researchers had been pointing out based on local data and their understanding of the social and cultural context (Banerji 1996; Priya 1994; Priya and Mehta 2008). The exaggerated epidemiological estimates generated fear of an impending catastrophe to make policymakers and health administrators act urgently worldwide, but proved counterproductive in terms of enhancing the stigma that increased the suffering of HIV positive persons and forced them 'underground,' endangering their own and others lives (Gruskin et al. 2013). Communication strategies about preventive measures too were propagated similarly for all, without recognizing that receptivity to messages will depend, among other factors, on the magnitude of prevalence of cases as experienced in different communities, with those communities having high prevalence and deaths were more likely to be receptive to such communication than those who had very low levels of infection and so no perceived increase in deaths. Similarly, there would be different levels of receptivity depending on the sexual cultural patterns as shaped by the social histories of different communities (Parker 2004; Priya 2003). This linking of epidemiology to the cultural context, and of communication strategies to epidemiological and cultural context got ignored since each was developed by a separate

disciplinary group. A PH perspective that examined their interlinkages 'by default', across diverse societies and across diverse sections within each society, was able to identify these linkages and suggest prevention and communication strategies as appropriately tailored to each context (Barnett and Whiteside 2002; Priya and Mehta 2008).

HSR as a distinct sub-field of PH has not only delinked itself from epidemiology, but also from critical dimensions in health systems design itself. The WHO defined health systems as "A health system consists of all organizations, people and actions whose *primary intent* is to promote, restore or maintain health" (WHO 2007; italics added for emphasis), and conceptualized its 'six building blocks' as Service delivery, Health workforce, Information, Medical products, vaccines, & technologies, Financing and Leadership/governance (WHO 2007). This left out completely the users of the service system! Much criticism of this gap led the WHO to later recognize 'the community' as a seventh building block. This visualization of health systems also limited 'health systems' to 'health *service* systems', thereby putting out the structural determinants of health such as issues of food security systems and agriculture or forestry, or patriarchy and gender relationships, except as could be addressed by health staff. 'Gender sensitivity' thus became only an issue of disaggregating health indicators by sex, and some efforts at ensuring access of health care to women and the girl child. While these are both important in themselves, efforts to address the structures of gender stereotyping and thereby gendered vulnerabilities are put out of the scope of PH (Priya and Reddy 2005).

HSR has, thus, become primarily a field with roots in organizational theory that addresses research questions about how to improve the delivery of bio-medicine based services as a top-down agenda. It rarely relates to the social determinants of health per se, other than of access to health services, or does a critical PH assessment of the technological and clinical options. Health Technology Assessment (HTA) is now becoming a separate field too (Garrido et al. 2008).

'Complex adaptive systems theory' is certainly an advance for HSR in that it provides a more dynamic framework for health service systems research, acknowledging the expectation of deviations from what is planned service designs in real-life settings. Going beyond the structural variables such as organizational hierarchies and doctors or beds by population, or outputs such as patient attendance or patient satisfaction, it emphasizes consideration of processes involved, such as the impact of historical developments studied as 'path dependency', 'feedback loops' as processes of self-assessment and correction, 'emergent properties' of systems that indicate deviations from the planned path that emerge as the plans are implemented (Paina and Peters 2011). Even in that, it has only in the past decade started moving from universal prescriptions to more context-specific comparative analysis and as a recent review of the field concluded "While this growing understanding of health systems as dynamic and adaptive may reduce the demand for universal, magic-bullet solutions, it does not mean that general policy proposals are useless, but rather that countries and sub-national jurisdictions need their own analytical capacity to trace health system changes and adapt interventions as needed" (Bennett et al. 2018).

Despite the advances in HSR theory in terms of its adoption of scientific realism and complex adaptive systems, translation of its findings into policy and planning is still weak. In order to address this lacuna, HSR attempts to bring the policy makers closer into the research process, prioritizing the research questions being posed by them. All too often policy level incoherence is sought to be corrected at the operational level because finding the operational gaps and suggesting how to correct them is the question policymakers set for the health systems researcher. For instance, peripheral health workers and the parents of children become the scapegoats to explain the failure of immunization programmes and correctives are sought in target setting, incentives, as well as communication strategies (Banerjee et al. 2010). This may be overlooking the larger problem that the population does not have access to trustworthy regular health care which is their felt need, and therefore they do not trust or are not enthusiastic about the immunization programme (Dasgupta et al. 2008). Thereby, HSR again is tending to circumscribe the system boundaries narrowly, at the 'social programme' they are examining, while it may be argued that the programme itself will be influenced by the functioning of the larger health service system in which it is set and the even wider social and cultural context in which it is to be implemented. Setting the boundaries of the system under examination too narrowly, which scientific realism theory allows, will preclude these somewhat distal causal processes and may lead to reductionist interpretations and conclusions.

C. Values and Principles

PH is an applied science with positivist roots, and yet it cannot be 'value-neutral.' Given its objectives being to improve the health of populations and thereby having to focus more on those segments of the population more vulnerable to ill-health, this sets an inherent humanitarian and egalitarian value frame (Beaglehole et al. 2004). The principles of universal access to health care, of accessibility, affordability and acceptability as criteria for assessing the quality of health service systems, of patient-centred care and patients' empowerment, of community involvement and empowerment, are all uncontested ideals (WHO-UNICEF 1978a; WHO-UNICEF 1978b; Tanahashi 1978; WHO-UNICEF 2018). However, they are then set aside as 'too idealist and impractical' (Walsh and Warren 1979). Is this latter the pragmatic choice amid insurmountable constraints, or is it a result of the theoretical framework with which technocratic policymakers and bio-medically oriented researchers view the situation?

PH has two faces, democratic and empowering and authoritarian and disempowering. Acting at the population level through state and professional action, PH can be very powerful for both these socio-political approaches. As the history of PH in Europe shows: it's being the purpose for great improvements in the conditions of life of the urban areas and industrial workers on one end of this spectrum, and the eugenic agenda of the Nazi holocaust being the other end (Rosen 1958). Health system designs must be based on considerations of values that can contribute to egalitarian and people/community empowering health systems.

Towards this end, the Primary Health Care approach that had attempted to bridge the gap between the health services and the people is worth revisiting. An analysis found that the Alma Ata Declaration and Report that committed to Primary Health Care and set out its contours (WHO-UNICEF 1978a; WHO-UNICEF 1978b) were the most empowering documents yet on health systems. The PHC approach espoused principles of universal access to health care, use of appropriate technology, health professionals other than doctors, self-reliance and community participation. Yet, it had missing links that needed to be addressed (Priya 2018):

- the complexity of 'community' and disparities and diversities within;
- the validity of plural knowledge and the politics of knowledge;
- the culture and ethics of health care providers;
- the unaffordability of the Euro-American institutional model of medical technology-based health care;
- application of PHC principles to secondary and tertiary level services, and
- the physical, social and cultural iatrogenesis ie. the ill-health and disempowerment caused by conventional medicine (Illich 1977).

Recognizing that there are no perfect solutions and that policy choices will be made based on ideological predilections of the social forces wielding power, it proposed that "Answers can optimally come from creating structures that enable operationalization of the values of transparency in rational policy making, democratic pluralism, bottom-up and dialogic processes for continuous shaping and reshaping of systems. This is the PHC agenda and spirit." (Priya 2018)

This takes us back to the basic argument that theory is what gives the researcher the 'default' framework for conceptualizing the research problem or the policymaker and planner about how to prioritize between health problems and between optional intervention strategies. Given the complexity of determinants of health and disease as well as of health care and health care systems, what theoretical frame can then be useful for research to inform policymaking and planning that addresses the complexity adequately? What needs to become a default way of thinking in Public Health? That brings epidemiology, health culture studies, health systems development, health education and information, etc. into one frame when health system design, policy and planning are undertaken. This paper proposes a theoretical frame of Critical Holism.

CRITICAL HOLISM AS PH THEORY

Holism as a Multifaceted Concept

'Holism' is a term much used in relation to health. In relation to health knowledge, at the individual level, it means that the mind and the body are intrinsically intertwined, and the individuals are embedded in their ecological and social context. At the societal level, holism means that communities are not simply aggregates of individuals but are greater than the sum of the individuals, societies are not just aggregates of communities but greater than their sum due to their inter-relationships. Similarly, organizations are not an aggregate of their structure alone but of their value frames, the interactive processes among those who comprise them and their interactions with their social context.

Various terms are commonly used in PH that express the need for bringing together various ideas and activities for designing health services, such as 'comprehensive' PH measures (that address health care and non-health interventions in other 'sectors' that can improve health such as food production and entitlements to food), 'integrated' health care (that indicates a health care system that ensures a continuum of primary/secondary/tertiary services and no vertical silos for specific diseases). 'Universal' health care indicates health care accessible to all. These are descriptive concepts reflecting holistic thinking about health service systems, but do not in themselves provide an explanatory frame that can bind and support coherence across the various dimensions.

Since ancient times in all societies, explanations of causes of health and disease have been located in imbalance within individual constitutions due to ecological and social (along with supernatural) conditions. Developments in the biological sciences and the discovery of pathogenic micro-organisms in the 19th century led to a disruption in significance given to these factors, with the uni-causal germ theory becoming dominant. The resurfacing of holism in epidemiology in the 1920-30s after the dominance of the reductionist 'germ theory' has been traced to three simultaneous phenomena. "Virtually all who have written on and advocated the concept of holism have described themselves as responding to three interrelated transformations, one epistemological, another epidemiological, and the third sociological." (Kunitz 2002). The epistemological basis was J. C. Smuts' first using the term holism in 1920, elucidating his understanding of the tendency in nature for adaptations to change of whole systems. The epidemiological shift from infectious to non-communicable diseases in the western world was the second basis, leading to a shift from the germ theory to multi-causality. Thirdly, the sociological, related to the major social upheavals due to the rural to urban shift in post-industrial revolution Europe leading to loss of community as previously known and then the first world war, thereby people having to adapt to new stresses and strains. Holistic

approaches have made advances ever since, but as parallel streams with the more reductionist remaining dominant.

Holism relates to all three elements of knowledge generation: ontological (with systems theory, that the whole is more than the sum of its parts), epistemological (multi-level and multi-dimensional phenomena have to be understood with their interlinkages as relating to the whole), and methodological (synthesizing knowledge to describe and explain the whole and locate its parts within the whole rather than focus on breaking down its parts into smaller entities).

In this context there are two significant critiques of holism. One is that its focus on the whole carries the possibility to lead to a totalizing perspective such as fascism, where the parts can be sacrificed for the cause of the whole. This is the authoritarian face of PH (Bubandt and Otto 2010). Secondly, that, since 'seeing' and examining 'the whole' is humanly impossible, about holism being too methodologically impractical. While the later section on methodology and conceptual approaches will categorically address this critique, the possibility of holism moving towards a totalizing tendency is proposed to be checked by the adoption of critical theory to complement it. The point of wholeness is not about an empty shell encompassing all, or a blurring of all that is within the whole into one common mass.

Critical Theory

Critical theory is an approach in the social sciences that focuses on social structures and cultural constructs to challenge power in favour of the marginalized. It allows one to view the various social segments and place them within the whole in relation to each other. Its historical development gives it three special elements: to view reality as experienced by the marginalized in society as against the dominant, to develop an understanding of the contestations and negotiations among segments within the whole, and developing an understanding of how change can happen in favour of the marginalized. It arose at the same time as 'holism' after the first world war, the 1930s, as a response to authoritarianism, and developed further in the 1960s-80s in response to critiques of modern development and its fallouts. Besides the political and economic analyses, it examines the historical and cultural contexts of social problems. It reflects on the source of generation of knowledge, rejecting the positivist idea of the researcher producing an objective depiction of reality, and therefore positing the need for a self-reflexive research process, and for collaborative and dialogic research processes across social actors and identities (Kellner 1990).

Its roots are different from those of holism. Yet, it may be expedient at this juncture of the social and global context to bring these together for public health. Given the principles of PH, there is a need to give due space to diverse perspectives on health and health care articulated by feminist thinking, various occupational groups, caste, ethnic and racial identity assertions, decolonization discourses, patient-doctor dichotomies in perception, and so on. There is also the pluralism in knowledge systems, of the marginalized traditional and indigenous forms

versus the dominant conventional bio-medicine (WHO 2014). Within each knowledge system, there are diverse streams that can be examined using critical theory. The critical theory makes for addressing parts of the whole in ways that highlight the marginalized and their agency with a value-critical approach. Thus, the application of critical theory can be one way to check the authoritarianism of holism and PH.

Critical Holism

This term has been proposed earlier by sociologist Vincent Tucker for health (Pieterse 2002) and by Ulrich for ecological thinking and sustainable solutions (Ulrich 1993). Tucker proposed it as a frame for bringing the holism of complementary medicine at the individual level together with the holism of PH that understands health in its environmental, social, economic, cultural and political context. Thus he poses it as a solution to the reductionism of conventional bio-medicine at both individual and population levels, with attention to combining wholeness and difference.

Ulrich proposes Critical Holism as an approach for ecological and systems thinking to deal with two problems: one, that of the impracticality of 'holism' in "considering everything relevant" to the problem environment, and two, that of handling the complexity of diverse 'rationalities' in ways that can bring practical resolution in favour of those at the lower end of the power equation.

"It appears to me that the call for "holistic" or "systems" thinking, popular as it has become…, is really too simple: the problem of sustainable development resides much deeper than in, say, the willingness of planners and decision makers to become more holistic in their ways of thinking. The deeper problem for me lies in the concept of rationality that underlies most of contemporary systems theory and methodologies. Its roots are largely the same as those of the conventional analytical-reductionist model of science; they are to be found in Kant's ideal of a rationality that would be so comprehensive as to become transparent to itself and to justify the conditions of its own possibility in an absolute, because complete, fashion – for the totality of conditions….The two notions of rationality – the model of science and the systems approach – find common ground in their striving for unconditional justification" (Ulrich 1993: p.3).

"the conventional "monological," instrumental and functional (often utilitarian) concept of rationality needs to be complemented by the "dialogical" (communicative) and normative (ethical) dimension of rational practice. And since in practice the two dimensions of rationality will frequently be in conflict with each other, it is not sufficient to "welcome" the idea of communicative in addition to functional rationalization of systems. It is indispensable to demonstrate exactly how practical reason can be practiced without simply presupposing that everybody involved is willing and able to be perfectly rational. It will thus not be enough to merely open again the closed second eye and to acknowledge the existence of the normative dimension; nor will some occasional decisionistic appeals to the moral responsibility of

systems planners do. It is not only at the level of personal awareness but at the level of methodological tools that the normative dimension needs to be incorporated, so that it can become an intrinsic part of rational argumentation" (Ulrich 1993: p.4). This is what the 'critical' can add to holism.

Ulrich goes on to posit 'critical' thinking as providing methodology to go beyond "scientism – the identification of rationality with the limits of science – and subsequently the immunization of scientific rationality and expertise against the critical efforts of practical reason"(Ulrich 1993: p.7).

In this context it is relevant to consider Habermas (1979) distinguishing "between two modes of action: (a) "purposive-rational" action, in which social order is built upon technical reasoning and the social actor is viewed as an instrument for obtaining the goals of the order; and (b) "communicative" action, in which social order is normatively defined through the reciprocal, social exchange of subjective actors. In the former case, organizational knowledge is validated against objectively verifiable criteria. In the latter case, it is validated through consensus [the group norms, beliefs, and values socially constructed through group experience and shared history]" (Steffy and Grimes 1986).

Thus, CH is about the depth and breadth of human experience and the realities of the world we live in. It is about accepting the possible validity of multiple 'rationalities', i.e. diverse perspectives based on social vantage point, ontologies and epistemologies, choices based on existential realities and values. CH as PH theory would, thereby, require elucidating the technical reasoning for application of the principles that underlie PH and its 'purposive-rational action', on one hand. On the other, it would require the 'social construction' of the basis of validation of choices made through dialogue across social segments and actors. As applied to PH, CH would include the following considerations:

1. CH in PH is a theoretical frame elucidated for knowledge generation with a practical purpose of improving population health through means that are empowering and emancipatory for all. Thereby it has to encompass the diversity of variability, uncertainty and dynamicity of health, and of its human understanding, as social realities.
2. CH in PH denotes understanding and explaining the physical and mental states of human collectives and individuals in relation to all relevant factors and processes under diverse conditions of human experience and in relation to all human activities that influence health; not only those bound by programmes or health services.
3. It implies understanding health as the capacity to maintain balance under diverse conditions and through diverse biological, psychological, environmental, social, material, cultural, technological and political processes. It has to explain health inequalities through all these determinants and pathways. It has to encounter the power imbalances in society and evolve ways to address them.
4. Recognizing the researcher as part of the social context and research as a social endeavour, CH requires adopting a value-critical systems approach that envisages a multi-level, multi-dimensional holistic understanding derived from the perspectives of diverse social segments and actors. Considering the power differentials across them, to give special attention to voices of the marginalized so as to place them in relation to each other and within the whole. Finally to use this

understanding to design interventive approaches that can be emancipatory at a societal level for all.

Politics of knowledge: The hierarchization of different forms of knowledge, between patient and doctor, between the biological/clinical and social sciences, 'modern' conventional bio-medicine and 'traditional' medicine, officially recognized forms of systematized textual traditional health knowledge and 'folk' healers, reflect power equations across these hierarchies. The dominant form becomes the reference point to judge the other. Popular epidemiology and Cultural epidemiology (Brown 1997; Weiss 2001) generate conceptual and methodological tools to enable overcoming of this dominance in the understanding of the nature and causality of health and disease. When that dominant form is reductionist, the thinking 'by default' tends to become reductionist for others as well, unless consciously moored in a different mode of thinking. Conventional bio-medicine or allopathy is considered 'reductionist' and other traditions of health knowledge are characterized as 'holistic.' While this can be considered so on several counts, all knowledge systems also have several streams within them and are dynamic entities (Sujatha and Abraham 2012). The more holistic traditions, for instance, have attempted to adopt many of the dominant system's modes of functioning. Their 'pharmaceuticalization' at the cost of other components of their multi-dimensional measures is an example of their moving in a reductionist direction (Banerjee 2009). Modern medicine is gaining from 'systems biology' and the biopsychosocial model and thereby becoming less reductionist. Fields such as psychoneuroimmunology and critical/cultural epidemiology (Lauderdale 2006) have emerged. Thus, Critical Holism would propose that we examine all traditions for what is reductionist and what is holistic within them, along the entire spectrum from positivist approaches to the interpretivist, realist and holist. This understanding is important in practical terms because it can facilitate Integrative processes by bringing similar elements of the spectrum in each tradition together in a systems approach.

Thus CH does not negate the value of the positivist/reductionist or the interpretivist and the realist approaches and their findings. It attempts to place their findings in relation to the whole. And it attempts to go beyond by widening the boundaries and opening up knowledge generation to ideas contributed from outside of academia, breaking the monopoly of established dominant expertise (Gaitonde et al, 2019).

In doing this it uses the analytical studies of positivist methods to fill in the detail of micro phenomena, interpretivist findings to fill in the diverse contexts and differently perceived versions of human experience, realist approaches to build in linkages and emergent properties of organizational structures and their relationship with the society in which they are embedded. It goes further in examining diverse epistemologies and systems of knowledge. It identifies the critical points of interaction and inflection across various epistemologies, and thereby the possibility of integrative systems that allow multiple knowledges to thrive. Critical points are also identified within the multi-level and multi-dimensional linkages within societies and across societies. This is made possible by the value-critical approach that requires the researcher to consciously explain the values underlying decisions taken at each

step of the research process; to examine ones own intent and to consider who is likely to be affected by each decision and in what way (Ratcliffe and Gonzalez 1988; Ulrich 1993).

HOW CAN CRITICAL HOLISM BE PUT INTO PRACTICE? THE METHODOLOGICAL AND CONCEPTUAL APPROACH

This conscious, self-aware research process requires greater attention to the purpose of the research and its initial framing of the research problem in coherence with the purpose.

Emphasizing that CH's central concern is with practicability, unlike critical theory that attempts to understand, Ulrich "accepts the intrinsic complementarity and interdependence of theoretical and practical reason…" it understands the holistic idea – the systems idea – as having critical significance only; hence, it limits itself to the task of securing at least a critical solution to the problem of practical reason. A critical solution does not yield any "objective" justifications of normative validity claims; but it can at least make us competent in dealing critically with the normative content of applied inquiry and design, and in arguing rationally against false validity claims, e.g., on the part of those who have the expertise and power to decide" (Ulrich 1993: p.8).

Thereby the argument is made of a dialogic and communicative methodology that allows the critical thinking of the marginalized sections of the problem space to surface. The normative content of the systems design can then be collectively addressed by the diverse interest groups, to reveal the purpose, value bases, basis of knowledge and basis of power within the system. A set of questions that reveal whose worldview is most reflected, who is likely to benefit and who to lose most, where will barriers to the desired change arise and from where will support be likely, can be usefully delineated. Such questioning leads to the emancipatory potential of CH.

The first step in CH has to be conceptualization or envisaging of the system as a whole, a 360 degree- three dimensional view. Setting the widest of boundaries depending on the purpose, the research questions and the context of the study site(s) would be the starting point. Then the boundary may be delimited, sub-systems identified, all actors in the problem space located, social segments with special vulnerabilities in the population identified, critical nodes of relevance identified, and all this by drawing upon existing research and experiential or tacit knowledge of patients, providers and administrators, of diverse communities and sections of society. This formative research would help in designing research adopting a CH approach in a way that is practical and feasible. At each step the researchers must examine the available options before them and explain the basis of the decision they took while designing and implementing the research. While being self-critical about this, they should also document them as transparently as possible for readers of their research. The questions to be asked of one-self at each step of the research brings 'value criticality,' as has been detailed by Ratcliffe and Gonzalez 1988.

Applying Critical realist, Complex adaptive systems and Critical Holist approaches

For instance, if we are studying the Tuberculosis (TB) programme to review and redesign the strategies and approach to lower the prevalence and suffering of TB in a population, and we want to go beyond the bio-medical and RCT mode to a more holist approach, we can adopt a Realist HSR approach, as a Realist approach with complex adaptive systems thinking, or a CH approach. How would they be different? The realist HSR approach would examine the given structure of the building blocks in the programme being implemented. Providers' perspectives and the problems they face, patients' initial health seeking behaviour once symptoms of TB occurred, experience of the programme and their outcomes in terms of completion of treatment and cure would be assessed. To understand the challenges faced by patients in adherence to treatment for the entire period, their socio-economic status, the livelihoods patterns of the community being served, issues of stigma and discrimination may be useful.

Adding to the realist approach, the dynamics and processes within and across these sub-systems and as experienced by diverse actors and socio-economic sections, would be well served by adopting a complex adaptive systems approach. What has been the history of TB care in the area, what feedback loops have been instituted and have worked or not worked? Should social determinants such as nutritional status (Bhargava 2016) and psychological stress that have been shown to affect incidence of TB and response to treatment, be included to explain variations in outcomes in different treatment centres of the programme? Clearly, mixed method designs have to be used to capture the various multi-level and multi-dimensional aspects. Involving patients and providers in the interpretation of data to draw conclusions and in giving feedback would help in further enriching the findings with ground realities. A multi-site study comparing across different social and health service contexts would be very useful in further revealing what works where, for whom, when and how.

For the same purpose, CH would go further still. Adopting the CH approach would mean that we begin by answering the question— do we place our boundaries of the problem space at the TB Control Programme, or at the general health service system, or wider still? If the programme is integrated with the general health services, then the wider boundary would be meaningful, if a separate vertical programme, then that itself could define the boundary. The larger social setting would form the environment of the system, and a Social Epidemiology approach would be required to study the eco-social determinants linking the macro, meso and micro factors that need to be addressed. A historical, political economy and cultural approach would delineate the epidemiological trends, natural history of TB in relation to social history and history of measures to deal with it in the area. The prevailing programme structure and functioning would be documented. Having mapped all this, critical nodes can be identified from existing knowledge in literature as well as in consultation with care providers and TB patients. Any epidemiological issues identified may be investigated using appropriate micro-biological studies, community survey for morbidly and mortality studies, the systems' six building blocks within the defined boundary would be studied, not only as the dominant global systems design for them, but for all the available options for each one so as to best serve

the purpose. Health technology assessment would be conducted for a cost-effectiveness analysis as well as the health system capacities required for optional regimens. If health seeking behaviour indicate preferences, traditional medical practitioners may be useful in identifying cases early. Where treatment efficacy and drug resistance or recurrence of TB are issues, the potential role of systems biology, genomics, a higher level ecosystem for research investigating both the host and the mycobacterium in identifying actionable points in the pathology of the disease could provide new approaches for treatment regimens (Kontsevaya et al. 2021; Nikolayevskyy et al. 2019). The role of traditional medical knowledge assisting in provision of adjuvants to decrease side-effects of anti-TB drugs or to enhance their effects and prevent drug resistance developing, are already under enquiry (Sharifi-Rad et al. 2017). Facilitating interaction between systems biology on oxidative stress and traditional medicine may enhance achievements of both to the benefit of patients (Shastri et al, 2018). The perspectives of the various actors on the options would be brought into a dialogic space to address the politics of knowledge. Sharing of diverse perspectives with the explicit common purpose and desirable value frames, would be the expectations from CH based trans-disciplinary research. This would bring into examination the bases of preference of institutions, the health personnel for service delivery, the choice of health technologies and other PH interventions, the sources of legitimacy and of decision making. The dialogic process can help surface the implicit biases behind the preferences and their differences, creating a more transparent engagement with better possibilities of resolution (Stirling 2008).

Such methodological approaches indicate the need for inter-disciplinary thinking for any of these systems thinking based approaches, to widen the scope of enquiry with coherence in the design and interpretation of findings. It also requires the use of trans-disciplinarity to open up the research process to include the users of services as well as the providers and administrator-planners. The shift in paradigm from the positivist to the Critical Holist is an epistemological one, as has been well established in the philosophy of science (Boon and Van Baalen 2019) and is in evidence in fields such as science policy studies and sustainability studies. PH is yet to make this leap even though all its elements are ready and in place. Fragmented by its sub-fields and by the attraction for the reductionist approaches of the powerful national and global technocracies, the application of CH for policy and planning will require assertion of democratic values and collective self-interest.

Uni/Multi/Inter/Trans-Disciplinarity: Generating knowledge through a CH lens will need recourse to all kinds of disciplinary arrangements. Drawing upon uni-disciplinary and multi-disciplinary research findings as relevant, it would undertake evidence-synthesis through inter-disciplinary thinking and trans-disciplinary empirical work. Depending on the nature of problem being studied, the level of knowledge already available would inform the research questions. While initial exploratory studies may be uni or multi-disciplinary, as basic findings emerge, inter-disciplinary synthesis would be necessary. The whole spectrum, from positivist to holist approaches would be used as appropriate to the problem. The more holistic explanatory frames of the biopsychosocial clinical model, eco-social epidemiology, various systems approaches (Ackoff 1971) like political economy of health and the politics of knowledge would be useful for holistic inter-disciplinary linking across multiple levels and dimensions.

Further, adopting trans-disciplinarity and drawing non-academic discipline-based actors into the research thinking, such as user communities or policy makers, would 'open up' to a wider social base and diversity of perspectives (Toomey et al. 2015; Muntaner 2013; Marshall et al. 2018).

Conceptual blending: Holistic approaches such as the biopsychosocial, eco-social, political economy, across PH sub-fields themselves denote 'blended concepts' arising from inter-disciplinary thinking, and they also facilitate further inter-disciplinary thinking. Terms such as 'wellbeing,' quality of life, health culture are other examples of such useful concepts for holistic thinking (Pleshakova and Quintan 2013; Dooris et al. 2017). Applying them to examine the diversity and inequalities across social segments, identifying the pathways by which structures of differential power result in the inequalities through historical analysis of trends in health, political and economic conditions as well as the politics of knowledge would be the contribution of critical thinking. Together, CH adopted in this way could provide broad frameworks for the spectrum of paradigms, from positivist to holist and from bio-medical to ecological to enrich themselves and transcend the present reductionist dominance.

IN CONCLUSION

Public Health needs to make a conscious epistemic shift in order to bring more centrally into its practice the approaches such as of the clinical biopsychosocial model and systems biology, ecological and social understandings of health and disease, realist and complexity theory, that are now well established advances of the past four to five decades. For this purpose, Critical Holism appears to be a theoretical frame whose time has come.

This paper argues for consideration of its use as an overarching frame for public health research, with the practical purpose of informing health policy and planning based on PH values and principles. Holistic approaches are considered desirable as ideals across clinical, epidemiological, HSR and policy studies as fields of research. However in the bulk of health research, the predominant ethos/mindset/paradigm remains reductionist, still dominated by the conventional bio-medicine and disease orientation. A paradigmatic shift to CH as the 'new normal' default thinking may break this stranglehold even while it makes bio-medicine itself more holistic. Ways of thinking and doing research and of teaching PH will then have to incorporate the theoretical advances, as has already happened to some extent in fields such as of Ecology, Sustainability studies and science policy studies. The basic requirement is of a default conceptual capacity to visualize 'the whole' and then to place the problem to be addressed within it. Formulating the research problem appropriately in relation to other interlinked dimensions of the whole, using an appropriate eclectic choice of methods, and interpreting the data gathered internal to the problem boundary and in relation to the whole, would facilitate de-fragmenting the knowledge and practice of PH. This 'new normal' is what the scientific enterprise has made strides towards, and needs to assert it as the 'scientific temper' of the present century.

The classical bio-medical Cartesian mind-body divide has to become an approach of the past. A conception of 'the whole' has to become the paradigm in health. For explanatory understandings, the scientific imagination has to be imbued with 'the big picture' within which even the most micro-level research can be embedded. The clinical imagination has to be imbued with an epidemiological imagination. Epidemiology has to widen its scope to study not only causal factors quantitatively, but also social, economic, political, cultural processes that will require qualitative tools. Health perception and behaviour studies will have to become vital components of HSR, with these being studied for patients, communities, health care providers and policy makers and administrators. Generating a 'dialogue' across these various actors is what trans-disciplinary research could contribute, providing an intelligible articulation of each ones perspective to foreground the commonalities and differences. Knowledge traditions across time and space should be brought into dialogue with each other and drawn upon for appropriate use.

Value-criticality, with a self-conscious transparency of choices made in the research process, is the second essential for CH. Addressing the issues of access to quality care and its affordability has to be integrated with maximizing the agency and empowerment of patients/communities across different social segments. HSR has to develop an openness to plural epistemologies and health knowledge traditions, something its contemporary avatar seems to have avoided. A widening of its horizons through a dialogic ecosystem that encourages the various PH paradigms to interact with each other and with society at large, will deepen and strengthen the discipline.

Finally, PH has to be able to claim its central place in thinking about and intervening for a more caring, ecological and sustainable societal development. PH's inherent values and principles, as well as its basic objectives of enhancing human survival and wellbeing, make it an eminently suited claimant for this space, if it is able to create a holistic vision that includes space for diversity of all.

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