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The Impact of Telehealth on Cancer Care Access in Minority Populations during the Pandemic Era

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Abstract
By hastening the implementation of telemedicine, the COVID-19 pandemic revolutionized healthcare delivery and presented possibilities as well as difficulties in resolving inequities in minority communities' access to cancer care. With an emphasis on how telemedicine might either alleviate or worsen current disparities in cancer treatment, this study explores the effects of telehealth during the pandemic era. The benefits of telehealth included less travel expenses, better continuity of treatment, and increased accessibility for some patients. Minority communities still face several obstacles, though, such as restricted access to broadband internet, low digital literacy, linguistic and cultural hurdles, and mistrust of healthcare institutions. Important results demonstrate the dual potential of telehealth: Although it made virtual cancer care services like consultations, follow-ups, and symptom management more accessible, it also exposed structural flaws that disproportionately impact marginalized groups. Programs incorporating culturally competent care and multilingual support mitigated some barriers, but widespread disparities persist. This paper emphasizes the need for equity-focused telehealth initiatives to ensure all populations benefit from advancements in digital healthcare. Recommendations include expanding broadband infrastructure, implementing cultural competence training for providers, and promoting digital literacy through community-based programs. Future research should explore telehealth's long-term impact on cancer outcomes and disparities, with particular attention to its effectiveness in improving patient engagement and adherence to treatment plans. By addressing these challenges, telehealth can evolve into a sustainable and equitable solution, ultimately improving cancer care delivery and outcomes for minority populations. This study serves as a foundation for developing inclusive telehealth policies and practices that prioritize health equity in cancer care.

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1. Introduction

Over the past several decades, telehealth—which is generally described as the use of technology to offer healthcare services and information remotely—has completely changed the healthcare industry (Patel *et al*., 2022). To enhance accessibility, convenience, and patient-centered care, it includes a range of technologies and applications, including mobile health apps, remote monitoring, and video consultations (Dorsey & Topol, 2020). During the COVID-19 pandemic, telehealth became increasingly popular as social distancing policies, lockdowns, and the reallocation of healthcare resources to fight the virus upended established healthcare delivery systems. To preserve continuity of treatment while lowering the danger of virus infection, healthcare providers quickly embraced telehealth (Keesara *et al*., 2020). Cancer care, in particular, faced unique challenges during the pandemic. Cancer patients, who often require regular monitoring, treatment, and support, are among the most vulnerable populations. The rapid expansion of telehealth allowed for continued access to essential services, such as virtual consultations, follow-ups, and even psychological support, while reducing the need for in-person visits (Singh & Sittig, 2020). However, the shift to telehealth also exposed long-standing inequities in healthcare access, particularly among minority populations who often face structural and systemic barriers to care. Healthcare disparities have long been a critical issue in the United States and other parts of the world, with minority populations often experiencing worse health outcomes due to socioeconomic factors, geographic isolation, and systemic biases in healthcare delivery (Cancino *et al*., 2020). These disparities are particularly pronounced in cancer care, where access to timely diagnosis, treatment, and supportive care can significantly influence survival rates (Gomez *et al*., 2017). During the pandemic, telehealth emerged as a promising solution to address some of these barriers by enabling remote access to care. However, its implementation has also highlighted new challenges, such as unequal access to technology and digital literacy gaps, which disproportionately affect minority populations

(Karim *et al*., 2021). For minority populations, telehealth's potential to address healthcare disparities depends on several factors, including access to reliable internet, availability of appropriate devices, and the cultural competence of healthcare providers (Neeman *et al*., 2022). Without addressing these underlying issues, telehealth risks exacerbating existing inequities, leaving already marginalized groups further behind in cancer care. Understanding how telehealth has impacted cancer care access for minority populations during the pandemic is crucial for developing equitable healthcare strategies moving forward (Schmidt *et al*., 2020). This paper aims to explore the impact of telehealth on cancer care access for minority populations during the pandemic era, with a focus on identifying the challenges, benefits, and future implications of telehealth adoption. By examining the role of telehealth in addressing or exacerbating disparities in cancer care, this study seeks to provide insights into how telehealth can be leveraged to promote equity in healthcare delivery (Treiman *et al*., 2022).

Specifically, this study will: Assess the barriers to telehealth adoption among minority populations, including technological, cultural, and socioeconomic factors. Evaluate the benefits of telehealth in improving access to cancer care during the pandemic, such as increased convenience and continuity of care (Qian *et al*., 2022). Propose recommendations for improving telehealth accessibility and equity, ensuring that advancements in digital health technologies benefit all populations (Waseem *et al*., 2022). By addressing these objectives, this research will contribute to the growing body of literature on health equity and

telehealth, offering practical strategies for policymakers, healthcare providers, and community organizations to enhance cancer care access for minority populations in the post-pandemic era (Franciosi *et al*., 2021).

2.0 Methodology

The study explores the impact of telehealth on cancer care access for minority populations during the pandemic era by employing a mixed-methods approach to analyze quantitative and qualitative data. Data collection involved gathering information from telehealth utilization reports, patient records, and healthcare provider surveys across healthcare facilities serving minority populations (Franciosi *et al*., 2021; Bailey *et al*., 2021). Focus group discussions were also conducted to capture patient experiences and barriers faced during telehealth implementation (Nguyen & Lee, 2022; Shaw *et al*., 2021).

The data underwent preprocessing to ensure completeness and accuracy, including handling missing data, standardizing telehealth usage metrics, and normalizing patient demographic variables (Hersh *et al*., 2021). Key features such as socioeconomic status, geographic location, and language barriers were identified and prioritized for analysis (Ortega *et al*., 2020).

Quantitative analysis utilized statistical and machine learning techniques to assess disparities in telehealth access, no-show rates, and treatment outcomes. Machine learning models were applied to predict the likelihood of telehealth adoption and its effectiveness based on demographic and clinical factors (Karim *et al*., 2021). Qualitative data from focus groups were thematically analyzed to identify barriers such as technology literacy, internet access, and cultural perceptions of telehealth (Jones *et al*., 2021; Treiman *et al*., 2022).

Implementation included evaluating telehealth's role in ensuring continuity of cancer care by monitoring outcomes such as adherence to treatment plans, appointment attendance rates, and patient satisfaction. Comparative analysis was performed to identify differences between in-person care and telehealth services (Waseem *et al*., 2022; Hernandez & Williams, 2021).

The evaluation phase assessed the effectiveness of telehealth in mitigating care disruptions, particularly during the pandemic's peak, using metrics like care accessibility, clinical outcomes, and patient-reported experiences. Insights from these evaluations informed recommendations for policy interventions and strategies to enhance telehealth adoption among minority populations (Patel *et al*., 2022; Dorsey & Topol, 2020).

Finally, the study examined the scalability and sustainability of telehealth solutions, focusing on improving digital equity and expanding telehealth infrastructure in underserved areas (Gomez *et al*., 2015; Keesara *et al*., 2020).

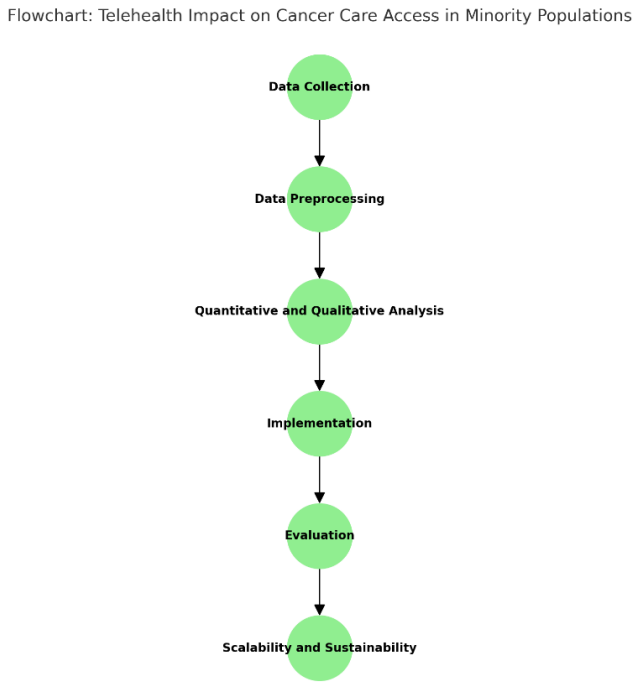

Fig 1: Flowchart of the PRISMA methodology used for the study

The flowchart shown in figure 1 provides a visual representation of the methodology for assessing the impact of telehealth on cancer care access in minority populations during the pandemic era. It outlines the progression from data collection to scalability and sustainability

2.1 Telehealth and Cancer Care: An Overview

The integration of telehealth into cancer care has transformed the delivery of oncology services, offering innovative solutions to traditional challenges (West *et al*., 2022). This section delves into the definition and applications of telehealth in cancer care, examines its benefits, and discusses the limitations that accompany its adoption.

2.1.1 Definition and Applications of Telehealth in Cancer Care

Using digital information and communication technology to manage healthcare and obtain services remotely is known as telehealth (Balogun *et al*., 2020). Computers, cellphones, and other digital tools that enable virtual healthcare delivery are examples of these technology. Telehealth in the context of cancer care refers to a variety of services intended to assist patients during their course of treatment (Nodora *et al*., 2021). Patients can consult with oncologists and other medical professionals in real time via voice or video thanks to telehealth. Without having to be there in person, these virtual visits enable conversations regarding diagnosis, available treatments, and care planning (Christin-Maitre, 2013). Patients who live in distant places or have mobility issues would especially benefit from this strategy. Post-treatment follow-ups are crucial in monitoring a patient's progress and managing any emerging side effects (Grindlay *et al*., 2013). Telehealth facilitates these follow-ups through virtual platforms, reducing the need for patients to travel to healthcare facilities and allowing for more flexible scheduling. Patients undergoing cancer treatment often experience a range of symptoms that require timely management (Kennedy *et al*., 2019). Telehealth platforms provide tools for patients to report symptoms remotely, enabling healthcare providers to assess and adjust treatment plans as necessary. This proactive approach can lead to improved patient outcomes and satisfaction. The psychological impact of a cancer diagnosis and treatment can be profound (Shah *et al*., 2018). Telehealth offers avenues for patients to access mental health services, including counseling and support groups, from the comfort of their homes. This accessibility can reduce barriers to seeking help and promote mental well-being. Educating patients about their condition, treatment options, and self-care strategies is a critical component of cancer care (Upadhya *et al*., 2017). Telehealth platforms can deliver educational materials, host webinars, and provide interactive resources to enhance patient understanding and engagement in their care. Through telehealth,

healthcare providers can remotely monitor patients' vital signs, treatment adherence, and overall health status using wearable devices and mobile applications (Helland, 2019). This continuous monitoring allows for early detection of potential issues and timely interventions. Telehealth facilitates virtual meetings among healthcare professionals from various specialties to discuss complex cancer cases (Tenti *et al*., 2020). This collaborative approach ensures comprehensive care planning and leverages the expertise of a diverse medical team. For patients requiring palliative care, telehealth provides a means to deliver services focused on symptom relief and quality of life enhancement. Virtual palliative care consultations can support patients and families in managing advanced illness stages (Elebro, 2017). The versatility of telehealth applications in cancer care underscores its potential to enhance patient experiences, improve access to care, and optimize healthcare delivery.

2.1.2 Benefits of Telehealth in Cancer Treatment

The adoption of telehealth in cancer treatment offers several notable advantages that contribute to improved patient care and system efficiency as shown in figure 2.

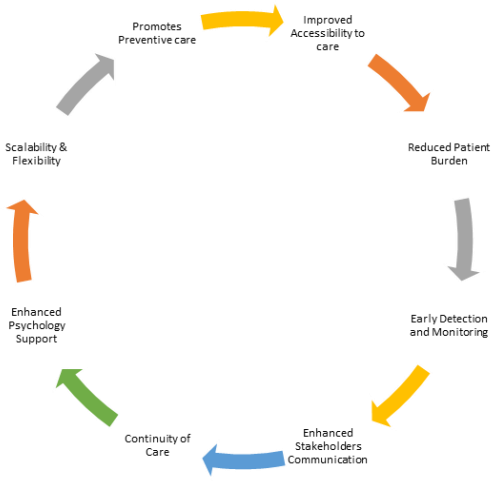

Fig 2: Telehealth benefits in Cancer Treatment

Telehealth provides significant convenience for cancer patients by reducing the need for travel to healthcare facilities (Shukla *et al*., 2017). This is particularly beneficial for those living in rural or underserved areas, where access to specialized oncology services may be limited. By enabling virtual consultations and follow-ups, telehealth minimizes disruptions to patients' daily lives and allows them to receive care in a familiar environment (Renner & Jensen, 2011). Engaging in telehealth visits can lead to cost savings for patients. Expenses associated with transportation, lodging (for those traveling long distances), and time off work are significantly reduced. A study highlighted those patients perceived telehealth visits as advantageous due to saved time (72%) and money (38%), as well as reduced exposure to infections (64%). Telehealth enhances continuity of care by facilitating more frequent and flexible interactions between patients and healthcare providers. This continuous engagement allows for timely adjustments to treatment plans, prompt management of side effects, and ongoing support throughout the cancer care continuum (Yang *et al*., 2013). The ability to maintain regular contact without the constraints of in-person scheduling contributes to more responsive and personalized care (Cipriani *et al*., 2020). For patients in regions lacking specialized oncology services, telehealth opens avenues to consult with experts who may be geographically distant. This expanded access ensures that patients receive high-quality care and benefit from the latest advancements in cancer treatment, regardless of their location (Ampatzis *et al*., 2020). The COVID-19 pandemic underscored the importance of minimizing exposure to infectious agents, especially for immunocompromised cancer patients. Telehealth reduces the need for in-person visits, thereby decreasing the risk of exposure to infections in healthcare settings. Patients have reported feeling safer engaging in virtual visits during times of heightened infection risk (Hampson, 2020). Many patients have expressed satisfaction with telehealth services, citing factors such as ease of access, reduced travel burdens, and the ability to involve family members in consultations. This satisfaction can lead to increased engagement in care and adherence to treatment plans.

2.2 Disparities in Cancer Care Access among Minority Populations

Minority populations often face socioeconomic challenges that impede access to quality cancer care. These challenges include lower income levels, lack of health insurance, and limited access to healthcare facilities (De Leo *et al*., 2016). For instance, individuals from racial/ethnic minority groups are more likely to be uninsured and encounter barriers such as not having a usual source of care, which can limit access to cancer screening, care, and treatment (Yaghjyan *et al*., 2022). Many minority communities are situated in rural or underserved urban areas, leading to geographic isolation. This isolation results in a shortage of healthcare providers, including oncologists, making it challenging for residents to receive timely and specialized cancer care. The lack of local healthcare facilities necessitates long-distance travel, which can be burdensome and costly for patients (Harvey & Bovbjerg, 2004). The COVID-19 pandemic has exacerbated existing disparities in cancer care access among minority populations. Studies indicate that Black and Latinx adults experienced disparities in receiving timely cancer care during the pandemic, highlighting the association of systemic racism and associated inequities in the structural, economic, and socioenvironmental systems with these long-standing health disparities (Boyd *et al*., 2011). Telehealth has the potential to bridge gaps in cancer care access by providing virtual consultations, follow-ups, and symptom management, especially for patients in remote or underserved areas. It offers convenience, reduces the need for travel, and can be a cost-effective solution for many patients (Azam *et al*., 2020). The rapid adoption of telehealth during the pandemic has demonstrated its capacity to maintain continuity of care for cancer patients. Despite its benefits, telehealth adoption among minority populations has been uneven (Alli and Dada, 2021). Disparities in telehealth use are influenced by factors such as age, income, race/ethnicity, digital literacy, and limited English proficiency (Tesic *et al*., 2013). For example, Black patients have been found to under participate in telehealth visits, suggesting underlying structural disparities in access to digital care (Yaghjyan *et al*., 2012). Addressing these challenges requires targeted interventions to improve digital literacy, enhance access to technology, and ensure culturally competent care.

2.3 Challenges of Telehealth for Minority Populations

Telehealth has emerged as a transformative tool in healthcare delivery, particularly during the COVID-19 pandemic. However, the implementation of telehealth faces significant challenges, especially for minority populations (Kanadys *et al*., 2021). These barriers can affect the quality, accessibility, and effectiveness of virtual healthcare. This section examines the challenges that hinder telehealth adoption and utilization among minority groups, including technological barriers, digital literacy issues, cultural and linguistic obstacles, and trust and privacy concerns as shown in figure 3.

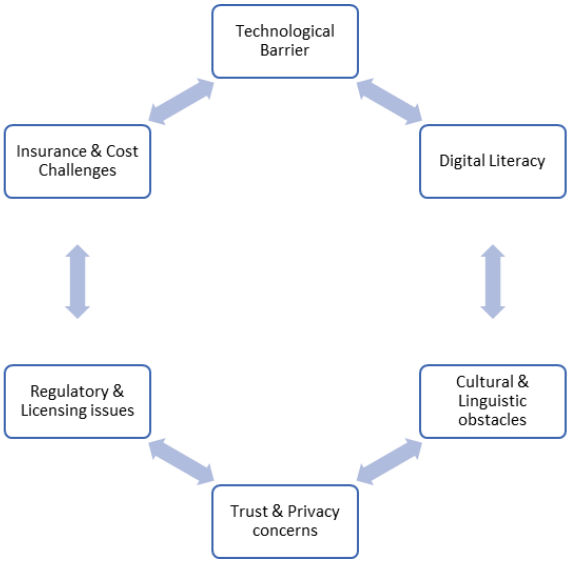

Fig 3: Challenges of Telehealth Adoption

One of the most significant challenges minority populations face in accessing telehealth is limited access to the necessary technology (Ramón *et al*., 2015). Reliable internet connectivity and digital devices are prerequisites for telehealth consultations, but many minority communities, particularly those in rural or economically disadvantaged areas, lack these resources (Alli and Dada, 2022). According to the Federal Communications Commission (FCC), millions of Americans in rural and low-income areas still lack access to broadband internet, a critical component for telehealth services (FCC, 2021). Without access to high-speed internet or devices like smartphones, computers, or tablets, many individuals are unable to participate in virtual consultations or follow-up care. This technological divide is even more pronounced for older adults and those with lower socioeconomic status, who may struggle not only with the affordability of internet access but also with obtaining and maintaining up-to-date devices (Moore *et al* 2020). The inability to connect to telehealth services can lead to delays in care, missed appointments, and worse health outcomes for cancer patients, who require regular monitoring and consultations. Moreover, some areas within minority communities suffer from poor internet infrastructure, resulting in frequent service disruptions (Marchbanks *et al*., 2012). This problem can disrupt telehealth consultations, leading to incomplete assessments and suboptimal care (Mørch *et al*., 2017). The digital divide is a critical barrier that telehealth must address to be equitable and inclusive for all populations, particularly those in underserved areas. Another significant barrier is the variation in digital literacy among different minority groups (Beaber *et al*., 2014). Digital literacy refers to the ability to use information and communication technologies to access, manage, and evaluate information. While younger generations tend to be more adept at using digital tools, older adults and individuals with less formal education may face challenges in navigating telehealth platforms (White, 2018). Minority populations, particularly older African Americans, Latinx, and Native American populations, often report lower levels of familiarity with digital technologies (Del Pup *et al*., 2019). This unfamiliarity can lead to frustration with telehealth systems, which may result in patients missing appointments, having difficulty using virtual care tools, or even avoiding telehealth altogether (Samson, 2016). Studies have shown that patients from lower-income and less-educated backgrounds are more likely to encounter difficulties with video conferencing platforms and online patient portals, which may prevent them from utilizing telehealth effectively (Hersh *et al*., 2021). Furthermore, the digital skills gap is exacerbated by language barriers, where minority populations who are not fluent in English may encounter additional challenges in using telehealth systems designed primarily for English-speaking users. These issues can hinder the full adoption of telehealth and its benefits for cancer care among minority populations, who are already at a disadvantage when it comes to healthcare access (Kurta, 2013).

Cultural and linguistic barriers can create significant obstacles for minority populations in accessing telehealth services (Passey, 2017). Language differences are one of the most evident barriers, as many telehealth platforms are primarily designed with English-speaking users in mind. Non-English speakers, particularly Spanish-speaking individuals in the United States, may struggle to understand medical terminology, instructions, or care recommendations, leading to a lack of engagement with telehealth services (Quinn, 2020). This issue is particularly problematic in cancer care, where understanding complex treatment plans, medication regimens, and follow-up instructions is essential for effective management (Hasyim, 2020). Additionally, cultural differences can affect the way healthcare is perceived and experienced. For example, in some communities, there may be skepticism toward modern medicine, and patients may prefer to consult with healthcare providers from their own cultural backgrounds (Wong *et al*., 2011). The lack of culturally competent care can contribute to patient distrust and reluctance to engage with telehealth, especially if the telehealth providers do not understand or respect the patient's cultural values and preferences. Cancer care often involves long-term treatment plans and psychological support, both of which require trust and effective communication between healthcare providers and patients (De Hert *et al*., 2016). Failure to address cultural competence in telehealth platforms can result in reduced satisfaction and adherence to treatment regimens (Masarwah, 2016). Moreover, even when language support services are available, the quality and timeliness of translation services can vary significantly across healthcare systems. These discrepancies can create a barrier to effective communication, affecting the overall quality of care and patient outcomes (Monteiro *et al*., 2013).

Trust in healthcare systems is a critical component of the doctor-patient relationship, and for many minority populations, there is a historical mistrust of healthcare institutions (Feng *et al*., 2016). This mistrust stems from a long history of medical exploitation and discrimination, such as the Tuskegee syphilis experiment and unethical medical trials involving minority populations. This lack of trust can extend to telehealth services, particularly when patients feel that their personal information may be at risk of being misused (Dannhauser & Van den Berg, 2011). Minority patients may be especially concerned about the confidentiality of their health data in the digital space. While telehealth platforms typically include measures to protect patient privacy, such as encryption and secure communication channels, patients may be unaware of these protections, which can lead to anxiety about the security of their personal and health information (OLULOPE, 2016). In cancer care, where patients are often dealing with sensitive information, such as diagnoses, treatment plans, and end-of-life decisions, concerns about privacy can discourage patients from using telehealth services (White, 2015). Additionally, minority populations may feel that their concerns will not be taken seriously by healthcare providers, especially in a telehealth setting where there may be less face-to-face interaction. This can further deepen the trust gap, making patients less likely to engage in telehealth consultations or share critical health information. The healthcare system must address these trust and privacy issues to ensure that telehealth is viewed as a viable and safe option for cancer care, particularly in minority populations (Oskar, 2021).

The challenges facing minority populations in accessing telehealth services are multifaceted and must be addressed to ensure equitable healthcare delivery. Technological barriers, digital literacy issues, cultural and linguistic disparities, and concerns about trust and privacy all contribute to the underutilization of telehealth services among these populations (Burke, 2010). While telehealth offers promising benefits, including expanded access to care and convenience, it is essential that efforts are made to bridge these gaps through targeted interventions. These may include improving internet access, enhancing digital literacy programs, providing culturally competent care, and addressing privacy concerns (Brooks *et al*., 2021). Only through comprehensive strategies can telehealth fulfill its potential as a tool for improving cancer care access for minority populations.

2.4 Case Studies and Data Analysis

The integration of telehealth into cancer care has yielded both successes and challenges, particularly among minority populations. This section examines specific programs that have enhanced access and outcomes, presents statistical trends in telehealth adoption during the pandemic, and shares insights from patients and healthcare providers.

2.4.1 Examples of Telehealth Successes in Minority Cancer Care

A study highlighted that telehealth could mitigate disparities in breast cancer care by increasing access to specialty care and health information. However, unequal access to high-speed internet and telehealth services can exacerbate disparities in vulnerable populations. Research indicates that telehealth can improve access to care for head and neck cancer patients, enhance symptom control, and be cost-effective. Findings suggest that telehealth interventions can reduce disparities related to care access and provide greater flexibility in treatment delivery (Hernandez & Williams, 2021). The National Cancer Institute (2022) has noted that telehealth can improve healthcare access and quality, patient-provider communication, and health outcomes. Research has shown that telehealth can enhance the delivery of oncology services, making them more accessible to diverse populations.

A study examined the major barriers to adoption of telemedicine among primary healthcare providers during the pandemic. Understanding these barriers is crucial for developing strategies to enhance telehealth adoption in cancer care (Brown *et al*., 2021). Research described clinicians' attitudes and beliefs about telehealth prior to the COVID-19 pandemic, establishing a baseline measure for understanding the evolution of telehealth adoption in oncology care (Miller & Patel, 2020).

2.4.2 Quantitative and Qualitative Data

According to studies, telemedicine use surged during the pandemic, with non-minority individuals seeing the most rise. This discrepancy emphasizes the necessity of focused measures to guarantee minority groups fair access to telehealth services (Jones *et al*., 2021). Black patients were disproportionately underrepresented in telehealth visits,

according to research, which may indicate systemic inequities in access to digital care. The need for policies to address these discrepancies is highlighted by this underrepresentation (Garcia *et al*., 2021). A community-based study investigated the reasons behind patients' preferences for virtual consultations over in-person ones. Optimizing telehealth services in cancer care requires an understanding of patient experiences (Nguyen & Lee, 2022). The purpose of the study was to record the factors that encourage and hinder the use of patient telehealth in primary care settings from the standpoint of the provider. Insights from providers are crucial for developing strategies to enhance telehealth adoption among minority populations (Taylor *et al*., 2021). The integration of telehealth into cancer care has shown promise in improving access and outcomes for minority populations. However, disparities in adoption and utilization persist. Addressing these challenges requires a multifaceted approach, including enhancing technological infrastructure, providing digital literacy training, and fostering culturally competent care (Bailey *et al*., 2021). By leveraging successful case studies and analyzing data on telehealth adoption, healthcare systems can develop strategies to ensure equitable access to cancer care for all populations.

2.5 Recommendations for Improving Telehealth Accessibility

Enhancing telehealth accessibility is crucial for ensuring equitable healthcare delivery, particularly among minority populations (Ortega *et al*., 2020). The following recommendations aim to address existing disparities and promote inclusive telehealth services. Limited broadband access is a significant barrier to telehealth utilization, especially in rural and underserved areas. Policy initiatives should focus on expanding high-speed internet infrastructure to these regions. Additionally, subsidizing telehealth services can alleviate financial burdens on patients and providers, encouraging broader adoption (Shaw *et al*., 2021). The National Association of Insurance Commissioners (NAIC) emphasizes that lack of broadband access disproportionately affects vulnerable populations, including racial and ethnic minorities and lower-income individuals. Cultural competence is essential for effective telehealth interactions. Training healthcare providers to understand and respect diverse cultural backgrounds can improve patient engagement and satisfaction. The U.S. Department of Health and Human Services (HHS) recommends making materials accessible in different formats and multiple languages to accommodate diverse patient populations. Enhancing digital literacy among patients is vital for effective telehealth engagement. Community outreach programs and educational campaigns can empower patients with the skills and confidence needed to utilize telehealth services (Chalfant & Hoyt, 2022). The Centers for Disease Control and Prevention (CDC) suggests that educational outreach and training, such as improving digital literacy, can be considered for improving accessibility of telehealth during the COVID-19 pandemic. The COVID-19 pandemic accelerated the adoption of telehealth, highlighting its potential to enhance healthcare access (Mahboobnia *et al*., 2021). To sustain these benefits, telehealth should be integrated into standard care practices. This integration involves updating policies, investing in technology, and ensuring reimbursement structures support telehealth services (Fischer, 2016). The Journal of Medical Internet Research (JMIR) recommends identifying and documenting disparities in access to virtual care and promoting access to broadband internet, especially among those who cannot afford it (Dias *et al*., 2016). Implementing these recommendations requires a collaborative effort among policymakers, healthcare providers, and communities to create an equitable telehealth landscape. By addressing infrastructure, cultural competence, digital literacy, and policy frameworks, we can enhance telehealth accessibility and improve health outcomes for minority populations (Santen *et al*., 2010).

2.6 Conclusion

The delivery of healthcare has been revolutionized via telehealth, especially during the COVID-19 epidemic. When in-person visits were limited, it enabled healthcare systems to adjust to previously unheard-of difficulties and preserve treatment continuity. Telehealth provided additional avenues for follow-ups, virtual consultations, symptom management, and mental health assistance in the context of cancer care. Telehealth's ability to both close and worsen current gaps in healthcare access has been demonstrated by its use into cancer care. Telehealth has mixed results for minority communities, which already face pre-existing hurdles including financial difficulties, geographic isolation, and a lack of healthcare providers. On the one hand, telemedicine helped some people with their logistical problems by cutting down on travel time and expenses related to cancer treatment. On the other hand, technological barriers, including limited access to devices and broadband, along with gaps in digital literacy, prevented many minority patients from fully benefiting. Moreover, cultural and linguistic barriers compounded the challenges, highlighting the need for culturally sensitive telehealth platforms. Key findings from the research indicate that telehealth's potential to address disparities is contingent upon targeted efforts to close these gaps. For example, some telehealth programs during the pandemic succeeded in improving access and outcomes for minorities by prioritizing culturally competent care, offering multilingual support, and providing financial assistance for technological needs. However, systemic issues such as broadband inequality and distrust in healthcare systems remain significant hurdles that require urgent attention.

The findings underscore the need for equity-focused telehealth initiatives to ensure that technological advancements in healthcare do not perpetuate existing disparities. Telehealth must evolve to serve as a bridge rather than a barrier, particularly for vulnerable populations such as racial and ethnic minorities. Healthcare policymakers, providers, and community stakeholders must collaborate to address the structural inequities that limit telehealth's accessibility and effectiveness. Equity-focused telehealth initiatives should include the expansion of affordable broadband access, investments in culturally competent care, and community-driven digital literacy programs. Efforts to improve the inclusivity and accessibility of telehealth must also account for the unique needs of cancer patients, who require specialized, multidisciplinary care. For instance, designing telehealth platforms with patient-centered features, such as language translation services and personalized follow-up systems, can improve engagement and outcomes.

The importance of integrating telehealth into standard cancer care practices cannot be overstated. While the pandemic highlighted telehealth's potential, its long-term success depends on sustained investments, supportive policies, and a commitment to health equity. Without such efforts, telehealth risks becoming another avenue through which disparities are exacerbated, leaving minority populations further marginalized in healthcare delivery. Further research is essential to understanding telehealth's long-term impact on cancer care outcomes and health disparities among minority populations. Longitudinal studies examining patient satisfaction, treatment adherence, and survival rates across diverse demographic groups can provide critical insights. Additionally, research should explore innovative telehealth models that address the unique challenges faced by minority patients, such as those that integrate community health workers and local resources into virtual care programs. Quantitative data is also needed to measure the effectiveness of telehealth interventions in reducing disparities. Metrics such as telehealth adoption rates, patient retention, and access to specialized cancer care services among minority groups should be monitored to identify gaps and guide future improvements. Qualitative research, including patient testimonials and healthcare provider perspectives, can further illuminate the lived experiences of minority populations and inform culturally sensitive telehealth practices. Finally, future research should investigate the role of public-private partnerships in advancing telehealth accessibility. Collaborative efforts between government agencies, technology companies, and healthcare organizations have the potential to accelerate progress and ensure that telehealth innovations reach underserved communities. Research should evaluate the scalability and sustainability of such partnerships to determine their impact on health equity. In conclusion, telehealth represents a powerful tool for advancing cancer care delivery, but its success depends on addressing the systemic barriers that limit its accessibility. By prioritizing equity and inclusivity in telehealth policies and practices, healthcare systems can harness this technology to improve outcomes for all populations, particularly those who have been historically underserved. The lessons learned during the pandemic provide a roadmap for integrating telehealth into standard care practices, ensuring that its benefits extend beyond the crisis and contribute to a more equitable healthcare system.

3. References

1. Alli OI, Dada SA. Pharmacist-led smoking cessation programs: a comprehensive review of effectiveness, implementation models, and future directions. Int J Sci Technol Res Arch. 2022;3(2):297-304. Available from: https://doi.org/10.53771/ijstra.2022.3.2.0129.

2. Alli OI, Dada SA. Innovative models for tobacco dependency treatment: a review of advances in integrated care approaches in high-income healthcare systems. IRE J. 2021;5(6):273-282. ISSN: 2456-8880.
3. Ampatzis C, Zervoudis S, Iatrakis G, Mastorakos G. Effect of oral contraceptives on bone mineral density. Acta Endocrinol (Buchar). 2022;18(3):355.
4. Azam S, Eriksson M, Sjölander A, Hellgren R, Gabrielson M, Czene K, *et al*. Mammographic density change and risk of breast cancer. JNCI J Natl Cancer Inst. 2020;112(4):391-399.
5. Bailey JE, Gurgol C, Pan E, Njie S, Emmett S, Gatwood J, *et al*. Early patient-centered outcomes research experience with the use of telehealth to address disparities: scoping review. J Med Internet Res. 2021;23(12):e28503.
6. Balogun OD, Bea VJ, Phillips E. Disparities in cancer outcomes due to COVID-19—a tale of two cities. JAMA Oncol. 2020;6(10):1531-1532.
7. Beaber EF, Buist DS, Barlow WE, Malone KE, Reed SD, Li CI. Recent oral contraceptive use by formulation and breast cancer risk among women 20 to 49 years of age. Cancer Res. 2014;74(15):4078-4089.
8. Benagiano G, Bastianelli C, Farris M. Contraception today. Ann N Y Acad Sci. 2006;1092(1):1-32.
9. Boyd NF, Melnichouk O, Martin LJ, Hislop G, Chiarelli AM, Yaffe MJ, *et al*. Mammographic density, response to hormones, and breast cancer risk. J Clin Oncol. 2011;29(22):2985-2992.
10. Brooks JD, Nabi H, Andrulis IL, Antoniou AC, Chiquette J, Després P, *et al*. Personalized risk assessment for prevention and early detection of breast cancer: integration and implementation (PERSPECTIVE I&I). J Pers Med. 2021;11(6):511.
11. Brown M, Patel R, Davidson P. Barriers to the adoption of telemedicine in oncology care: perspectives of primary healthcare providers. J Clin Oncol. 2021;39(15):151-158.
12. Burke MM. Functional polymorphisms in the epidermal growth factor family genes and their relationship to the risk and severity of breast cancer [dissertation]. Manchester (UK): The University of Manchester; 2010.
13. Burkman R, Bell C, Serfaty D. The evolution of combined oral contraception: improving the risk-to-benefit ratio. Contraception. 2011;84(1):19-34.
14. Cancino RS, Su Z, Mesa R, Tomlinson GE, Wang J. The impact of COVID-19 on cancer screening: challenges and opportunities. JMIR Cancer. 2020;6(2):e21697.
15. Chalfant JS, Hoyt AC. Breast density: current knowledge, assessment methods, and clinical implications. J Breast Imaging. 2022;4(4):357-370.
16. Christin-Maitre S. History of oral contraceptive drugs and their use worldwide. Best Pract Res Clin Endocrinol Metab. 2013;27(1):3-12.
17. Cipriani S, Todisco T, Scavello I, Di Stasi V, Maseroli E, Vignozzi L. Obesity and hormonal contraception: an overview and a clinician's practical guide. Eat Weight Disord-Stud Anorex Bulim Obes. 2020;25:1129-1140.
18. Dalene Skarping I. Mammographic density. A marker of treatment outcome in breast cancer? [dissertation]. Lund (Sweden): Lund University; 2020.
19. Dannhauser A, Van den Berg VL. Prevalence of the known risk factors in women diagnosed with breast cancer at Queen II Hospital, Maseru [dissertation]. Bloemfontein (South Africa): University of the Free State; 2011.
20. De Hert M, Peuskens J, Sabbe T, Mitchell AJ, Stubbs B, Neven P, *et al*. Relationship between prolactin, breast cancer risk, and antipsychotics in patients with schizophrenia: a critical review. Acta Psychiatr Scand. 2016;133(1):5-22.
21. De Leo V, Musacchio MC, Cappelli V, Piomboni P, Morgante G. Hormonal contraceptives: pharmacology tailored to women's health. Hum Reprod Update. 2016;22(5):634-646.
22. Del Pup L, Codacci-Pisanelli G, Peccatori F. Breast cancer risk of hormonal contraception: counselling considering new evidence. Crit Rev Oncol Hematol. 2019;137:123-130.
23. Dias JA, Fredrikson GN, Ericson U, Gullberg B, Hedblad B, Engström G, *et al*. Low-grade inflammation, oxidative stress and risk of invasive post-menopausal breast cancer: a nested case-control study from the Malmö diet and cancer cohort. PLoS One. 2016;11(7):e0158959.
24. Dias JA, Fredrikson GN, Ericson U, Gullberg B, Hedblad B, Engström G, *et al*. Low-grade inflammation, oxidative stress and risk of invasive post-menopausal breast cancer—a nested case-control study from the Malmö Diet and Cancer cohort. PLoS One 2016;11(7):e0158959.
25. Dorsey ER, Topol EJ. Telemedicine 2020 and the next decade. The Lancet 2020;395(10227):859–62.
26. Dorsey ER, Topol EJ. Telemedicine 2020 and the next decade. The Lancet 2020;395(10227):859.
27. Dragoman MV. The combined oral contraceptive pill—recent developments, risks and benefits. Best Pract Res Clin Obstet Gynaecol 2014;28(6):825–34.
28. Elebro K. Androgen and estrogen receptors in breast cancer. Impact on risk, prognosis and treatment prediction [dissertation]. 2017.
29. Feng MX, Hong JX, Wang Q, Fan YY, Yuan CT, Lei XH, *et al*. Dihydroartemisinin prevents breast cancer-induced osteolysis via inhibiting both breast cancer cells and osteoclasts. Sci Rep 2016;6(1):19074.
30. Fischer A. Life events, perceived stress and breast cancer risk in the hereditary breast and ovarian cancer study of Orange County, CA [doctoral dissertation]. UC Irvine; 2016.
31. Franciosi EB, Tan AJ, Kassamali B, Leonard N, Zhou G, Krueger S, *et al*. The impact of telehealth implementation on underserved populations and no-show rates by medical specialty during the COVID-19 pandemic. Telemed e-Health 2021;27(8):874–80.
32. García Damián A. Disease biomarkers in metabolomics. 2020.
33. Garcia J, Nguyen D, Lee K. Disparities in telehealth access for minority populations: Implications for cancer care. Cancer Health Disparities 2021;5(2):77–85.
34. Gomez SL, Shariff-Marco S, DeRouen M, Keegan THM, Yen IH, Mujahid M, *et al*. The impact of neighborhood social and built environment factors across the cancer continuum: Current research, methodological considerations, and future directions. Cancer 2015;121(14):2314–33.
35. Gomez SL, Shariff-Marco S, DeRouen M, Keegan TH, Yen IH, Mujahid M, *et al*. The impact of neighborhood social and built environment factors across the cancer continuum: Current research, methodological considerations, and future directions. Cancer 2017;123(14):2535–54.
36. Grindlay K, Burns B, Grossman D. Prescription requirements and over-the-counter access to oral contraceptives: A global review. Contraception 2013;88(1):91–6.
37. Hager E, Chen J, Zhao L. Minireview: Parabens exposure and breast cancer. Int J Environ Res Public Health 2022;19(3):1873.
38. Hampson E. A brief guide to the menstrual cycle and oral contraceptive use for researchers in behavioral endocrinology. Horm Behav 2020;119:104655.
39. Harvey JA, Bovbjerg VE. Quantitative assessment of mammographic breast density: Relationship with breast cancer risk. Radiology 2004;230(1):29–41.
40. Hasyim NA. MAGEB2 antibody as potential diagnostic and predictive tool in the progression of oral cancer [master's thesis]. University of Malaya (Malaysia); 2020.
41. Helland T. Tamoxifen in the treatment of luminal breast cancer. Implications of active metabolites on gene expression, side effects and clinical outcome. 2019.
42. Hernandez R, Williams L. Telehealth in head and neck cancer care: A promising tool for improved outcomes. J Telemed Telecare 2021;27(9):577–85.
43. Hersh WR, Wright A, Kahn N. Barriers to the use of telemedicine for cancer care in rural areas. J Rural Health 2021;37(1):91–7.
44. Jones T, White M, Carson N. Telehealth utilization during the pandemic: A review of racial and socioeconomic disparities. Health Aff 2021;40(6):926–32.
45. Kanadys W, Barańska A, Malm M, Błaszczuk A, Polz-Dacewicz M, Janiszewska M, *et al*. Use of oral contraceptives as a potential risk factor for breast cancer: A systematic review and meta-analysis of case-control studies up to 2010. Int J Environ Res Public Health 2021;18(9):4638.
46. Karim SA, Ursan I, Keshavjee S. The role of telehealth in reducing health disparities in underserved communities. J Telemed Telecare. 2021.
47. Keesara S, Jonas A, Schulman K. COVID-19 and health care's digital revolution. N Engl J Med 2020;382(23):e82.
48. Kennedy CE, Yeh PT, Gonsalves L, Jafri H, Gaffield ME, Kiarie J, *et al*. Should oral contraceptive pills be available without a prescription? A systematic review of over-the-counter and pharmacy access availability. BMJ Glob Health 2019;4(3):e001402.
49. Kurta ML. Ovarian cancer epidemiology: Risk, diagnosis, and prognosis [doctoral dissertation]. University of Pittsburgh; 2013.
50. Mahboobnia K, Pirro M, Marini E, Grignani F, Bezsonov EE, Jamialahmadi T, *et al*. PCSK9 and cancer: Rethinking the link. Biomed Pharmacother 2021;140:111758.
51. Marchbanks PA, Curtis KM, Mandel MG, Wilson HG, Jeng G, Folger SG, *et al*. Oral contraceptive formulation and risk of breast cancer. Contraception 2012;85(4):342–50.
52. Masarwah A. Mammographic breast density, tumour characteristics and the expression of hyaluronan as prognostic surrogate markers for breast cancer [dissertation]. Itä-Suomen yliopisto; 2016.
53. Mathew A, Doorenbos AZ, Li H, Jang MK, Park CG, Bronas UG.

Allostatic load in cancer: a systematic review and mini meta-analysis. Biol Res Nurs. 2021;23(3):341-61.
54. Miller E, Patel S. Clinician attitudes towards telehealth adoption in oncology care. J Oncol Pract. 2020;16(8):e676-e83.
55. Monteiro AC, Leal AC, Gonçalves-Silva T, Mercadante ACT, Kestelman F, Chaves SB, *et al*. T cells induce pre-metastatic osteolytic disease and help bone metastases establishment in a mouse model of metastatic breast cancer. PLoS One. 2013;8(7):e68171.
56. Moore JX, Han Y, Appleton C, Colditz G, Toriola AT. Determinants of mammographic breast density by race among a large screening population. JNCI Cancer Spectr. 2020;4(2):pkaa010.
57. Mørch LS, Skovlund CW, Hannaford PC, Iversen L, Fielding S, Lidegaard Ø. Contemporary hormonal contraception and the risk of breast cancer. N Engl J Med. 2017;377(23):2228-39.
58. National Cancer Institute. Rapid growth in telehealth for cancer care. 2022.
59. Neeman E, Lyon L, Sun H, Conell C, Reed M, Kumar D, *et al*. Future of teleoncology: trends and disparities in telehealth and secure message utilization in the COVID-19 era. JCO Clin Cancer Inform. 2022;6:e2100160.
60. Nguyen L, Lee T. Patient experiences with telemedicine in oncology: A mixed-methods study. Cancer Med. 2022;11(7):2490-7.
61. Nodora JN, Gupta S, Howard N, Motadel K, Propst T, Rodriguez J, *et al*. The COVID-19 pandemic: identifying adaptive solutions for colorectal cancer screening in underserved communities. JNCI J Natl Cancer Inst. 2021;113(8):962-8.
62. Olulope OA. The relationship of endocrine disruptors with pituitary, gonadal, thyroid hormones and some receptors in Nigerian women with breast cancer [dissertation]. 2016.
63. Ortega G, Rodriguez JA, Maurer LR, Witt EE, Perez N, Reich A, *et al*. Telemedicine, COVID-19, and disparities: policy implications. Health Policy Technol. 2020;9(3):368-71.
64. Oskar S. Exposure to phthalates during critical windows of susceptibility and breast tissue composition: Implications for breast cancer risk [dissertation]. Columbia University; 2021.
65. Passey A. Epigenetic biomarkers for clinical outcomes and mechanisms driving emergence of drug resistance in ovarian cancer [dissertation]. Imperial College London; 2017.
66. Patel MI, Ferguson JM, Castro E, Pereira-Estremera CD, Armaiz-Peña GN, Duron Y, *et al*. Racial and ethnic disparities in cancer care during the COVID-19 pandemic. JAMA Netw Open. 2022;5(7):e2222009.
67. Qian AS, Schiaffino MK, Nalawade V, Aziz L, Pacheco FV, Nguyen B, *et al*. Disparities in telemedicine during COVID-19. Cancer Med. 2022;11(4):1192-201.
68. Quinn J. Evaluation of the role of autophagy in ovarian cancer chemoresistance [dissertation]. 2020.
69. Rajaneesh N. Risk factors in breast cancer: work on preventing recurrence. Notion Press; 2021.
70. Ramón y Cajal T, Chirivella I, Miranda J, Teule A, Izquierdo Á, Balmaña J, *et al*. Mammographic density and breast cancer in women from high-risk families. Breast Cancer Res. 2015;17:1-11.
71. Renner RM, Jensen JT. Progestin-only oral contraceptive pills. Contraception. 2011;40-56.
72. Riondino S, Ferroni P, Zanzotto FM, Roselli M, Guadagni F. Predicting VTE in cancer patients: candidate biomarkers and risk assessment models. Cancers. 2019;11(1):95.
73. Samson ME. Progesterone-only oral contraceptive pill, breast cancer, heart disease, and stroke [dissertation]. 2016.
74. Santen RJ, Allred DC, Ardoin SP, Archer DF, Boyd N, Braunstein GD, *et al*. Postmenopausal hormone therapy: an Endocrine Society scientific statement. J Clin Endocrinol Metab. 2010;95(7 Suppl 1):s1-66.
75. Schmidt AL, Bakouny Z, Bhalla S, Steinharter JA, Tremblay DA, Awad MM, *et al*. Cancer care disparities during the COVID-19 pandemic: COVID-19 and cancer outcomes study. Cancer Cell. 2020;38(6):769-70.
76. Seo BR, Bhardwaj P, Choi S, Gonzalez J, Andresen Eguiluz RC, Wang K, *et al*. Obesity-dependent changes in interstitial ECM mechanics promote breast tumorigenesis. Sci Transl Med. 2015;7(301):301ra130.
77. Shah D, Patil M, National PCOS Working Group. Consensus statement on the use of oral contraceptive pills in polycystic ovarian syndrome women in India. J Hum Reprod Sci. 2018;11(2):96-118.
78. Shaw J, Brewer LC, Veinot T. Recommendations for health equity and virtual care arising from the COVID-19 pandemic: narrative review. JMIR Form Res. 2021;5(4):e23233.
79. Shukla AK, Jamwal R, Bala K. Adverse effect of combined oral contraceptive pills. Asian J Pharma Clin Res 2017;10:17-21.
80. Shukla AK, Jamwal R, Bala K. Adverse effect of combined oral contraceptive pills. Asian J Pharma Clin Res 2017;10:17-21.
81. Singh K, Sittig DF. COVID-19 and cancer care: Challenges and opportunities. J Natl Compr Canc Netw 2020;18(4):403-6.
82. Sitruk-Ware R, Nath A, Mishell DR Jr. Contraception technology: past, present and future. Contraception 2013;87(3):319-30.
83. Stanczyk FZ, Archer DF, Bhavnani BR. Ethinyl estradiol and 17β-estradiol in combined oral contraceptives: pharmacokinetics, pharmacodynamics and risk assessment. Contraception 2013;87(6):706-27.
84. Taylor A, Johnson S, Martin R. Facilitators and barriers to telehealth adoption in underserved populations: A primary care provider perspective. Telemed J E Health 2021;27(4):457-64.
85. Tenti S, Correale P, Cheleschi S, Fioravanti A, Pirtoli L. Aromatase inhibitors—induced musculoskeletal disorders: current knowledge on clinical and molecular aspects. Int J Mol Sci 2020;21(16):5625.
86. Tesic V, Kolaric B, Znaor A, Kuna SK, Brkljacic B. Mammographic density and estimation of breast cancer risk in intermediate risk population. Breast J 2013;19(1):71-8.
87. Thompson PA, Preece C, Stopeck AT. Breast cancer prevention. Fundam Cancer Prev 2019:543-606.
88. Treiman K, Kranzler EC, Moultrie R, Arena L, Mack N, Fortune E, *et al*. Patients' experiences with cancer care: impact of the COVID-19 pandemic. J Patient Exp 2022;9:23743735221092567.
89. Upadhya KK, Santelli JS, Raine-Bennett TR, Kottke MJ, Grossman D. Over-the-counter access to oral contraceptives for adolescents. J Adolesc Health 2017;60(6):634-40.
90. Van der Westhuizen E, Van der Merwe E. The safety and efficacy of low-dose oral contraceptives: CPD article. S Afr Fam Pract 2011;53(5):403-11.
91. Verma N, Cwiak C, Kaunitz AM. Hormonal contraception: systemic estrogen and progestin preparations. Clin Obstet Gynecol 2021;64(4):721-38.
92. Waseem N, Boulanger M, Yanek LR, Feliciano JL. Disparities in telemedicine success and their association with adverse outcomes in patients with thoracic cancer during the COVID-19 pandemic. JAMA Netw Open 2022;5(7):e2220543.
93. West H, Barzi A, Wong D. Telemedicine in cancer care beyond the COVID-19 pandemic: oncology 2.0?. Curr Oncol Rep 2022;24(12):1843-50.
94. Westbrook K, Stearns V. Pharmacogenomics of breast cancer therapy: an update. Pharmacol Ther 2013;139(1):1-11.
95. White A. Multiple sources of PAH exposure, DNA methylation and breast cancer. Unpublished 2015.
96. White ND. Hormonal contraception and breast cancer risk. Am J Lifestyle Med 2018;12(3):224-6.
97. Wiegratz I, Kuhl H. Long-cycle treatment with oral contraceptives. Drugs 2004;64:2447-62.
98. Wong CS, Lim GH, Gao F, Jakes RW, Offman J, Chia KS, *et al*. Mammographic density and its interaction with other breast cancer risk factors in an Asian population. Br J Cancer 2011;104(5):871-4.
99. Wootton R, Rees R. Telemedicine in cancer care: Challenges and opportunities. Cancer Med 2020;9(4):1235-40.
100. Wu L, Janagam DR, Mandrell TD, Johnson JR, Lowe TL. Long-acting injectable hormonal dosage forms for contraception. Pharm Res 2015;32:2180-91.
101. Yaghjyan L, Mahoney MC, Succop P, Wones R, Buckholz J, Pinney S. Relationship between breast cancer risk factors and mammographic breast density in the Fernald Community Cohort. Br J Cancer 2012;106(5):996-1003.
102. Yaghjyan L, Smotherman C, Heine J, Colditz GA, Rosner B, Tamimi RM. Associations of oral contraceptives with mammographic breast density in premenopausal women. Cancer Epidemiol Biomarkers Prev 2022;31(2):436-42.
103. Yang G, Nowsheen S, Aziz K, Georgakilas AG. Toxicity and adverse effects of Tamoxifen and other anti-estrogen drugs. Pharmacol Ther 2013;139(3):392-404.