IRAN UNDER SANCTIONS

The Impact of Sanctions on Medical Education in Iran

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SAIS

ABOUT IRAN UNDER SANCTIONS

Iran's economy has been under sanctions in one form or another since the 1979 revolution. Yet little systematic knowledge exists on the short- and medium-term impacts of sanctions on the growth patterns of the Iranian economy, the general welfare of its people in the cities and rural areas, societal dynamics, civic space, and the country's environment. The focus has often been on a few metrics that flare up with tightening of sanctions: currency depreciation, inflation, and recession, which are then followed by increases in unemployment and poverty. But the more comprehensive picture is lost in political cacophony around the policy's merits. This is the gap that SAIS is filling with its Iran Under Sanctions project, which is a 360-degree in-depth view on the implications of sanctions on Iran. This first-of-its-kind research provides for an instructive case study on the use of sanctions as a tool of statecraft. For any questions or feedback on the project, please reach out to Ali Vaez at avaez2@jh.edu.

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TABLE OF CONTENTS

I. CONCEPTUAL OVERVIEW

Iran has been targeted by waves of unilateral and multilateral economic sanctions for four decades. While in recent decades these have exempted humanitarian transactions, a well-established body of research shows that the sanctions have gone well beyond the intended economic impact on targeted industries to affect various aspects of livelihood. Immediately following the 2015 nuclear deal between Iran, the U.S, UK, Germany, France, China and Russia known as the Joint Comprehensive Plan of Action (JCPOA), Iran experienced a brief period of limited sanctions relief and the prospect of broader engagement with the world. That prospect was immediately destroyed when Donald Trump became president and soon withdrew the U.S. from the agreement and imposed comprehensive economic sanctions that have seriously impacted Iran's economy and its people's livelihood.

Understanding the impact of sanctions on health and healthcare systems provides a lens for understanding their impact on society and citizens' lived experiences, sense of self and relationship with the future. Most research regarding sanctions and Iran's healthcare has focused on immediate shortages of medicine and short- and medium-term impediments to accessing care. This paper, however, concentrates on sanctions' long-term and cumulative impact on medicine itself, resulting in infrastructural and cultural/professional/pedagogical changes.

While the experience of sanctions is primarily known to affect patients, little attention has been paid to how sanctions impact the way medical professionals – those in formative professional stages in particular – are trained and/or compelled to practice medicine with direct or indirect implications for the general population. This paper provides a preliminary analysis of sanctions' impact on medical education by drawing upon qualitative research into perceptions of doctors who were either involved in designing educational policies or educators during the period that sanctions were fully or partially in effect. The aim is to go beyond prevailing dichotomies in debates on sanctions that are narrowly focused on establishing a causal relationship between a particular measure and impact on the ground and overlook the complexity of the cumulative impact in conjunction with coexisting realities. The

research draws on the lived experience of those involved in medical education and on alternative narratives that challenge formulations attributing specific negative health outcomes to sanctions *alone* at the risk of masking significant concurrent contributing factors, as well as alternative or generative outcomes and opportunities for circumventing scarcity.

The overarching argument put forward by our interlocutors points to the impossibility of pinpointing causality when it comes to the impact of sanctions on their pedagogical experiences or the life of medicine in general. Rather, overlapping experiences of educators and those at the receiving end as trainees point to how operation under sanctions impacts medical education in three distinct but connected areas: clinical decision-making (treatment, distribution of resources, ethics of care, training and being trained); research and the psychopolitics of knowledge production; and personal decision-making and one's sense of role and place in society. This multi-generational condition not only changes the experience of medical education, but will likely also impact long term medical care in the country.

This paper draws on the preliminary findings of research conducted in 2020 and is part of a broader ongoing project on the impact of sanctions on medical education in Iran. It draws upon existing, scarce literature on medical pedagogy and discourse analysis in relation to shifting policies in medical education, as well as extended interviews with trainees, educators and key actors in educational policy-making. One author's experience as a physician trained at the University of Tehran provides both further access to key networks and lived experience and situated knowledge required for contextualizing the data. Interlocutors have diverse academic backgrounds, representing both clinical trainees and seasoned as well as mid-career physicians and educators. Educators and medical trainees were asked to reflect on personal and professional experiences in relation to sanction regimes. Some questions asked include: which stages and aspects of medical education are affected most? How are sanctions experienced at micro and macro levels by educators and trainees? What patterns have emerged over time, and how have they changed in different periods of U.S. sanctions policy? What is the impact on medicine, academia and higher education in general? Which parts of these experiences can be attributed *directly* and solely to sanctions? These questions are informed by existing data about sanctions' impact on healthcare itself.

II. DATA ON THE IMPACT OF SANCTIONS ON HEALTHCARE

Iran has been under unilateral U.S. sanctions since the 1980s. These have expanded over decades, becoming more sophisticated, subjecting non-U.S. entities and at times being reinforced multilaterally by the European Union (EU) and UN. The most expansive ones have targeted not only Iran's nuclear and weapons production industries, but also its financial institutions, international transactions and oil production and automotive sectors.[1] From 2006 to 2015 when the JCPOA was concluded, Iran was subjected to progressively intensified international sanctions. At its height, UN Security Council Resolution 1929 imposed severe restrictions on the banking system.[2] With implementation of the JCPOA in 2016, the EU and UN sanctions were terminated, and the U.S. committed to loosen some of its restrictions, particularly for non-US entities. When Washington withdrew from the JCPOA in May 2018, however, almost all previously lifted sanctions were re-imposed, and more were added.[3]

Since 2000, the U.S. has exempted export of agricultural and medical products under the Trade Sanctions Reform and Export Enhancement Act.[4] The U.S. Treasury Department has issued general licenses for humanitarian transactions, including the work of nonprofit and humanitarian NGOS and services, as well as software and hardware for personal communications.[5] Nevertheless, despite the exemptions, researchers point to the negative impact of sanctions on Iranians' access to health care, particularly medicine, and mostly as a result of companies and mainly banks being fearful of being subjected to broad U.S. sanctions. Iran has prioritized domestic production to minimize dependency on imports; according to official statistics, it produces 97 per cent of the medicines used domestically.[6] A third of the domestically produced medications, however, are dependent on imported raw materials.[7] Most imported medicines are those required for treating rare and special diseases.[8] According to statements, 70 per cent of such medical equipment as Magnetic Resonance Imaging (MRI), scanning devices, dentistry equipment and hospital beds is imported.

Between 2010 and 2015, researchers noted reports of widespread shortages of special medicines for cancer patients, haemophiliacs and diabetics.[9] Post 2018, UN human rights officials and human rights groups continue to report difficulties in accessing specialized treatments for leukemia, epidermolysis bullosa (a disease that causes fragile, blistering skin) and epilepsy.[10] Numerous media reports point to disruption of access or shortage of insulin and cancer medicines.[11] While it is difficult to differentiate between the impact of the government's role in allocating funds for timely import and corruption and smuggling issues on the one hand, and sanctions' direct impact on the other, several cases indicate that banks or companies chose to end trade with Iran for fear of sanctions.[12]

III. MEDICAL EDUCATION

Though structured as a direct doctorate program (seven to eight years of undergraduate studies), the Iranian medical education is modeled after the U.S. system, and its content is mainly adopted from American textbooks. Pedagogically, however, medical education has undergone a major curricular reform, resulting in the launch of a new curriculum in 2011.[13] In the old system, the first two years included a thorough curriculum of basic sciences, followed by a year of physiopathology, two of clerkship in various specialties, and two of clinical internship. In the latter, trainees gained hands-on clinical practice while spending several months in core rotations, such as internal medicine, surgery, obstetrics and gynecology, and pediatrics, as well as month-long elective rotations including psychiatry, ophthalmology, dermatology and ENT. In the new system, in line with global trends, the first years are dedicated to an organ-based education, as opposed to a discipline-based introduction to basic sciences. Lectures and courses often follow American textbooks and international references such as UpToDate. U.S., UK and Persian medical journals are widely used in training.[14] As elsewhere, training increasingly relies on online sources and platforms as well as access to international medical journals and research outputs. When it comes to specializing, admission to residency programs (not unlike medical school itself) is based upon an annual national competition. Curriculum aside, it is important to keep in mind the developmental stage of the interns and residents. Having passed several competitive exams, most are of the age when the stresses of making ends meet and consolidating careers prevail.

Sanctions did not impede the preliminary stages of recent pedagogical reforms as much as internal resistance and intra- and inter-institutional rivalries did. But at the implementation stage, sanction had both direct and indirect impact, including limiting opportunities for procurement of Skills Lab equipment, software, online subscriptions, etc. Experts who spearheaded the reforms contend that it is difficult to differentiate between causal factors, as sanctions' impacts were intertwined with internal institutional politics and power struggles, as well as with broader domestic policies restricting access to platforms

like Zoom or YouTube. "Most of what we interpret as the impact of sanctions", one said, "is in fact the result of internal discord and politics; while sanctions are fundamentally detrimental, they can also become a scapegoat in official narratives to explain all ills". Others argued that beyond direct and tangible restrictions -- such as those affecting procurement for Skills Lab equipment or software -- the psychological impact of day-to-day conflicts significantly diminishes rigorous scientific and academic exchange and collaboration. The resulting mentality, in other words, is more consequential than the material restrictions that are often eventually circumvented one way or another.

We consider the training of doctors as situated in the intersection of three areas and how they change as a result of sanctions:

- access to educational material, medication or technology (more tangible);
- access to global economies of knowledge, international mobility and exchange; and
- modes of socialization and professionalization: ways of being and becoming a doctor, how one perceives doctoring and his/her future.

IV. THE IMPACT OF SANCTIONS ON EDUCATION

Our research indicates that in analyzing the impact of sanctions on long term and multi-faceted processes such as education, the perceptions and interpretations of individuals are as significant as tangible and measurable impacts. For example, alongside verifiable clinical or economic implications, rumors and hearsay become instrumental in shaping doctors' and medical trainees' informal and tacit forms of knowledge, which in turn continually shapes their mindsets and clinical decisions and/or teachings. These perceptual effects reflect conditions of possibility, opportunities or lack thereof and spaces of discrimination that are often masked in quantitative analyses of the impact of sanctions.

Broadly speaking, sanctions' impacts can be divided into direct and indirect categories: direct impacts include lack of access to certain diagnostic techniques, limited access to educational material (such as Coursera or Up-to-date or certain medical journals) or applications, and the challenge of monetary transactions to access or submit to certain journals that reject Iranian submissions outright based on the indication of "violating sanctions". In many cases, a variety of methods are used to bypass restrictions and substitute access, such as piracy, VPN technology or alternative international resources. Direct impact is easier to identify in specialized areas of medical education, where cutting-edge diagnostic techniques, medical devices or access to academic exchange play more significant roles.

The main aspects of medical education that are clearly impacted by sanctions can broadly be categorized as: clinical decision-making, when lack of access to most up to date medical devices for diagnosis and treatment of patients during residency can limit the scope of experience and training; difficulties in academic exchanges and participation in research production due to risks and restrictions associated with traveling; increasingly prohibitive costs of membership in associations and

of journals; as well as the perception of their identity as a doctor in connection to their own society and global community. Indirect effects, however, are manifest in more insidious, perceptual and reputational matters, such as a sense of isolation from the international scientific community and of losing exchange or learning opportunities; or even more tangible outcomes such as Western academics being reluctant to travel to Iran for conferences or academic exchanges out of concern for consequences in the U.S. This reputational and psychological deterrence is a by-product of both U.S. policies and more complex internal realities, such as the securitization of scholarly work by the Iranian regime over the past couple of decades, resulting in the detainment and harassment of several foreign and dual national scholars, with both pragmatic and psychological/diplomatic implications.

In sum, the impact of sanctions manifest in three experiential areas of decision-making:

- clinical (treatment, distribution of resources, ethics of care, training);
- research and the psychopolitics of knowledge production: what constitutes research, to what end (eg, CV, publishing with the goal of migration), dynamism and mobility (growth in plagiarism versus possibilities for international exchange); and
- personal worldviews: intersection with broader life decisions, such as choice of specialty, whether to leave Iran, etc.

a. Clinical decision making

Lack of access to the most modern techniques and medical devices for diagnostic and treatment procedures is the most tangible impact of sanctions on not only the quality of education, but also the perception of being "behind" the world. The quality of training, particularly in specialized areas, depends greatly on trainees' access to techniques and medical devices they can experiment with during residency at public university hospitals. Imaging techniques such as computed tomography (CT) perfusion and radiotherapy techniques for specialized diagnosis in neurological issues and cancer, as well as disruption in availability of chemotherapy medications, are among the most common examples.

Access to some commonly used educational material is also impacted, though scientific publications and textbooks are barely affected. Iran does not abide by copyright laws, so there has been unlimited access since the 1980s to offset copies of most original textbooks at a cheaper price. But online material is a different story. When access to online material is blocked, it is difficult to determine whether the cause is external sanctions (Coursera, Up To Date) or domestic censorship AKA "filtering" (Twitter, YouTube). The impact on first and second year medical students, who rely primarily on textbooks, is thus less significant than on clinical trainees. Access to some publishing resources has indeed

fluctuated over time; some become available after a series of negotiations, including restricted access to PubMed that has now been sorted out, and instances such as the restricted access to Medline that was mysteriously lifted.

The more tangible issues often have to do with restricted access to software and educational platforms. Apple's strict adherence to sanctions resulting in blocked access to the Apple Store and applications, for example, is consequential, since many Iranians use its iPhones, iPads and laptops. Zoom and Coursera are complex examples of platforms that exclude Iranians from subscriptions. Coursera's website states that it does not allow users in certain countries or regions including Iran to "access ... certain parts of our site, including certain degree program content".[15] Iranian users have shared screenshots of Coursera that block access of Iran IP addresses to the entire website.[16] Similarly, Zoom's website states that, for regulatory reasons, Iranians cannot access its services.[17] However, there is little consensus among users on whether the real reason behind the blockage is sanctions or censorship and domestic agendas for monopolizing domestic platforms. In response to Zoom's unavailability, a national alternative platform, NAMAD, was launched for Persian speakers, but educators and trainees frequently report its inefficiencies and question the academic versus ideological and political logic behind such "failed" attempts at promoting the discourse of "self-reliance". Many educators are concerned that these domestic "equivalents" to global platforms or social media are both poorly received and often come with high cost and low quality.

For internationally recognized and widely used resources such as Up To Date (UTD), the mechanism is more straightforward: the platform does not allow subscriptions from Iran. In the post-2015 climate of the nuclear deal, a loophole was briefly created for the Ministry of Health and Medical Education to obtain a legal subscription, but that was undone after 2018. At best, one now can access UTD via pirate Chinese websites, and one of our interlocutors, a veteran medical educator and clinician/researcher, pointed to dangerous consequences: first, normalizing illegal activity and breaking copyright laws changes a society's sense of ethics over time; and secondly, going through too many loopholes and short cuts, some of which keep failing and have to be reinvented, creates mental fatigue and kills motivation, so one eventually thinks "why bother". Significantly, several interlocutors expressed sentiments such as "how many times would one try to 'break the filter' on YouTube to watch a demo on a specific procedure before giving up?" This in part explains the over-reliance on textbooks in Iranian medical education, a trend that has become increasingly outdated globally and replaced by interactive platforms and manuals such as UTD.

b. Research and knowledge production

During the brief period after the JCPOA, there was optimism that international exchanges would increase, but after the most recent round of U.S. sanctions and Trump's maximum pressure policy, the number of foreign academics willing to risk traveling to Iran has dropped. It is also increasingly hard for Iranian medical students and faculty to overcome economic and political barriers (visa, travel ban, etc.) to attend international conferences.

Our research indicates that the medical community is frustrated at the difficulties in establishing and sustaining connections to the international academic community, particularly after 2018. The contributing factors, however, go beyond the direct restrictions imposed by sanctions. Economic deterioration tied to the sanctions, restrictions on travel to Iran and the Iranian establishment's suspicions and securitization of academic exchanges have further complicated navigation of the logistical barriers created by sanctions (such as transfer of money).

The issue of mobility and access to global networks is intimately tied to visceral concerns about representation on the global scientific stage. Many medical doctors and scientists in official positions underscore the *mutual* nature of the damage at cultural and diplomatic levels but imply that sanctions have after all failed to diminish the *academic* quality of medical education, since restricted access to educational material has never stopped Iranians from finding alternative ways to access the latest scientific developments. The key issue, they maintain, is the entrenchment of cultural misconceptions and animosity between Iran and the U.S.: "if you are deprived of meeting people from other places, not to mention the experience of visa and border regimes, you end up with mutual resentment and misconceptions. That's damaging for both sides".

Others with more hands-on experience are adamant that nuance is often missing from this often bipolar debate, especially among officials and the Diaspora who do not experience the day-to-day realities. Restricted mobility and international exchange via conferences, for example, is situated in a set of complex discursive processes, some sanctions related, some largely due to economic collapse, the rial's devaluation, dwindling university budgets and decisions inherently related to domestic rather than international politics. The chicken and egg question is are international guests reluctant to visit Iran because of the renewed sanctions (with implications for U.S. travel since 2018), or because of misconceptions or geopolitical complexities? How to pinpoint which is more damaging to diplomacy and global community membership: sanctions' brutal and inhumane reality? News headlines about detained foreign nationals? Issues related to scientific rigor? Or all the above?[18]

When a physician official and immunologist with extensive experience in research organized the first International Congress on Immunodeficiency in Iran in 2005, over 60 international guests were hosted in Tehran and treated to sightseeing in Isfahan and Shiraz. Fifteen years later, in the aftermath of renewed sanctions and heightened anxieties created by a punitive border regime that prohibits Europeans who have visited Iran to enter the U.S. without a visa, he laments, one should "forget about any such exchange". A clinical immunologist by training, he uses the immunological metaphor of *hypersensitivity* to describe the damaging consequences of isolation from global economies of knowledge. Diminished international mobility due to sanctions, border regimes and, most recently, the significant currency devaluation that makes visas, travel and conference registrations increasingly unaffordable deprives all involved societies not only of academic exchanges (with the direct implication of missing mutual learning opportunities and certain clinical experiences), but also of exchanges that allow for cultural *desensitization* and immunity. The damage, he argues, is mutual. Isolation results in lack of familiarity and thus, in immunological terms, "hypersensitivity to foreign bodies".

But international exchanges are not limited to conferences and research trips. Over the past two decades, international student exchanges have gained new significance for medical education in Iran, a notion that was absent in the late 1990s. It is likely that sanctions contributed to a sense of urgency to seek opportunities elsewhere. European grants that involved **funding individuals as opposed to institutions were not affected by sanctions. Iran has joined the International Federation of Medical Students' Associations (IFMSA) and Erasmus Plus, a global health net**work for student exchange in each round of which four medical students are eligible to be hosted in Iran. A parallel memorandum of agreement with medical schools in Ukraine provides for one-month exchanges of medical students without fees. Established partnerships with U.S., German and UK medical schools for short-term clinical exchanges during internship and residency also existed but were all aborted after the reinstatement of sanctions in 2018. The 2015 Memorandum of Agreement with the Mayo Clinic, for example, had established a two-way route for three-month exchanges that the officials involved considered "a huge achievement and milestone". But with the Trump administration and the subsequent travel bans, the plan was dropped. Similarly, the Tehran University of Medical Sciences (TUMS) neurology department agreed in 2017 with Leicester University for six to 12-month residencies for Iranians to receive part of their training in the UK. Since sanctions were renewed, however, it has become, financially and logistically, almost impossible to pursue that route.

Other educators go further and raise concerns about long-term academic consequences. One involved in curriculum design for medical schools maintains:

> For one thing, in the context of a broader sense of isolation from the world due to visa and border regimes, it is widely understood that going to conferences is at once an opportunity for travel and tourism, too, which means one is not 100 per cent dedicated to the conference. This is just how it is. And now, even that opportunity is dwindling and becoming unaffordable for individuals and institutions. So gradually you're cut off from global debates and exchanges. This can result in stagnation or worse, in some cases a sense of scientific grandiosity and being out of touch.

He believes this is detrimental to medical pedagogy, as absence of exchange and exposure results in absence of critique, debate and dynamism. "Being an academic faculty member becomes reduced to being an educator/teacher with little to do with a research mindset". Having dedicated a significant portion of his academic and clinical career to introducing and implementing a rigorous research mindset in medical education, his insight also points to the complexity and limitations of causal explanations. It is not only border regimes, the rial's devaluation, the economy and sanctions that perpetuate scientific isolation; over the past several decades, the disturbing growth in plagiarism and an informal black market for "dissertations, scientific papers, journal articles" has tainted Iran's scientific medical environment. Indeed. rigorous clinical and biomedical research funded by the government and the private sector is well underway in several institutions, universities and research centers, but "what constitutes research" is a disturbingly absent question from pedagogical debates.

Some interlocutors were instrumental in implementation of institutional policies for incentivizing research and including it in faculty development criteria around the time when, post-JCPOA, international exchanges began to pick up. But after renewed sanctions, the economic crisis, and budget cuts, all exchanges were paused. Many attribute a detrimental role to sanctions in entrenching exclusionary politics and psychologies well beyond concrete challenges such as economic transactions and travel. "The damage Trump caused is not only short term in terms of undoing the post [nuclear] deal developments; it also is about killing the spirit and motivation for starting over". The fundamental damage, they maintain, is in the way the notion of being an academic is reduced to teaching, but there are also ripple effects: for example, university budget cuts pave the way for pharmaceutical companies to sponsor travel or other costs, but that comes for doctors at the expense of complicity and giving up critical thinking. These cultural and psychological consequences have a way of becoming entrenched over time, outlasting political decisions, sanctions, and elections.

c. Personal decision making

The young doctors express frustration that every day they feel they are falling behind in their academic and career development, and behind classmates who chose to leave the country. This comparison has made them either consider leaving also or doubt the decision to continue their education as specialists in Iran. The perception of disparity in income, "value" of work and ability to live comfortably is in comparison not only with peers who continued their education abroad but also other professions, particularly in the service industry.

For a myriad of economic and domestic policy reasons, residents have increasingly become a service-led workforce as opposed to trainees. They struggle with overwork and burnout, increasingly shouldering clinic and hospital workloads from senior doctors and faculty members, who are themselves disengaging from the public sector and focusing more on private practice than clinical training. This vicious cycle significantly impacts medical education and is rooted in broader economic contexts and shifting policies with regard to university budget allocations.

When it comes to a qualitative evaluation of Iranian lived experiences today, representation is everything. The higher the social and global status of the domain in question (eg, science, medicine, technology), the higher the stakes. To understand the interpretations of medical educators, particularly those holding official positions, one has to take into account both their own representational concerns and status anxieties -- particularly when in conversation with the Diaspora and the international community – as well as medicine's historically constructed socio-political function in Iranian society. Iranian doctors have a quasi-sacred social status, historically comparable with the clergy, and thus a paradoxical relationship with politics: on the one hand, a long history of doctor-politicians and techno-scientific mindsets leading the twentieth century modernization efforts, and on the other hand, a protected space in the post-revolutionary landscape thanks to the profession's symbolic capital and the immediacy of health matters.[19]

While doctor-politicians occupy a significant space in collective history and imagination, there is an implicit understanding among many physicians that medicine should be apolitical. On one end of the current political engagement spectrum are many educators whose first response to questions about the impact of sanctions on medicine would be "minimal", pointing to the myriad advances and innovations that have kept Iranian medicine up with international standards. Iran's contributions to medical tourism, specialized treatments and medical research are often mentioned. However, among those who insist that "medicine should not be politicized, and doctors should not bring politics into

their clinical thinking", a palpable sense of realism often surfaces upon further probing: it is true that politics should not determine clinical decisions, but that is not the reality on the ground; how can you escape politics, the reality of sanctions and the internal mechanisms of governance that directly influence what can and cannot be done at the clinical bedside?

The tension is almost tacit knowledge in official narratives; medical education is thus influenced by a growing sense of hopelessness, uncertainty and anxieties about the future. "When we were in medical school, most challenges were due to international political conditions", said an educator referring to his student years in the late 1990s, "but now, it is mostly about the sense of isolation from the world and uncertainties that students feel in relation to the future". Both education and research are international matters, he argued. "We all need each other" to advance science and medicine; sanctions have become integrated into pedagogical trajectories not only because they stifle the economy, but also because of their "more subjective impact on educators and trainees, on youth, on the collective psyche". For example, even though not using virtual simulations in Skills Labs is not significantly consequential, knowing that they are new in medical education worldwide and the awareness of being deprived of a standard international practice for economic and political reasons creates a deeply corrosive sense of helplessness among medical trainees.

In this context, the political and economic realities of sanctions, compounded by domestic mechanisms, penetrate all spheres of perception, interpretation and decision-making. Never ending attempts at procuring alternative or generic software or equipment does little to assuage this deeply felt sense of isolation that is not limited to education. Becoming a doctor is about imagining futures. What happens when the worlds that can be imagined shrink instead of expand? What does it mean to perceive the outside world as a fast changing one that continually leaves you behind? What happens when one's perception of possibilities becomes tainted with uncertainty and anxiety? And how can one differentiate between causal factors of which sanctions are but a part?

For the most part, educators believe that sanctions' impact on trainees is primarily in relation to how they change their perceptions of the world around them, their aspirations, hopes and anxieties about the future, their energy levels, the pressure of brain drain and life decisions that affect how they learn. The elite among them are most likely to be planning to migrate toward the end of medical school, so they engage less with clinical training and focus more on building résumés by completing Masters degrees and the like, resulting in their lower demands and dynamism in the clinic, as well as disincentives for educators.

There is also a distinction between undergraduate medical students and postgraduate residents and fellows. At the former level, curricular reform and significant achievements have raised the pedagogical standards, and despite intersecting challenges, there is still room and will for improvement. At the residency level, however, trainees are more likely to consider the economic context in their decisions about specialties, resulting, for example, in declining quality of those who choose internal medicine or pediatrics and more competent students turning to such fields as ophthalmology and dermatology. This raises concern about the long-term trajectory of medical disciplines, particularly of primary, but less lucrative, ones like internal medicine.

V. CONCLUSION

The preliminary findings of our ongoing research show that the lived experience of life under sanctions creates a new mode of being, thinking, learning, imagining and doing medicine that can be simultaneously informed by myriad factors, including:

1. prevailing sense of isolation from the world, resulting in a particular psychopolitics and mode of imagining, hopelessness, and internalized anxieties about the future;
2. permeation of social, political, economic and professional uncertainty into daily life. Doctors frequently comment on the demise of the middle class to which they presumably belong, as well as the hollowness of the cultural capital of becoming a doctor in the absence of the socioeconomic status with which the profession has historically been associated;
3. simultaneously, a spirit of resilience and self-sufficiency that can have a generative and empowering effect on medical innovations, of which there have been many, but that have also resulted in inadvertent consequences, such as growing plagiarism, diminishing research quality and perceived or real inefficiency of domestically manufactured medications;
4. an urge or duty to build and improve the status quo, which, in the face of the brain drain crisis, is palpable among those who stay in Iran, determined to improve things;
5. alternatively, resignation, the ever present dilemma of doctors facing the decision about staying or leaving the country;
6. heightened awareness of "what could have been": in these narratives, it is almost given that an underlying reality of injustice (domestic and/or international) has deprived the educated elite of what life could have offered under more normal circumstances;
7. risk management, navigation and vigilance skills integral to both becoming and training doctors (eg, the question of how to navigate international travel or invitations in the face of economic instability, possible security issues or state paranoia);
8. hence internalization of a disciplined/vigilant mode of being and doctoring, resulting in a specific biopolitics of knowledge production as a space of strategic, economic, political, and cultural navigation;
9. alternative processes of clinical or professional decision-making, including ongoing adjustment to sanctions and

local and global change (eg, what medication or treatment to choose);

10. lack of trust in internal and domestic mechanisms, resulting in a search for shortcuts and workarounds as a necessity. We believe this has profound pedagogical implications, particularly for medical research; and
11. intersecting, and at time opposing, ideologies and discourses of self-reliance and revolutionary ethos versus political disenchantment, frustration and anger.

This paper contends that a meaningful analysis must consider the impossibility of pinpointing causality when it comes to the impact of sanctions on pedagogical experiences or on medicine in general. Beyond the materiality of sanctions lie new and complex worlds and mindsets and subjective experiences in society at large and among medical professionals. Our preliminary findings reflect the cumulative effects across a spectrum of domestic and sanctions-related issues that discursively feed, morph and entrench each other. Sanctions are by no means enacted in a sociopolitical vacuum, and thus escape a single-issue analysis. To evaluate their afterlife, we need to understand the discursive effect of the *lived* as well as *perceived* impact of a network of global and domestic discourses: the Islamic Republic's growing crisis of legitimacy and distorted governance, rampant corruption and cronyism, growing economic uncertainty and inequality, socio- political disillusionment and collective dysphoria, as well as oft-resurrected discourses of nationalism, resistance, self-reliance and resilience. More, one has to consider significant variations across different periods of time in the ways sanctions have impacted Iranians or have been circumvented via alternative solutions. Fluctuations in the terms and severity of sanctions, and particularly the stark difference between the post-nuclear deal and post-2018 renewal of sanctions, are persistently reflected on.

In sum, our data points to at least three implications for medical education that need to be taken into account when assessing the impact of sanctions on the society that go beyond merely detecting causality in a binary way. First, the perception of being cut off from the outside world has detrimental impacts on both medical training and practice that are most tangible to the community. Secondly, the very practical issue of limited access to educational resources, a by-product of external sanctions and internal censorship (at times indistinguishable), seriously impacts the prospect of Iran's knowledge production, which, while less visible in quantitative evaluations, will likely be more long lasting. Thirdly and perhaps most complex is how sanctions result in creation of specific psychological and political landscapes that change doctors' perceptions and aspirations, not only influencing their decision making, but also contributing to demoralization and loss of hope for the future.

ENDNOTES

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