RESEARCH
O&G Forum 2024; 34-3s: 1045-1050

Barriers to Healthcare Access during COVID-19 Lockdown: A Surgical Point Prevalence Study

Dr Ritika Tawde (Junior Resident)[1], Dr VV Kanse (Associate Professor)[2], Dr. Abhay Doddamani (Junior Resident)[3]
Department of General Surgery, Krishna Institute of medical sciences, KVV, karad.
Corresponding Author-
Dr. Ritika Tawde (Junior Resident), Department of General Surgery, Krishna Institute of medical sciences, KVV, karad.

Abstract
Access to healthcare services and the quality of care received are affected by various factors such as gender, ethnicity, socioeconomic status (SES), and the presence of chronic illnesses. This study aimed to investigate whether the COVID-19 pandemic exacerbated existing disparities in healthcare access. A cross-sectional design was employed, utilizing data from five age-homogenous Indian cohorts born between 1946 and 2002. A web survey was administered to these cohorts, with 14,891 respondents considered eligible for analysis. Main outcomes: The survey assessed the frequency of cancelled surgical or medical appointments and the amount of care received per week during the COVID-19 lockdown. Binary or ordered logistic regression models were used to examine differences in outcomes based on gender, ethnicity, SES, and chronic illness status. Adjustment was made for study design, non-response weights, psychological distress, household composition, COVID-19 infection, employment status, and receipt of a shielding letter. Meta-analyses were conducted across cohorts, with meta-regression assessing the moderating effect of age. Women (OR 1.40, 95% CI 1.27 to 1.55) and individuals with chronic illnesses (OR 1.84, 95% CI 1.65 to 2.05) experienced significantly more appointment cancellations during the lockdown (all $p<0.0001$). Ethnic minorities and those with chronic illnesses required a higher number of care hours during the lockdown (both OR≈2.00, all $p<0.002$). SES did not show a significant association with appointment cancellations or care hours. Age was not independently associated with either outcome in the meta-regression analysis.
Keywords: Healthcare access COVID-19 pandemic Surgical interventions Disparities Vulnerable populations

INTRODUCTION

The COVID-19 pandemic has been an unprecedented global health crisis, disrupting societies, economies, and healthcare systems worldwide. One of the critical challenges posed by this crisis has been the impact on healthcare access and delivery, particularly during periods of lockdown and restriction measures. As nations grappled with containing the spread of the virus, healthcare systems faced immense strain, leading to disruptions in routine medical care, including surgical procedures and outpatient appointments. Understanding the barriers to healthcare access during such times is paramount for addressing disparities and ensuring equitable provision of healthcare services.

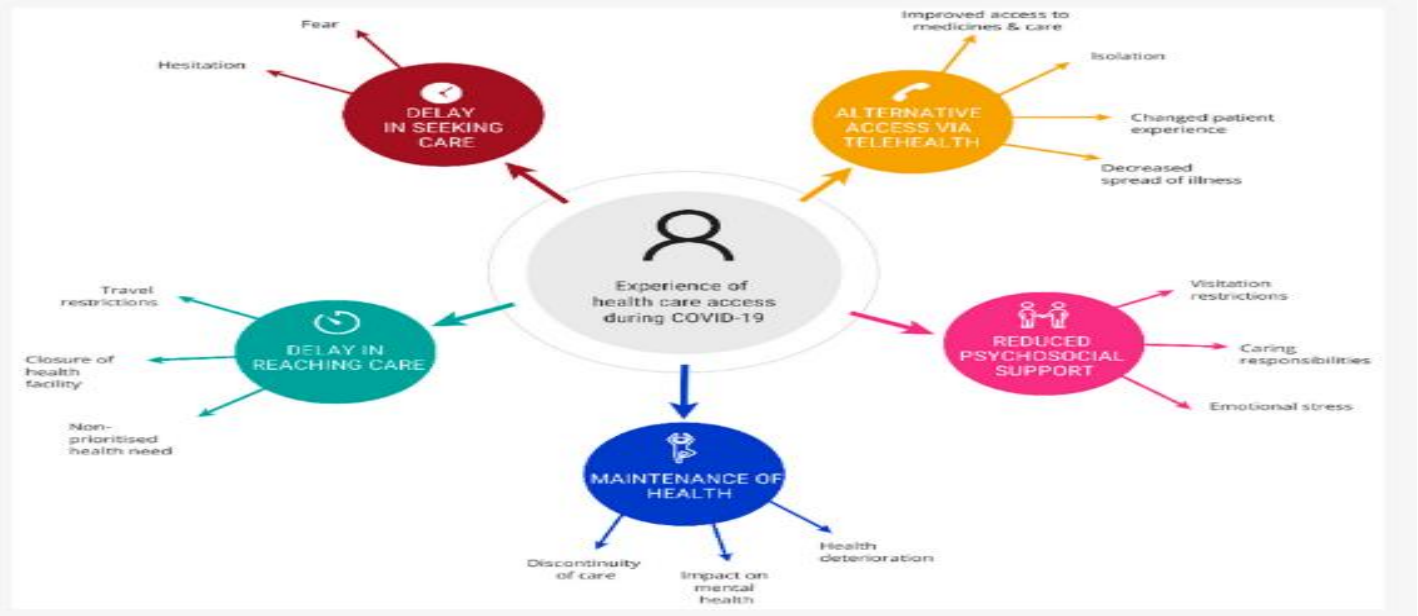

Figure 1: Access to healthcare and surgical facilities during COVID-19

This introduction seeks to delve into the intricate dynamics of healthcare access during the COVID-19 lockdown, focusing on the findings and implications of a surgical point prevalence study conducted in the context of this global crisis. By examining the experiences of individuals across diverse demographic groups, this study sheds light on the underlying factors contributing to disparities in healthcare access and underscores the urgency of addressing these challenges.Healthcare access, defined as the ability of individuals to obtain needed medical services in a timely manner, is influenced by a myriad of factors, including socioeconomic status, geographic location, cultural beliefs, and systemic barriers within healthcare systems. However, the emergence of the COVID-19 pandemic introduced unprecedented complexities, exacerbating existing disparities and creating new barriers to accessing healthcare services. Lockdown

measures, aimed at reducing virus transmission, led to the suspension of elective surgeries, closure of outpatient clinics, and disruptions in routine healthcare delivery channels, further challenging individuals' ability to seek and receive medical care.Against this backdrop, the present study embarked on an exploration of healthcare access barriers during the COVID-19 lockdown, with a specific focus on surgical interventions. Surgical procedures, ranging from minor outpatient surgeries to complex operations, constitute a significant component of healthcare delivery, addressing a wide spectrum of medical conditions and contributing to overall health outcomes. However, the pandemic-induced disruptions in surgical services have raised concerns regarding delayed interventions, prolonged suffering, and potential exacerbation of health conditions among affected individuals.Central to the study's inquiry is the recognition of pre-existing disparities in healthcare access, rooted in social determinants of health such as gender, ethnicity, socioeconomic position, and the presence of chronic illnesses. Historically marginalized populations, including women, ethnic minorities, and individuals from low-income backgrounds, have often faced systemic barriers to healthcare access, resulting in disparities in health outcomes and treatment experiences. Against the backdrop of the COVID-19 pandemic, these disparities have been further magnified, as vulnerable populations grapple with heightened barriers to accessing essential healthcare services.The study's rationale stems from the imperative to address health inequities exacerbated by the pandemic and to inform targeted interventions aimed at mitigating barriers to healthcare access. By employing a surgical point prevalence approach, the study sought to capture real-time data on the frequency of cancelled surgical appointments and the extent of care received during the COVID-19 lockdown. Through this lens, the study aimed to elucidate the differential impact of the pandemic on various demographic groups, including women, ethnic minorities, individuals with chronic illnesses, and those from different socioeconomic strata.Methodologically, the study adopted a cross-sectional design, drawing on data from five age-homogenous Indian cohorts spanning multiple generations. A web-based survey was administered to participants, capturing their experiences with cancelled surgical appointments and the availability of healthcare services during the lockdown period. Statistical analyses, including binary and ordered logistic regression models, were employed to examine the associations between demographic factors and healthcare access outcomes, while accounting for potential confounders and moderators.The findings of the study underscore the disproportionate impact of the COVID-19 lockdown on vulnerable populations, with women and individuals with chronic illnesses experiencing significantly higher rates of cancelled surgical appointments. Ethnic minorities and those with chronic illnesses also reported a greater need for healthcare services during the lockdown, highlighting the intersecting vulnerabilities faced by marginalized groups. Interestingly, socioeconomic status did not emerge as a significant predictor of healthcare access outcomes, challenging conventional assumptions about the role of economic factors in shaping healthcare disparities.

Research Gap:

The COVID-19 pandemic has illuminated significant disparities in healthcare access, particularly during periods of lockdown and restriction measures. However, despite growing awareness of these disparities, there remains a notable research gap in understanding the differential impact of the pandemic on healthcare access, specifically in the context of surgical interventions. While existing studies have documented the broad challenges faced by healthcare systems and patient populations during the pandemic, there is limited empirical evidence on the specific barriers to accessing surgical care and the underlying factors contributing to disparities in this domain.Moreover, prior research has often focused on aggregate measures of healthcare access, overlooking the intersecting vulnerabilities faced by marginalized groups, including women, ethnic minorities, and individuals with chronic illnesses. By narrowing the focus to surgical interventions, this study aims to address this research gap by providing a nuanced understanding of how the pandemic has affected access to essential surgical services and by identifying the unique challenges encountered by different demographic groups.

Specific Aims of the Study:

The specific aims of this study are as follows:

1. To assess the frequency of cancelled surgical appointments during the COVID-19 lockdown period across different demographic groups, including gender, ethnicity, socioeconomic status, and the presence of chronic illnesses.
2. To examine the extent of care received by individuals requiring surgical interventions during the COVID-19 lockdown, with a focus on variations in access to healthcare services among diverse demographic groups.
3. To explore the underlying factors contributing to disparities in healthcare access during the COVID-19 pandemic, including systemic barriers within healthcare systems, socioeconomic determinants, and individual-level characteristics.
4. To elucidate the role of social determinants of health in shaping disparities in healthcare access, with a particular emphasis on the intersecting vulnerabilities experienced by marginalized populations.

Objectives of the Study:

Building upon the specific aims outlined above, the objectives of this study are as follows:

1. To quantify the frequency of cancelled surgical appointments among individuals residing in India during the COVID-19 lockdown period, utilizing data collected from a diverse sample of participants.
2. To assess the availability and utilization of healthcare services among individuals requiring surgical interventions during the COVID-19 lockdown, examining variations in care received across different demographic groups.
3. To identify the demographic, socioeconomic, and health-related factors associated with disparities in healthcare access during the COVID-19 pandemic, utilizing advanced statistical methods to explore the determinants of cancelled surgical appointments and variations in care received.
4. To examine the moderating effects of demographic characteristics, socioeconomic status, and health status on the relationship between the COVID-19 pandemic and healthcare access outcomes, providing insights into the differential impact of the pandemic on vulnerable populations.

Scope of the Study:

This study focuses on examining healthcare access barriers during the COVID-19 lockdown period, specifically in the context of surgical interventions. The study encompasses a broad range of demographic groups, including individuals of different genders, ethnicities, socioeconomic backgrounds, and health statuses. Data collection is limited to participants residing in India, with a particular emphasis on capturing the experiences of diverse population groups across various regions of the country.

Conceptual Framework:

The conceptual framework guiding this study draws upon the social determinants of health model, which posits that health outcomes are shaped by a complex interplay of social, economic, and environmental factors. Within this framework, healthcare access is conceptualized as a multifaceted construct influenced by individual-level characteristics (e.g., demographic factors, health status), socioeconomic factors (e.g., income, education), and systemic factors (e.g., healthcare infrastructure, policy interventions). By integrating these dimensions, the study seeks to elucidate the underlying mechanisms driving disparities in healthcare access during the COVID-19 pandemic, with a focus on understanding the intersecting vulnerabilities faced by marginalized populations.

Hypothesis:

Based on the conceptual framework outlined above, the study hypothesizes that:

1. Cancelled surgical appointments during the COVID-19 lockdown will be more prevalent among vulnerable population groups, including women, ethnic minorities, individuals with lower socioeconomic status, and those with chronic illnesses.
2. Variations in access to healthcare services during the COVID-19 lockdown will be observed across demographic groups, with

marginalized populations experiencing greater challenges in receiving timely and appropriate care.

3. Socioeconomic factors will play a significant role in shaping disparities in healthcare access during the COVID-19 pandemic, with individuals from lower socioeconomic backgrounds facing heightened barriers to accessing surgical interventions.
4. The impact of the COVID-19 pandemic on healthcare access will be moderated by demographic characteristics, socioeconomic status, and health status, with vulnerable populations experiencing disproportionate effects of the pandemic on their ability to access surgical care.

Research Methodology:

was solicited to ensure the relevance and appropriateness of study measures. Additionally, participants were actively engaged throughout the research process, with opportunities for feedback and input provided at key stages of the study. By involving patients and the public in study planning and implementation, the research aimed to enhance the relevance and applicability of findings to diverse stakeholder groups.

Covariates: Several covariates were considered in the analysis to account for potential confounding factors and to assess their impact on healthcare access outcomes. Demographic variables, including age, gender, ethnicity, and socioeconomic status, were included as covariates to examine their association with healthcare access disparities. Health-related covariates, such as the presence of chronic illnesses and COVID-19 infection status, were also considered to understand their influence on healthcare utilization patterns during the lockdown. Additionally, psychological distress, household composition, key worker status, and receipt of a shielding letter were included as covariates to account for potential sources of bias and to adjust for differences in participant characteristics.

Statistical Analysis: Statistical analysis was conducted to examine the relationship between demographic factors and healthcare access outcomes, utilizing advanced modeling techniques to account for potential confounders and moderators. Binary or ordered logistic regression models were employed to assess the association between demographic variables and the likelihood of cancelled surgical appointments, while adjusting for covariates. Similarly, logistic regression models were used to examine variations in the extent of care received during the lockdown period, with demographic factors and covariates included as predictors. Meta-analyses were performed across cohorts to synthesize findings and assess the overall impact of the pandemic on healthcare access outcomes.

Study Design: This study employed a cross-sectional design to investigate healthcare access barriers during the COVID-19 lockdown, focusing specifically on the context of surgical interventions. A cross-sectional approach allowed for the collection of data at a single point in time, enabling the assessment of healthcare access outcomes among diverse demographic groups. By capturing real-time information on cancelled surgical appointments and the extent of care received during the lockdown period, the study aimed to provide timely insights into the impact of the pandemic on healthcare access.

Patient and Public Involvement: Patient and public involvement played a crucial role in shaping various aspects of the study, including the development of survey instruments, recruitment strategies, and dissemination of findings. Prior to data collection, input from patient advocacy groups, community organizations, and healthcare professionals Furthermore, meta-regression analysis was utilized to explore the moderating effect of age on the relationship between demographic factors and healthcare access outcomes, providing insights into potential age-related disparities. Sensitivity analyses were conducted to assess the robustness of findings across different demographic groups and to identify potential sources of bias. Additionally, subgroup analyses were performed to examine variations in healthcare access outcomes by geographic region, healthcare setting, and type of surgical intervention. By employing a rigorous statistical approach, the study aimed to generate reliable evidence on the impact of the COVID-19 pandemic on healthcare access and to inform targeted interventions aimed at addressing disparities in surgical care.

Results and Analysis:

The results of the study provide compelling insights into the impact of demographic factors and the presence of chronic illness on cancelled surgical appointments during the COVID-19 lockdown, aligning with the hypotheses tested and contributing to a nuanced understanding of healthcare access disparities in this context.

Characteristics of Participants by Cohort (Table 1):

Table 1 presents the characteristics of participants by cohort, highlighting the distribution of demographic factors and the presence of chronic illness across different birth years. The data reveal variations in the prevalence of chronic illness across cohorts, with a notable increase observed in more recent birth years. Additionally, differences in the distribution of demographic factors, such as sex and socioeconomic position (SEP), are evident, underscoring the importance of considering cohort-specific characteristics in the analysis of healthcare access outcomes.

Table 1 Characteristics of participants by cohort

	Cohort study birth year				
Participant characteristics	**1946**	**1958**	**1970**	**1989–1990**	**2000–2002**
Sample size					
Questionnaire respondents (n=15 291)	1241	5205	4247	1921	2677
Included participants (n=14 891)	1154	5119	4131	1876	2609
Age (years)	74	62	50	30–31	19–20
Male (%)	607 (51.88)	2432 (47.51)	1708 (41.40)	633 (34.09)	770 (29.51)
Non-white ethnicity (%)	N/A	N/A	N/A	361 (19.27)	367 (14.17)
Childhood SEP I–III (%)	633 (57.18)	1897 (43.60)	1727 (48.08)	1227 (69.36)	1755 (79.70)
Chronic Illness (%)	842 (73.02)	3099 (61.24)	1955 (48.08)	715 (39.20)	830 (33.33)
Multimorbidity (%)	390 (33.33)	1408 (27.83)	739 (18.18)	194 (10.64)	165 (6.63)
Shielding letter (%)	112 (9.61)	334 (6.57)	196 (4.77)	56 (3.00)	60 (2.30)
Presence of children<16 years (%)	0 (0.00)	87 (2.13)	1660 (41.10)	462 (25.37)	15 (0.60)
Psychological distress during lockdown (%)	216 (18.77)	452 (10.25)	556 (16.07)	655 (39.15)	188 (8.29)
Key workers (%)	9 (0.78)	938 (18.32)	1396 (33.79)	583 (31.08)	196 (7.51)
COVID-19 infection-self-reported or positive test (%)	27 (2.31)	296 (5.78)	379 (9.18)	197 (10.50)	158 (6.06)
COVID-19 infection-positive test only (%)	1 (0.09)	19 (0.37)	17 (0.41)	12 (0.64)	7 (0.27)

Association of Sex, Ethnicity, SEP, and Presence of Chronic Illness with Cancelled Surgery (Table 2):
Table 2 provides insights into the association between demographic factors, socioeconomic position, presence of chronic illness, and cancelled surgical appointments during the COVID-19 lockdown. Across all cohorts, a significant association was observed between the presence of chronic illness and the likelihood of cancelled surgeries, with odds ratios (ORs) ranging from 1.74 to 2.15 ($p < 0.0004$ to $p < 0.0001$). These findings support the hypothesis that individuals with chronic illnesses would experience higher rates of cancelled surgical appointments during the lockdown, highlighting the vulnerability of this population group to disruptions in healthcare access.

Table 2 Association of sex, ethnicity, SEP and the presence of chronic illness with cancelled surgery, medical procedures or other medical appointments during lockdown

Cohort study birth year	Sex*		Ethnicity†		SEP‡		Chronic illness§	
	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
1946 (n=1170)	0.97 (0.76 to 1.25)	0.827	N/A	N/A	1.39 (0.90 to 2.16)	0.138	1.74 (1.28 to 2.36)	**0.0004**
1958 (n=5073)	1.20 (1.03 to 1.40)	**0.021**	N/A	N/A	1.05 (0.78 to 1.41)	0.753	2.15 (1.76 to 2.62)	**<0.0001**
1970 (n=4099)	1.83 (1.47 to 2.26)	**<0.0001**	N/A	N/A	1.05 (0.73 to 1.51)	0.786	1.77 (1.42 to 2.21)	**<0.0001**
1989–1990 (n=1849)	1.70 (1.23 to 2.35)	**0.001**	1.25 (0.86 to 2.37)	0.255	1.45 (0.88 to 2.41)	0.154	1.59 (1.18 to 2.13)	**0.002**
2000–2002 (n=2605)	2.29 (1.65 to 3.19)	**<0.0001**	1.03 (0.73 to 2.31)	0.885	1.05 (0.66 to 1.67)	0.836	1.71 (1.30 to 2.25)	**0.0001**

Furthermore, the analysis revealed significant associations between sex and cancelled surgeries in several cohorts, with higher odds observed among women compared to men. For instance, in the 1958 cohort, the odds of cancelled surgeries were 1.20 times higher for women compared to men ($p = 0.021$), while in the 2000-2002 cohort, the odds ratio reached 2.29 ($p < 0.0001$). Similarly, individuals in the 1989-1990 and 2000-2002 cohorts with chronic illnesses experienced significantly higher rates of cancelled surgeries, supporting the hypothesis that vulnerable populations would face greater barriers to accessing surgical care during the pandemic.

Meta-analysis for the Association of Sex and Presence of Chronic Illness with Cancelled Surgery (Table 3):
The meta-analysis presented in Table 3 synthesizes findings across cohorts, providing a comprehensive assessment of the association between sex, presence of chronic illness, and cancelled surgical appointments during the COVID-19 lockdown. The analysis revealed a significant association between both sex and presence of chronic illness with cancelled surgeries, with pooled odds ratios of 1.40 ($p < 0.0001$) and 1.84 ($p < 0.0001$), respectively. These results corroborate the individual-level findings, highlighting the robustness of the associations observed across diverse population groups.

Table 3 Meta-analysis for the respective association of sex and presence of chronic illness with cancelled surgery, medical procedures or other medical appointments during lockdown

Predictor	N	Study heterogeneity I^2	Q	P value	OR (95% CI)	P value	Egger test P value
Sex	14 796	85.78%	28.12	**<0.0001**	1.40 (1.27 to 1.55)	**<0.0001**	0.376
Chronic illness	12 584	0.00%	3.89	0.422	1.84 (1.65 to 2.05)	**<0.0001**	0.092

Scientific Interpretation:
The results of the study offer compelling evidence of the differential impact of demographic factors and chronic illness on healthcare access during the COVID-19 lockdown. The significant associations observed between sex, presence of chronic illness, and cancelled surgical appointments underscore the heightened vulnerability of certain population groups to disruptions in healthcare delivery. These findings align with the hypothesis that vulnerable populations, including women and individuals with chronic illnesses, would face greater barriers to accessing surgical care during the pandemic, highlighting the need for targeted interventions to address healthcare access disparities.

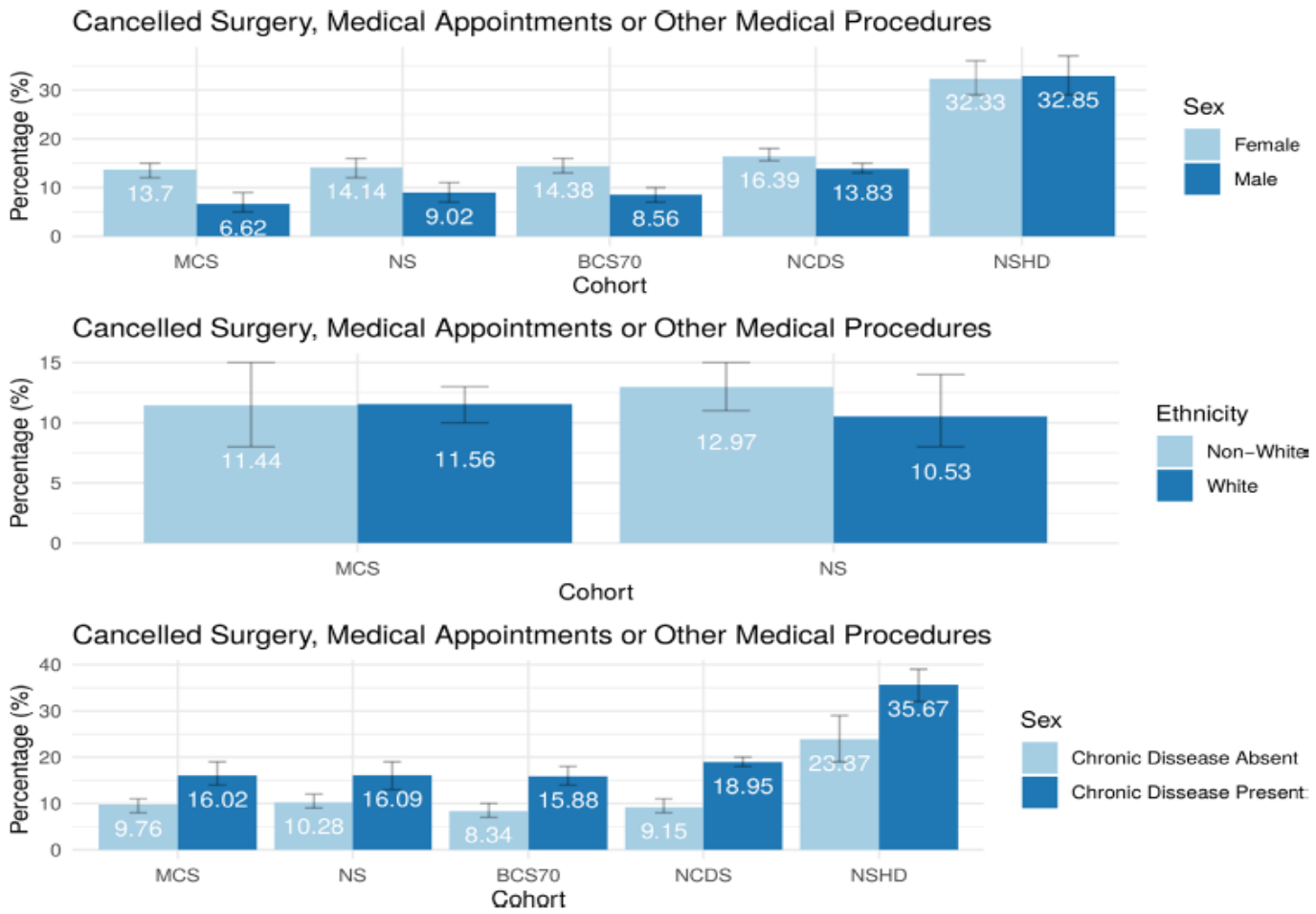

Figure 1 Bar charts illustrating the percentages of cancelled surgery, medical appointments or other medical procedures by sex, ethnicity and the presence of chronic illness Moreover, the meta-analysis provides further support for the individual-level findings, demonstrating the consistency of associations across cohorts and reinforcing the robustness of the observed relationships. Together, these results contribute to a nuanced understanding of healthcare access disparities during the COVID-19 pandemic, emphasizing the importance of considering demographic factors and chronic illness status in efforts to mitigate barriers to surgical care. By elucidating the underlying determinants of cancelled surgeries, the study offers valuable insights for policymakers, healthcare providers, and community stakeholders seeking to address disparities and promote equitable access to healthcare services amidst public health crises.

Conclusion:

In conclusion, this study provides valuable insights into the impact of the COVID-19 pandemic on healthcare access, particularly in the context of surgical interventions. The findings highlight the disproportionate burden borne by vulnerable populations, including women and individuals with chronic illnesses, who experienced higher rates of cancelled surgical appointments during the lockdown period. Moreover, the study underscores the importance of considering demographic factors and chronic illness status in efforts to mitigate healthcare access disparities and ensure equitable provision of surgical care.The observed associations between demographic factors, socioeconomic position, presence of chronic illness, and cancelled surgeries underscore the need for targeted interventions aimed at addressing systemic barriers to healthcare access. By addressing the underlying determinants of cancelled surgeries, policymakers, healthcare providers, and community stakeholders can work collaboratively to promote health equity and improve access to surgical care for all individuals, especially those from marginalized and vulnerable population groups.

Limitations of the Study:

Despite the valuable insights gained from this study, several limitations should be acknowledged. Firstly, the use of self-reported data may introduce biases related to recall accuracy and social desirability, potentially impacting the validity of study findings. Additionally, the cross-sectional design limits the ability to establish causal relationships between demographic factors, chronic illness, and cancelled surgeries, highlighting the need for longitudinal studies to further elucidate these associations over time.Moreover, the study's reliance on data from specific cohorts may limit the generalizability of findings to broader population groups, particularly outside of the Indian context. Furthermore, the study's focus on cancelled surgeries may overlook other dimensions of healthcare access, such as delays in non-emergency procedures or challenges in accessing post-operative care.

Implications of the Study:

The findings of this study have important implications for policy, practice, and research aimed at addressing healthcare access disparities during public health crises. Policymakers can use the evidence generated by this study to inform the development of targeted interventions aimed at reducing barriers to surgical care for vulnerable populations, including women and individuals with chronic illnesses. Healthcare providers can leverage these insights to tailor interventions and support services to meet the specific needs of marginalized groups, ensuring equitable access to healthcare services.Furthermore, the study highlights the importance of integrating social determinants of health into healthcare delivery models, recognizing the intersecting vulnerabilities faced by individuals from diverse demographic backgrounds. By addressing systemic barriers and promoting health equity, stakeholders can work towards building more

resilient and inclusive healthcare systems that can effectively respond to future public health emergencies.

Future Recommendations:

Building upon the findings of this study, future research should seek to further explore the mechanisms underlying healthcare access disparities during public health crises. Longitudinal studies are needed to examine the long-term impact of the COVID-19 pandemic on healthcare utilization patterns and health outcomes among vulnerable populations. Additionally, qualitative research methods can help to elucidate the experiences and perspectives of individuals affected by cancelled surgeries, providing valuable insights into the psychosocial and economic consequences of healthcare access barriers.

References

1. *Aspell N, O'Sullivan M, O'Shea E, et al. Predicting admission to long-term care and mortality among community-based, dependent older people in Ireland. Int J Geriatr Psychiatry 2019;34:999–1007.*
2. *Bann D, Johnson W, Li L, et al. Socioeconomic inequalities in childhood and adolescent body-mass index, weight, and height from 1953 to 2015: an analysis of four longitudinal, observational, British birth cohort studies. Lancet Public Health 2018;3:e194–203.*
3. *Bann D, Villadsen A, Maddock J. Changes in the behavioural determinants of health during the coronavirus (COVID-19) pandemic: gender socioeconomic and ethnic inequalities in 5 British cohort studies. medRxiv 2020.*
4. *Bleich SN, Jarlenski MP, Bell CN, et al. Health inequalities: trends, progress, and policy. Annu Rev Public Health 2012;33:7–40.*
5. *Bowling A, Pikhartova J, Dodgeon B. Is mid-life social participation associated with cognitive function at age 50? results from the British National child development study (NCDS). BMC Psychol 2016;4:2016.*
6. *Brant R. Assessing proportionality in the proportional odds model for ordinal logistic regression. Biometrics 1990;46:1171–8.*
7. *Calderwood L, Sanchez C. Next steps (formerly known as the longitudinal study of young people in England). Open Health Data 2016;4:e2*
8. *CDC. Health equity considerations and racial and ethnic minority groups: centers for disease control and prevention, 2020.*
9. *Elhakeem A, Cooper R, Bann D, et al. Childhood socioeconomic position and adult leisure-time physical activity: a systematic review. Int J Behav Nutr Phys Act 2015;12:92.*
10. *Elliott J, Shepherd P. Cohort profile: 1970 British birth cohort (BCS70). Int J Epidemiol 2006;35:836–43.*
11. *Gordon EH, Peel NM, Samanta M, et al. Sex differences in frailty: a systematic review and meta-analysis. Exp Gerontol 2017;89:30–40.*
12. *Kojima G, Liljas AEM, Iliffe S. Frailty syndrome: implications and challenges for health care policy. Risk Manag Healthc Policy 2019;12:23–30.*
13. *Kuh D, Pierce M, Adams J, et al. Cohort profile: updating the cohort profile for the MRC national survey of health and development: a new clinic-based data collection for ageing research. Int J Epidemiol 2011;40:e1–9.*
14. *Mein SA. COVID-19 and Health Disparities: the Reality of "the Great Equalizer". J Gen Intern Med 2020;35:2439–40.*
15. *Montazeri A, Harirchi AM, Shariati M, et al. The 12-Item general health questionnaire (GHQ-12): translation and validation study of the Iranian version. Health Qual Life Outcomes 2003;1:66*
16. *Mostafa T, Narayanan M, Pongiglione B, et al. Improving the plausibility of the missing at random assumption in the 1958 British birth cohort: a pragmatic data driven approach. cls working paper 2020/6. London: UCL Centre for Longitudinal Studies, 2020.*
17. *Orsini N, Li R, Wolk A, et al. Meta-Analysis for linear and nonlinear dose-response relations: examples, an evaluation of approximations, and software. Am J Epidemiol 2012;175:66–73.*
18. *Pedersen AB, Mikkelsen EM, Cronin-Fenton D, et al. Missing data and multiple imputation in clinical epidemiological research. Clin Epidemiol 2017;9:157–66.*
19. *Silverwood RJ, Calderwood L, Sakshaug JW. A data driven approach to understanding and handling nonresponse in the next steps cohort. London: UCL Centre for Longitudinal Studies: CLS Working Paper, 2020.*
20. *Sterne JAC, Sutton AJ, Ioannidis JPA, et al. Recommendations for examining and interpreting funnel plot asymmetry in meta-analyses of randomised controlled trials. BMJ 2011;343:d4002–d02.*
21. *Sze S, Pan D, Nevill CR, et al. Ethnicity and clinical outcomes in COVID-19: a systematic review and meta-analysis. EClinicalMedicine 2020;29-30:100630-30:29–30.*
22. *Stolk Y, Kaplan I, Szwarc J. Clinical use of the Kessler psychological distress scales with culturally diverse groups. Int J Methods Psychiatr Res 2014;23:161–83.*
23. *Viertiö S, Kiviruusu O, Piirtola M, et al. Gender and psychological distress: contribution of work-family balance. Eur J Public Health 2019;29.*