

Digital Divide in Telemedicine Services: Who Gets Left Behind?

Dr. Divya Parvathy J*

Assistant professor, Department of Community Medicine, Tagore Medical College and Hospital, Rathinamangalam, Chennai, India

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***Corresponding author:** Dr. Divya Parvathy J, Assistant professor, Department of Community Medicine, Tagore Medical College and Hospital, Rathinamangalam, Chennai, India, Tel: 8921999090

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ABSTRACT

Immunotherapies, particularly immune checkpoint inhibitors (ICIs), have revolutionized the treatment of various malignant tumors by reactivating antitumor immune responses. However, excessive activation of the immune system can trigger immune-mediated adverse events, among which cardiac toxicities are included. Although rare, these complications which encompass myocarditis, pericarditis, arrhythmias, and heart failure carry high morbidity and mortality when not diagnosed and managed promptly. Immune-mediated myocarditis, though reported in less than 1% of patients treated with ICIs, has a mortality rate exceeding 50% in severe cases, underscoring the need for continuous monitoring and multidisciplinary management protocols. Various biomolecular and imaging markers have been evaluated for early diagnosis, including B-type natriuretic peptide (BNP), cardiac troponins, and cardiac magnetic resonance imaging with late gadolinium enhancement. Management is based on temporary or permanent discontinuation of immunotherapy combined with high-dose corticosteroids; additional therapies such as azathioprine and intravenous immunoglobulin may be instituted in refractory cases. Protocols for reintroducing ICIs after severe cardiac toxicity remain controversial and require case-by-case assessment. This review critically examines current evidence on the epidemiology, pathophysiology, diagnosis, and management of immunotherapy-related cardiac toxicities, proposing guidelines for early identification and therapeutic strategies aimed at reducing morbidity and mortality associated with these adverse events.

Keywords: Immunotherapy; Cardiotoxicity; Myocarditis; Checkpoint inhibitors; Cardiac safety

Digital Divide in Telemedicine: A Growing Concern

Telemedicine has now emerged as a transformative force in healthcare. This was witnessed to its peak, exceptionally when COVID-19 pandemic was a threat globally. The in-person visits became pathetically challenging and with virtual consultations and remote monitoring, telemedicine offered convenient and efficient patient care. Digital health applications, again offered

more peace for both patients as well as doctors. However, as healthcare became more digital, an evident divide followed between those who can access telemedicine services and those who cannot have the privilege to access. The lacunae in access towards digital health due to financial restrictions, unavailability of internet connection or poor digital knowledge creates a major healthcare gap which disproportionately affects the needy people¹.

Out of all the reasons, one of the noteworthy concerns is socioeconomic disparity. Telemedicine totally depends on devices such as smartphones, tablets, laptop or computers, which are equipped with a stable internet connection. Unaffordability of many low-income families poses a greater threat towards telemedicine utilization. Even though a few government programs provide limited access through subsidy towards this disparity, affordability still remains to be a greater bottleneck. Adding to the fire, Geographic disparities compound this issue, particularly for people in rural, remote and hard to reach communities. These communities often witness inadequate infrastructure. Internet is often wavery even if present. Without a solid and reliable access to broadband, video consultations becomes not only impossible but also impractical. Hence the patients are left with fewer options for obtaining quality virtual healthcare. This hindrance due to geographical location not only limits the people's ability to seek timely medical care but also forces them to travel long distances for care. Hence addressing this issue can help the beneficiaries to obtain the intended benefits of telemedicine.

Digital literacy is considered to be another major bottleneck, especially among aged people. Elderly individuals and those with limited education suffer more. The need for geriatric care is rising exponentially, many older adults struggle while using digital platforms. From booking online consultations or using health-monitoring apps to video conference at the scheduled time, elderly people are at a disadvantage due to digital illiteracy. This is witnessed in most of the urban and suburban regions, where, even after having access to technology, a significant lack of knowledge regarding the usage of digital tools can discourage them from utilizing telemedicine services². Additionally, According to some reports, even healthcare systems and healthcare delivery centres, may not be fully prepared for a complete telemedicine adoption. Many clinicians have received minimal training in virtual health care, leading to inconsistent telemedicine services witnessed across different healthcare delivery settings. Like a cherry on top of all the barriers, concerns about data security and, privacy breach further escalate the problem of telemedicine adoption. Many patients, particularly from vulnerable societies, are still reluctant to share personal health information on major digital platforms. This might be due to the fears of data breaches or misuse of information provided. This mistrust coupled with lack of infrastructure can prevent people from utilising telemedicine services, even when they have the all the means to do so.

Who Gets Left Behind?

The digital divide has witness disproportionate impact on several marginalised groups. This will exacerbate the already existing healthcare discrepancies. People who are elder often face significant hurdles in utilizing digital devices for health care and may require assistance in properly using the available telemedicine platforms. Rural populations, who are already struggling with limited healthcare infrastructure, suffer more due to unreliable and unstable internet access. Families, who are financially low, are unable to afford the necessary as well as available technology. Hence they are left without the option of obtaining digital health care. Furthermore, people with disabilities can also find telemedicine platforms inaccessible. This is due to a lack of inclusive design features which can be listed as voice commands or screen readers and more depending

on the disability of the individual. These barriers highlight that telemedicine is a powerful tool, yet it remains inaccessible to many who can potentially benefit from it.

Bridging the Digital Divide: The Way Forward

In order to ensure telemedicine to reach maximum people, a multifaceted comprehensive approach is needed. This includes expansion of digital infrastructure, in hard-to-reach areas and underserved areas. Both governments and private organizations must invest in broadband or fibrenet expansion to facilitate affordable internet services. This can potentially improve connectivity³. Measures to promote digital literacy is also equally important. Initiatives aimed at training elderly and aged adults, socio economically challenged individuals and marginalized communities in basic technology use becomes high priority. This can significantly enhance telemedicine adoption in the long run.

Healthcare delivery systems should also turn their focus towards developing hybrid models that can potentially integrate telemedicine with the traditional in-person visits. This ensures patients without digital access are not excluded⁴. Furthermore, policymakers at the top-level management, must acknowledge issues of affordability and accessibility. This can be done if, telemedicine consultations are covered by insurance, subsidizing internet costs for disadvantaged groups are being made possible and also enforcing data security regulations to build and maintain patient trust⁵. Telemedicine platforms should prioritize inclusive designs too, by making interfaces easier to be navigated for individuals with disabilities. This can also include incorporating multilingual support system.

Conclusion

Telemedicine has the potential to redefine healthcare accessibility, but without efforts to bridge the digital divide, it can potentially risks expanding the existing health care disparities. While technology has made healthcare more convenient for a few, it remains out of reach for many who lack digital access, digital literacy or financial resources. In order to prevent telemedicine from becoming an exclusive privilege, healthcare providers, policymakers and technology developers must work collaboratively to ensure that digital healthcare services are affordable, accessible and inclusive for all. Only then, telemedicine can truly fulfil its purpose in rendering care to the needy.

Sources of Support

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Conflict of Interest

Nil.

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