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Toward a solution-focused addiction science

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During the past 50 years there has been immense progress in our understanding of the etiology, pharmacology, neurobiology, epidemiology, and typologies of alcohol and other drug use disorders that has given rise to numerous novel pharmacological and behavioral treatments and recovery support services. Consequently, much has been documented and published regarding the causes and effects of drug use, addiction, related pathologies, and myriad modes of treatment. While such progress is to be celebrated, significant challenges nevertheless remain. This paper describes a novel perspective that proposes to enhance the effectiveness of our international efforts in addressing endemic drug problems through rigorous investigation into the successful long-term solutions that exist within the lived experiences of individuals, families, and communities. In this regard, such solutions are proposed to exist on a continuum of change spanning five domains: *resistance*, *resilience*, *risk minimization*, *remission*, and *recovery*, with each viewed as an independent achievement or as stages within a larger process of personal change. Ultimately, it is argued that the frontiers of addiction research lie in extending our study of the problem to include an intense focus on the prevalence, pathways, processes, styles, and stages inherent within these five domains.

KEYWORDS

addiction, recovery, remission, resilience, substance use disorder

Introduction

Recent decades have witnessed exponential growth in the volume and methodological rigor of addiction-related research studies (1). The depth of this new knowledge has occurred in areas of addiction etiology (e.g., genetics, epigenetics, trauma/stress), drug pharmacology, neurobiology, epidemiology, and typologies, that has resulted in greater elaboration and discovery of the exact biopsychosocial nature of the spectrum of substance involvement and impairment resulting in clearer delineation and diagnostic classification of these phenomena (2). The personal, familial, community, and cultural consequences of excessive drug use also have been meticulously studied and reported (3). Internationally and as a specialized field, we have developed and evaluated multimodality systems for the treatment of addiction, with a particular focus on risk factors related to addiction recurrence. Within the arenas of prevention, harm reduction and treatment, our focus has been on those individuals with the highest problem severity, complexity, and chronicity. In short, much has been documented and published with what we know about drug use, drug addiction, its related pathologies, and the many modes of addiction treatment.

The question to be addressed in this commentary is: How much is known scientifically about the long-term solutions to the problem of addiction—solutions that exist within the lived experience of individuals, families, and communities? For those at highest risk of severe and prolonged addiction careers, solutions might be conceived to exist on a continuum of change spanning five domains: *resistance*, *resilience*, *risk minimization*, *remission*, and *recovery*.

Each domain may be viewed as an independent achievement or as stages within a larger process of personal change (4, 5, 47).

Definitions of these domains may be contested by those seeking to protect or extend the boundaries of each concept and the professional and economic interests contained in each (48). Rigorous evaluation of proposed definitions is warranted, but beyond our present intent. However, to assure both conceptual integrity and broad applicability, each proposed definition must eventually, and in practice, meet the criteria of precision, inclusiveness, exclusiveness, measurability, acceptability, and simplicity (6).

Proposition and analysis

Resistance is the process through which those who know they may be at high risk of addiction consciously refuse or severely limit drug exposure as a preventative measure and as an assertion of personal or cultural sovereignty (7). Innumerable studies have identified such addiction risk factors as familial addiction history, early onset of drug use, atypical drug tolerance, developmental trauma, co-occurring medical/psychiatric illness, and drug-saturated physical and social environments (8). But from the standpoint of science, we know very little about the experiential psychodynamics of successful drug avoidance and refusal among those individuals at highest risk for substance use disorders. Such knowledge could enhance the design of targeted primary prevention programs.

Addiction is a disease of exposure; resisting individuals manage their personal risk by consciously refusing or limiting drug exposure and often doing so as an act of psychological defiance or social protest. This is a pattern sometimes seen in children traumatized by parental addiction (“I’ll never end up like my dad”) or among groups who have experienced the weaponization of drugs as a tool of cultural subjugation (9, 10). Examples of the latter can be found within two historically drug-besieged communities. Drug resistance within Native American tribal communities extends from early abstinence-based religious and cultural revitalization movements (e.g., Handsome Lake Movement, the Prophet Movements, Peyotism) to the more recent Red Road and Wellbriety movements (11). Drug resistance among African Americans can be found in calls for abstinence-based cultural protection and revitalization that span the writings of Frederick Douglass, Malcolm X, and other prominent leaders (12, 46). As a scientific community, we know very little about the life trajectory of high-risk individuals and groups who resist drug exposure. The high risk of intergenerational transmission of addiction and related problems linked to historical trauma is well-documented (13), but we know little about those experiencing such trauma who escape such transmission.

Resilience, a form of neuropsychological hardiness or immunity, is the process through which those at high risk for addiction avoid addiction in spite of significant drug exposure (14). Consider two siblings who share numerous addiction risk factors and similar experimentation with a broad menu of psychoactive drugs. One develops a severe, decades-long addiction and related medical sequelae while the other achieves a healthy life trajectory. Scientifically, we know a great deal about the addicted sibling, but very little about the non-addicted sibling. We need to understand the protective factors of the healthy brother that prevented the progression from drug use to drug addiction (15). Identification of such factors and designing

intervention programs to enhance such factors at personal, family, and community levels could guide the future design of targeted prevention and early intervention programs (16, 17).

A solution-focused research agenda could provide answers to key questions (18). Is immunity a fixed state or something more dynamic that ebbs and flows in response to human ontogenesis and changing life circumstances or fluctuations in health status? Are there educational, medical, or psychological interventions for people with high vulnerability for addiction that can reduce or eliminate such vulnerability? If, for example, the essence of addiction vulnerability is at its core metabolic dysregulation and addiction recovery involves a restoration or creation of metabolic health, then studies of the neurobiology of long-term recovery could open new avenues of preventive treatments, including gene therapy (e.g., CRISPR-facilitated gene editing), immunotherapy (e.g., addiction vaccines), and medications that provide immunity to overdose or drug-related damage to body organs.

Risk Minimization, in the context of addiction, is the process through which addicted individuals alter the frequency, intensity, manner, and circumstances of their drug use to minimize drug-related harm to self, family, and community. Harm reduction as a public health philosophy and model of service intervention has increased internationally, spurred first by addiction-related HIV/AIDS transmission and more recently as a response to the acceleration in opioid overdose deaths (19, 20). While successful risk minimization has been documented via reductions in key indices of harm (21–23), the personal mechanisms of change undergirding such efforts remain unclear and whether such mechanisms are confined to certain expressions (phenotypes) or stages of addiction (i.e., individuals in pre-contemplative or contemplative stages of change who are not ready or willing to stop drug use, may utilize and benefit from certain harm minimization services (24, 25). Identifying and isolating such factors, designing interventions based on those factors, and expanding such interventions at a community level remain important agendas for most communities. Similarly, at a community and cultural level, extreme energy has been expended on the causes behind the exponential rise in drug overdose deaths, but little actual data on factors related to the recent decline in such deaths (26). Isolating such factors, designing interventions based on those factors, and expanding such interventions at a community level remain important agendas for most communities. As a research community, we need to study drug users, and particularly addicted drug users, who are achieving successful harm minimization. For example, we have considerable knowledge of people who experience multiple opioid overdose hospitalizations but not about those who experience one such hospitalization and avoid future overdose incidents (27). To what can the latter success be attributed and can it be brought to scale at a community level within the drug-using population?

Remission is the process through which those individuals who meet diagnostic criteria for a substance use disorder cease or decelerate drug use and related consequences to the point that SUD diagnostic criteria are no longer met (2). This change process spans full remission (absence of all SUD symptoms) or partial remission (absence of some but not all SUD Symptoms) remission (2). While a critically important milestone in and of itself, individuals nevertheless can remain in a grey zone of somewhat static remission where there has been a subtraction of addiction pathology, but not much improvement in the kinds of quality of life, meaning and purpose, and

social involvement and social contributions often associated with a more flourishing, “technicolored,” recovery (28). We know that remission durability is time dependent—that the rate of addiction recurrence is high during early stages of remission, and we have documented the propensity for prolonged addiction careers marked by recycling through diverse treatment approaches (29). We know a great deal about the long-term trajectory of substance use disorders and brief abstinence and moderation experiments, but far less about the trajectory of successful long-term remission from substance use disorders. What do we know about the neurobiology of remission initiation and remission maintenance? What happens physiologically and psychologically to those who achieve successful long-term stable SUD remission? What are the stages of change and active ingredients that mark such success? The addictions literature is filled with studies of short-term relapse and related risk factors, but in comparison only scant attention to the mechanisms of long-term relapse and stable remission, and even less to the prevalence and processes involved in the achievement of partial SUD remission.

Recovery is the process through which those who have experienced addiction achieve remission plus significant elevations in global health, social functioning, and community contribution (citizenship) (6, 30). Recovery can include a state of flourishing—dramatic elevations in quality of life, meaning and purpose, and social contribution (31–35). Recovery is a recently emerging paradigm within efforts to forge more solution-focused systems of care for SUDs (36, 37). A recovery focused research agenda is just emerging as the scientific measurement of addiction recovery is in its infancy (4, 38). Most studies of recovery to date use measures of remission (pathology subtraction) and only recently has attention been given to what is added – the broader recovery-derived achievements in quality of life, social functioning, and community contribution (39, 48). Arriving at measurable operational definitions of recovery as distinct from remission [e.g., (40)], involving the different elements’ dimensional thresholds and durations within the recovery construct domain, is difficult but once achieved could lead to estimations of the prevalence of recovery (distinguished from remission) across demographic and clinical populations and how these rates are changing over time at local and national levels [e.g., (41, 42)]. Other questions to be answered include: What are the pathways of recovery initiation and the primary and secondary catalysts of change within these pathways? What varieties exist in the methods of successful long-term recovery maintenance? Are there specific recovery phenotypes as well stages of recovery and stage-specific challenges and opportunities across and within types? What are the stages and processes of family recovery? Does parental/family recovery reduce SUD risk for the children of formerly addicted parents?

Extracting the most potent and actionable ingredients from the collective experience of recovering individuals and their families could lead to bold innovations in the prevention and treatment of addiction as well as to new approaches to long-term recovery management (18). For example, is the prevalence of flourishing within addiction recovery greater within programs that integrate medication support within a vibrant, peer-based culture of recovery compared to approaches that only provide medication or provide only limited psychosocial support? As with remission, few references can be found to partial recovery in the addiction literature, and most of these refer to partial restoration of damaged body functions and not to SUD recovery.

It is important that solutions be explored across the spectrum of problem severity and complexity. For example, the prevalence of

opioid overdose deaths is often cited as consequence of opioid addiction in spite of evidence that many people experiencing such deaths are opioid experimenters/users who would not meet diagnostic criteria for an opioid use disorder. We know very little about this population of drug casualties. How do drug experimenters/users avoid harm and progression to drug addiction?

Recent studies reveal that some chronic smokers avoid smoking-related illnesses (i.e., cancer) potentially due to genetically influenced protective mechanisms (43). There may be similar genetic protective factors that explain how some individuals can exhibit prolonged heavy use of other psychoactive drugs without developing a substance use disorder or drug-related medical complications. Isolating such factors through scientific inquiry might afford an opportunity for new interventions at personal and community levels to prevent or abort progression from drug use to destructive patterns of addiction. The research of Granfield and Cloud (44) underscores the importance of “recovery capital” in the resolution of severe substance use disorders, but such internal and external assets likely also apply to the successful resolution of subclinical substance-related problems (35). We need a deeper scientific exploration of the role of such assets within the prevention and resolution of drug-related problems across the severity spectrum (45).

Discussion

As described extensively in the history of addiction treatment and related problems in America (1), the evolution of addiction science could be conceived to be marked by three broad stages. The first stage followed a pathology paradigm in which addiction was isolated as a medical and social problem worthy of scientific study. The focus was on the problem—its definition, classification, essential nature, patterns and prevalence, and its causes. The assumption was that if we expanded our knowledge of the sources of addiction—its root cause(s)—that solutions would emerge from that understanding. The second stage could be considered an intervention paradigm through which intervention programs were designed and evaluated across the continua of primary prevention, harm reduction, early intervention, treatment, and recovery support services. The assumption here was that identifying the most effective interventions would allow replication of the most effective interventions in local communities and across the world. Such identification and replication have occurred, but with increased understanding of their limitations. The third and emerging paradigm is study of the successful solutions at individual, family, community, and cultural levels that exist across the spectrum of drug problem severity and across diverse cultural contexts (6, 18). The assumption here is that studies of successful recovery trajectories and successful programs could reveal elements that could be broadly replicated in other service settings and population-based prevention efforts (41).

Review of existing literature in the domains above, highlights the vital and important progress that has been made in the past 100 years in addressing endemic addiction problems. It also uncovers and identifies substantive knowledge gaps and, consequently, many new opportunities. It is time as a research community that we developed an agenda that can broaden our scientific knowledge of all these levels of positive change. Each of the five domains of change described above we assert may exist on

spectrums of depth and durability. The qualitative and quantitative dimensions of these changes warrant mapping and measurement as a future research agenda. We have measured what addiction has taken, but we have not measured the magnitude and types of positive changes that can occur across these five domains at personal, family and community levels (31, 33). We argue that expanding the frontiers of addiction research involves extending our study of the problem to include an intense focus on these solutions as noted above: the prevalence, pathways, processes, styles, and stages of resistance, resilience, risk minimization, remission, and long-term recovery. Scientists of our generation have entered this new solution-focused research frontier. It is our hope that the next generation of investigators will continue this exploration far beyond what we have envisioned to uncover, discover, and disseminate new knowledge of the multiple successful pathways followed by tens of millions into stable addiction recovery.

Author's note

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Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

JK: Formal analysis, Writing – original draft, Writing – review & editing. WW: Conceptualization, Formal analysis, Writing – original draft, Writing – review & editing.

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