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Review Article

Health situation analysis of cervical cancer in Delhi

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ABSTRACT

The capital city of India, Delhi is endowed with a plethora of multi- and super-specialty hospitals, both private and government, for treating various diseases. Patients from around the globe seek medical care in Delhi. The primary healthcare system is robust, with a network of newly established Mohalla and polyclinics. However, when it comes to a sensitive disease, 'cervical cancer', all glorious claims mentioned above seem to be inadequate. Cervical cancer is the 2nd most common cancer among Delhi's females. Delhi was 1st state to launch HPV vaccination as a public health program in 2016 despite resistance from civil societies. A situation analysis from literature reveals that cervical cancer screening services at the primary and secondary levels are on the backburner in Delhi, which is also evident from the poor screening habits of Delhi's females (0.7%) according to NFHS-5. This prompts questions regarding organization of the cervical cancer prevention program (NP-NCD) and the delivery of screening services in Delhi. In this review we have tried to illuminate the contemporary landscape of cervical cancer burden, screening, and treatment, while also identifying opportunities for enhancing cervical cancer management in Delhi. The study finds that implementation research targeted at finding barriers in program organization and service delivery would help strengthen the capacity of Delhi's health system.

Keywords: Cervical cancer, Situation analysis, Health system, Delhi

INTRODUCTION

Delhi is spread over a geographical area of 1483 km^2 with a population of 1.68 crores in 2011, of which 89,87,326 are males and 78,00,615 (46.5%) are females.[1] It is divided into 11 districts viz South, South-East, South-West, North, North-East, North-West, East, West, Central, New Delhi, Shahadra and is bordered by Haryana on three sides and by Uttar Pradesh in the east. Around 97.5% of the population lives in urban areas.[2] Eighteen lakh or 11% of the population live in slums. A significant proportion of Delhi's population is migrants from various parts of the country. Data from Census 2011 shows that 80% of the male and 71% of the female population is literate in Delhi, above the national rate.[1] Concerning its economy, Delhi had the highest per capita income in 2019-2020 (Rs. 2,83,636) and its per capita GDP is Rs. 6,34,408.[3]

Health is always the first priority of everyone and ensuring good health requires robust health infrastructure and ample manpower at health facilities. Primary healthcare is considered a fundamental element of more effective and efficient healthcare systems.[4] It plays a crucial role in addressing the health determinants viz social and environmental.[5] It is also a cost-effective way of delivering services.[5] However, only a narrow range of services are offered by the existing Government Primary

Health Care Facilities (GPHCFs), both in rural and urban areas, due to a variety of reasons which includes at times, the non-availability of providers as well.[4] Thus, the country is grossly underutilizing its GPHCFs. People in India generally choose to go to higher levels of government facilities even for primary care or private practitioners which leads to out-of-pocket (OOP) expenditure.[4] For cervical cancer screening, a clear division of tasks is provided in the operational guidelines of the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and stroke (NPCDCS) which was renamed as National Programme for Prevention and Control of Non-Communicable Diseases (NP-NCD) in 2023. According to these guidelines, health promotion, encouraging behavior change, and the identification of early warning signs of cancer are responsibilities of primary health care centres (PHCs). PHCs are generally located in the peripheries of the country, whereas Community Health Centres (CHCs), which are higher-level health care facilities need to conduct opportunistic screening. Tertiary Care hospitals are mandated to perform confirmatory diagnosis, treatment, and referral.[6]

Cervical cancer is a public health concern and the 2nd most common cancer among females in India as well as in Delhi according to the National Cancer Registry Program report 2020.[7] The main causes of it are two strains of the human papilloma virus (HPV), namely HPV-16 and HPV-18.[8] There are other behavioral risk factors as well for cervical cancer such as tobacco and alcohol.[8,9] An estimated 123,907 new cases and 77,348 deaths occur due to cervical cancer in India annually.[10] Across India, Papumpare and Aizawl districts have the highest age-adjusted incidence rates (AARs) for cervical cancer, 27.7 and 27.4 respectively. Delhi with an AAR of 14 ranks 11th (Figure 1). It is crucial to investigate areas vulnerable to poor cervical cancer screening and trends in its prevalence as India moves towards universalizing national-level screening. There is no study reported for the UT of Delhi that has comprehensively reviewed its situation w.r.t cervical cancer. A study by Chawla et al had reported that screening facilities for cervical cancer are not available in Delhi's primary health centres (PHCs).[11]

This review aims to compile and document the situation of the UT of Delhi concerning its geography, demography, socio-economic and health indicators, epidemiology of cervical cancer, health system involved in the management of cervical cancer, and status of the Cervical Cancer Prevention Program. Only secondary data has been used to achieve the objective. Strength, weakness, opportunity, threat (SWOT) analysis is done to examine the strengths and weaknesses of the health system in Delhi. Therefore, we have tried to illuminate the contemporary landscape of cervical cancer burden, screening, and treatment, while also identifying opportunities for enhancing cervical cancer management in Delhi.

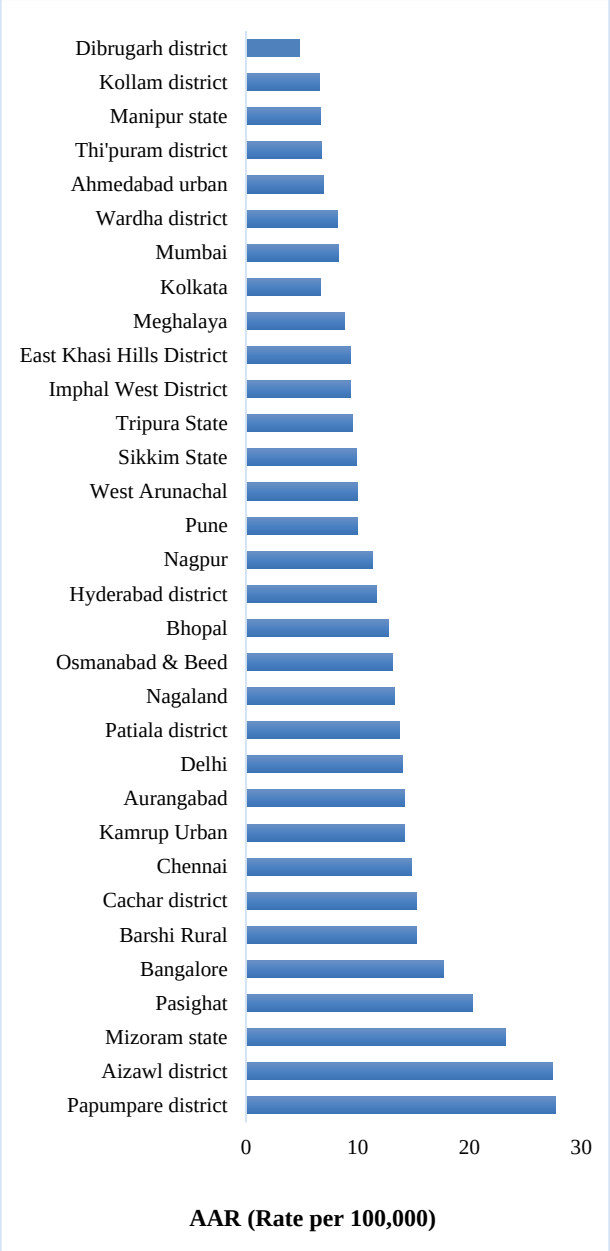

Figure 1: Cervical cancer AARs across 28 PBCRs.

Source: NCRP 2020[7]. AAR: Age Adjusted (incidence) Rates; PBCR*: Population Based Cancer Registry. * The Population Based Cancer Registries (PBCRs) is a long-term initiative of the Indian Council of Medical Research (ICMR), commenced in 1981 under National Cancer Registry Program (NCRP) that involves a network of cancer registries across the country. Its main goal is to collect data on all new cases of cancer in a well-defined population. The sources of registrations (SoR) for these cases can come from various places such as government hospitals, private hospitals, nursing homes, clinics, diagnostic labs, imaging centers, hospices, and registrars of births and deaths.

Overview of cancer burden in Delhi

The 3 leading cancer sites among males in Delhi currently are lung (AAR 10.5), mouth (AAR 7.5), and prostate (AAR 6.5) while in females' breast (AAR 27.8), cervix

(AAR 10), and gall bladder (AAR 8) are the top 3 sites (Figure 2). Lung cancer has been the leading site among males since 1988. Prostate cancer has seen a jump. It was in the 8th position in the (1988-1997) period and jumped to second leading site in the period 2005-2014. Currently it is at 3rd place (Figure 2a).[7]

Cervical cancer, presently with an AAR of 14.0 per 100,000 population is the second leading site of cancer among females in Delhi since 1988 after breast which has an AAR of 27.8 (Figure 2b). There has been a significant decline in the AAR for cervical cancer (19.9 in 1988-1997) to (12.0 in 2005-2014).[7]

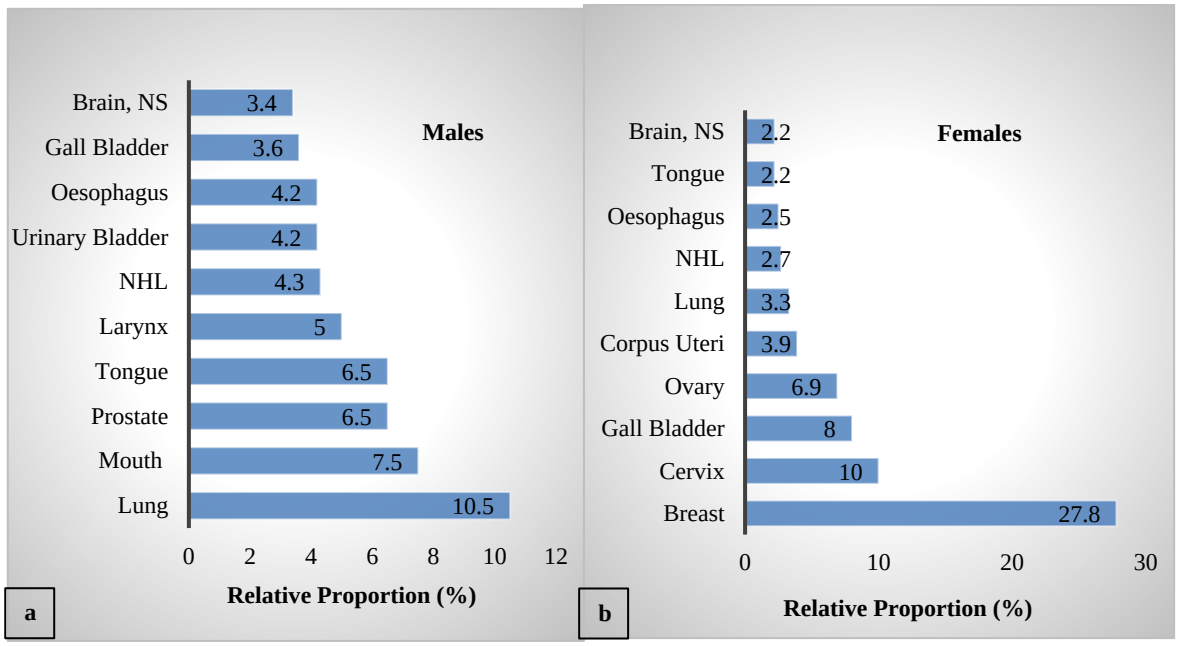

Figure 2: Leading sites of cancer in Delhi in (a) males and (b) females (2012-2014).

Source: NCRP 2020.[7]

Among females, there was a significant increase in AAR for breast cancer while a decrease in AAR for cervical cancer from 1988 to 2014.[7] This trend is reported among all five selected Population Based Cancer Registries (PBCRs) viz Bangalore, Chennai, Delhi, Bhopal, and Barshi rural over a 25–30-year period for the period of 1985–2014 according to a study by Sathishkumar et al.[13] Breast cancer rates are increasing due to changes in lifestyle such as dietary changes, reduced physical activity, and an increasing prevalence of obesity.[13] A declining trend in AAR has been observed for cervix uteri from 1988 (19.9) to 2014 (12.0). This trend is expected to continue till 2030.[14] Screening for precancerous lesions is associated with lower incidence of cervical cancer.[13] However, despite the lack of an organized screening program, cervical cancer incidence rates decreased among the 5 selected PBCRs in Bangalore, Chennai, Delhi, Bhopal, and Barshi rural over time.[13]

From 1988 to 2012, the incidence of lung cancer among males in urban Delhi increased. The rapid economic and industrial growth in the urban area of Delhi over the past few decades is believed to have led to an increase in the incidence of lung cancer.[15] There has been a significant increase in the incidence rate of prostate cancer over time in Delhi. It was once believed that the occurrence of prostate cancer in India was much lower than in western countries. However, due to the migration of rural populations to urban areas, changes in lifestyle, increased awareness, and improved access to medical facilities, more cases of prostate cancer are now being detected. This indicates that the rate of prostate cancer in India is not very different from that of Western countries.[16]

Cervical cancer in Delhi

Delhi ranks 11th in India in terms of cervical cancer burden with AAR 14 (Figure 1). The incidence rate of cervical cancer increased with age and the rate is highest in the 50-74 age group.[7] It reaches the peak in the 60-64 age group. Negligible incidence rates are observed below the 25-year-old age group. After 25 years, incidence rates of cervical cancer show an increase and reach the highest rates (62.3) in the age group of 60-64 years.[7]

HEALTH INDICATORS

Infant mortality rate

The infant mortality rate is a crucial metric for evaluating a population's demographics. It serves as a key indicator of a country's socioeconomic progress, quality of life, and also helps identify children who may be at a higher risk of death. In Delhi, the infant mortality rate (per 1000 live births) is 24.5 according to National Family Health Survey-5 (NFHS-5) while for India, it is 35.2.[17]

Behavioural risk factors for cervical cancer

Cigarette smoking and tobacco are well-known risk factors for cervical cancer.[18,19] Alcohol is a potential risk factor for acquiring HPV infection. However, only a few studies have examined the association between alcohol consumption and HPV persistence.[9] In the NCT of Delhi, among adults aged 15-49, a lower proportion (0.5%) of women consume alcohol which is less than the national average (1.3%).[17] Alcohol consumption is higher in urban (0.5%) areas as compared to rural areas (0.3%).[17] The East Khasi Hills district has the highest percentage of tobacco-associated cancers among males (70%) and females (46.5%) relative to all cancer sites.[7] In the Delhi PBCR, 41.2% of cancers in males are tobacco-associated and 12.4% of cancers in females are tobacco-associated.[7] Tobacco consumption among women aged 15-49 years in the NCT of Delhi is 2.2% which is lower than the national average (8.9%). Tobacco consumption is lower in urban areas (2.2 %) compared to rural areas (3.4%) (Figure 3).[17]

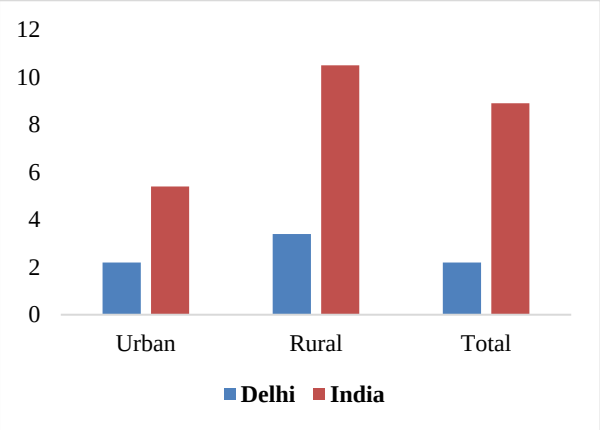

Figure 3: Tobacco consumption among Delhi's women above 15 years compared to India.

Source: NFHS-5.[17]

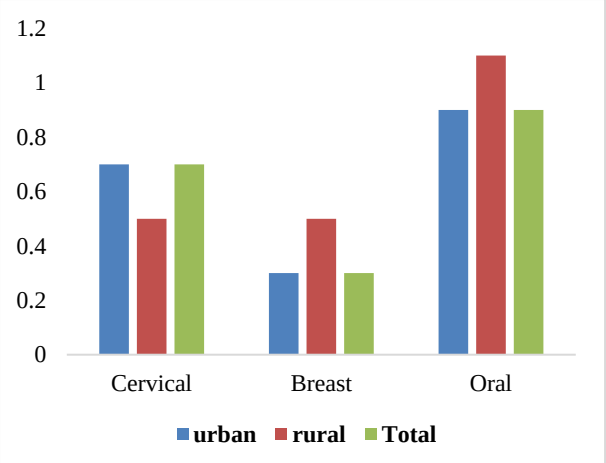

Figure 4: Cancer screening habits among Delhi's women.

Source: NFHS-5.[17]

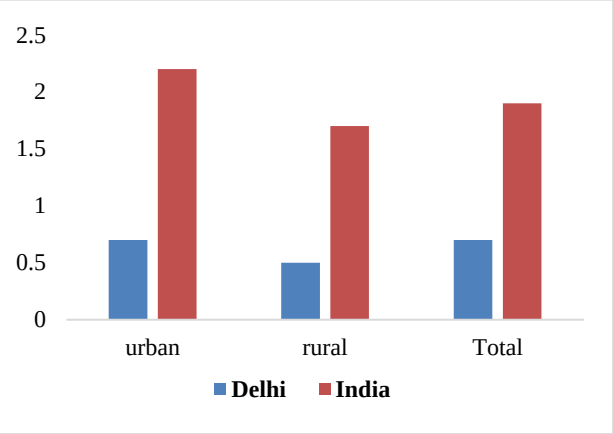

Figure 5: Women ever got a screening test done for cervical cancer (%).

Source: NFHS-5.[17]

NFHS-5 gathered crucial data on women's health, specifically asking whether they ever got themselves screened for cancers of oral cavity, breast, and cervix.[17] Cancer screening habits among the Indian population including Delhi's adults are not very promising. A mere 0.7%, 0.3%, and 0.9% of women aged 30-49 years got screened for cervical, breast, and oral cancer respectively in Delhi (Figure 4).[17] The cervical cancer screening habits are slightly higher among the urban population (0.7%) as compared to rural (0.5%) (Figure 5) which may be attributed to educational levels in urban areas. Cancer screening habits are highest for oral cancer in Delhi's women (Figure 4) while in India's women screening habits are best for cervical cancer.[17]

Overview of the health system and administration in Delhi

Delhi's Department of Health and Family Welfare is responsible for providing healthcare services to its citizens.[5] Under this department come, two Directorates--Directorate General of Health Services (DGHS) and Department of Family Welfare (DFW).[20] The major agency related to healthcare delivery is the DGHS of Government of NCT of Delhi. The DGHS is the largest department under the Department of Health and Family Welfare. It provides healthcare services at primary and secondary levels to the people of Delhi through a vast network of health outlets including dispensaries, health centers, school health clinics, and mobile health clinics.[21] DGHS coordinates and implements national and state health programs. Delhi is divided into 11 districts, with each district headed by one Chief District Medical Officer (CDMO). The CDMOs are responsible for monitoring the functioning of health centers and dispensaries in their respective districts. They are under the administrative control of DGHS and ensure better administration of healthcare services in their districts.[5]

Delhi has a mixed system of health delivery. Twelve healthcare agencies are functioning for providing health services, or 14 if counting the municipal corporations separately (Table 1).[22] There are private as well as public health facilities. The type of public facilities range from mohalla clinics to seed PUHCs/ dispensaries to District Hospitals to Tertiary Hospitals as given in Table 2. Delhi municipal corporation also constitutes a significant system in delivery of health services in the capital. The number of health facilities available in Delhi vary slightly depending on source. However according to the RHS report of 2020-21; there are 15 sub-centres (SCs), 549 primary health centres (PHCs), 0 community health centres (CHCs), 9 sub-district hospitals (SDHs), 37 district hospitals (DHs) (Table 3).[23] Delhi currently has 519 mohalla clinics and 29 polyclinics.[21]

Healthcare facilities are being provided by both government and non-government organizations. In addition, there is a high concentration of private healthcare providers, including large hospitals and small clinics. Accessible and quality health care services in Delhi are provided through network of primary, secondary, and tertiary facilities. Primary healthcare is provided through dispensaries, secondary healthcare through multi-specialty hospitals, and tertiary healthcare through super-specialty hospitals.[21]

Table 1: Agencies providing health services in Delhi.

S. no.	Health services
1.	State Government of Delhi
2.	Government of India
3.	Central Government of Health Services
4.	Directorate General of Health Services
5.	Autonomous institutions (i.e., All India Institute of Medical Sciences)
6.	Employee's State Insurance Corporation
7.	Ministry of Defense
8.	Ministry of Railways
9.	New Delhi Municipal Council
10.	North Delhi Municipal Corporation
11.	South Delhi Municipal Corporation
12.	East Delhi Municipal Corporation
13.	Private organizations and providers
14.	Voluntary organizations and nongovernment organizations

Source: (Lahariya, 2017).[22]

Table 2: Type of health facilities functioning in Delhi.

S. no.	Health facilities
1.	Super specialty hospitals
2.	Specialty hospitals
3.	Tertiary care including medical college hospitals
4.	Referral hospitals
5.	District hospitals
6.	Subdistrict hospitals
7.	Primary health centers
8.	Dispensaries
9.	Maternity homes
10.	Polyclinics
11.	Nursing home
12.	Special clinics
13.	Chest clinics
14.	Venereal diseases or sexually transmitted diseases clinics
15.	Mobile mother and child welfare units
16.	Mother and Child Welfare (MCW) center
17.	India population project clinics
18.	Postpartum units
19.	Urban welfare centers
20.	Urban health post
21.	Urban Primary Healthcare Centres (U-PHC)

Continued.

S. no.	Health facilities
22.	Mobile medical unit (MMU) and/or mobile vans
23.	Maternity centers
24.	School health units/clinics
25.	Mobile dispensary
26.	Mohalla clinics

Source: Lahariya, 2017.[22]

However, the government of NCT of Delhi has brought about a significant paradigm shift in the delivery of healthcare services by creating a four-tier healthcare delivery system such as: (1) Aam Aadmi mohalla clinic - providing primary healthcare services, (2) multi-speciality poly clinic - offering secondary healthcare services such as outpatient consultations with specialist doctors and diagnostic tests, (3) multi-speciality hospital - providing inpatient care (previously referred to as secondary level hospital) and (4) super-speciality hospital - offering advanced medical care (previously referred to as tertiary level hospital).[21]

Table 3: Facility number in Delhi and India.

	No. of SCs, PHCs functioning in rural and urban areas							
	SC		PHC		CHC		SDH	DH
	Rural	Urban	Rural	Urban	Rural	Urban		
Delhi	12	3	5	544	0	0	9	37
India	156101	1718	25140	5439	5481	470	1224	764
District-wise break-up	**SC**		**PHC**		**CHC**		**SDH**	**DH**
Central	1		76		0		4	6
East	0		33		0		0	2
New Delhi	1		77		0		3	4
North	0		38		0		0	3
North East	0		29		0		0	1
North West	1		64		0		1	5
Shahadra	0		34		0		0	5
South	0		36		0		0	1
South East	0		46		0		0	1
South West	12		43		0		0	4
West	0		73		0		1	5
Total Districts=11	15		549		0		9	37

Source: Government of India. Rural Health Statistics 2020-21.[23]

The government of Delhi had introduced the Aam Aadmi mohalla clinics, commonly known as mohalla clinics, as primary healthcare centers. They were established to reduce the congestion in hospitals across the city and form the first layer of a three-tier healthcare system, which includes primary health centers, polyclinics, and hospitals.[5] the 1st mohalla clinic came up in 2015. Delhi's citizens are entitled to a free basic healthcare package, which includes essential services such as medicines, diagnostics, and consultations in mohalla clinics. Preventive services are also delivered by mohalla clinics such as immunization, antenatal and postnatal care of pregnant women, assessment of nutritional status and counseling, and preventive and promotive components of National/State Health Programmes.[21] At present, there are 519 mohalla clinics and 29 polyclinics across Delhi.[21]

Health financing-Delhi

The National Health Mission (NHM) provides funds for the implementation of various programs in states of India. While the MoHFW forms policies and guidelines, it is the program implementors at the state who know what strategies will best be suited to their socio-cultural, demographic, and epidemiological context. In the financial year 2022-23, GoI allocated Rs. 89,155 crore to MoHFW. For FY 2022-23, Rs. 35,947 crore was allocated to NHM.[24] The NHM comprises six primary financing components, which are as follows: (1) reproductive and child health (RCH) flexipool, (2) health system strengthening (HSS)/NRHM mission flexipool (MFP), (3) NUHM flexipool, (4) communicable diseases (CD) flexipool. It finances the national disease control programme (NDCP) which includes revised national tuberculosis control programme (RNTCP) and national vector borne diseases control programme (NVBDCP), (5) non-communicable diseases (NCD) flexipool which finances national programme for control of blindness (NPCB), national programme for prevention and control of cancer, diabetes, cardiovascular diseases and stroke (NPCDCS), national tobacco control programme (NTCP), etc. and (6) infrastructure maintenance (IM) funds, which are allotted across various programmatic divisions of NHM.

The recommended budget (in lakh) for the implementation of various programs for UT of Delhi for FY-2023-24 as per NHM is briefed in Table 4. Budget for infrastructure maintenance in Delhi is meager (1%).[25]

Table 4: Recommended budget (in lakh) for implementation of various programs for UT of Delhi for FY-2023-24 as per NHM.

S. no.	Programs	Budget (INR)
1.	RCH flexible pool (including RI, IPPI, NIDDCP)	8703.82
2.	NDCP flexible pool	9182.28
3.	NCD flexible pool	2500.17
4.	NUHM flexible pool	11148.49
5.	Health system strengthening (HSS) under NRHM	21800.37
6.	Infrastructure maintenance	546
7.	Immunization kind grants	1854

Source: Ministry of Health and Family Welfare Delhi- Record of Proceedings (ROP) 2022-2024; pg:11.[25]

Cervical cancer prevention program in Delhi

HPV vaccination and cervical cancer screening program

Delhi launched the country's first HPV vaccination program for public health in November 2016. Delhi State Cancer Institute (DSCI) provides free vaccine to adolescent girls aged 11 to 15 years since November 2016- the only government institute. In 2017 and 2018, Punjab and Sikkim, too launched their programs.[26]

Given the increasing burden of non-communicable diseases, the Ministry of Health and Family Welfare, Government of India launched the National Program for Prevention and Control of Cancer (Breast, Cervix, Oral), Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) in 2010 and 2014 in Delhi. The program aims to promote health and prevent diseases, strengthen infrastructure and human resources, ensure early diagnosis and management, and integrate with the primary healthcare system. The NPCDCS aims to integrate the activities under the umbrella of the National Health Mission.[27] It was renamed as NP-NCD in May 2023.[28] In Delhi, both the NP-NCD under NHM and 'cancer control cell' scheme under GNCTD focus on common cancer control.[29] DGHS-Delhi annual report 2021-22 opportunistic screening data from health centers (DGD/ PUHC/ AAMC) reports that only 100 females got screened for cervical cancer in Delhi, and 4 were initiated on treatment.[29] Table 5 summarizes the state profile of Delhi.

Table 5: Summary of state profile.

State profile of Delhi	
Demographic indicators	
Population [1]	1.67 crore (census 2011)
No. of districts[2]	11
Urban population[2]	97.5%
Male[1]	89,87,326
Female[1]	78,00,615 (46.5% of total)
Literate females	55,42,911 (71%)
Infrastructure details (RHS 2021)[23]	
SC	15
PHC	549
CHC	0
SDH	9
DH	37
Mohalla clinics[21]	519
Polyclinics[21]	29
Vital statistics	
Crude birth rate (SRS 2020)[30]	14.2
Crude death rate (SRS 2020)[30]	3.6
Infant mortality rate IMR (SRS 2020)[30]	12
TFR (SRS 2020)[30]	1.4
Under 5 mortality rate (SRS 2020)[30]	14
Child sex ratio (NFHS-5)[17]	917
Female literacy[1]	71%

Continued.

State profile of Delhi	
Indicators	**Delhi**
Age-adjusted incidence rate per 100,000 population (all sites) -NCRP 2020[7]	M-147 F-141
AAR per 100,000 population (cervical cancer)- NCRP 2020[7]	14
Cervical Cancer screening habit (NFHS-5)[17]	0.7
Breast Cancer screening habit (NFHS-5)[17]	0.3
Oral cancer screening habit (women) (NFHS-5)[17]	0.9

Source: Compiled from multiple sources (source mentioned in the table itself).

SWOT ANALYSIS AND DISCUSSION

This review has aimed to provide insights into the recent trends of cancers particularly cervical cancer incidence and mortality rates in India and Delhi. Although cervical cancer incidence and mortality have decreased in the past three decades, it still remains a significant public health issue in Delhi and India. Incidence of cervical cancer differs by culture, and understanding of factors such as individual, socio-economic, and cultural that may be a reason for poor screening uptake is required. Although NHM-India allocated 58% and NHM-Delhi budget allocated 39% of funds for Health System Strengthening, the health system preparedness for cervical cancer in India at the primary level is abysmally low except for Maharashtra and Goa.[31] NCD flexible pool gets only a 4% to 5% share. In Delhi, a study conducted in 2012 by Chawla et al showed that the situation of primary health facilities for cervical cancer screening was abhorrently bad and non-existent at the primary level.[11] Budget for infrastructure maintenance is meager (1%) as evident from Table 4. No current study is available that reflects the health facility infrastructure in Delhi in recent years for cervical screening. The screening habits in Delhi's women are also abysmal with a mere 0.7% ever getting screened for cervical cancer according to NFHS-5.[17] Population based screening for cervical cancer is yet to take proper shape in Delhi. Mohalla clinics and polyclinics offer a good opportunity at the primary level due to their easy accessibility and affordability which could be exploited to implement cervical cancer screening program in Delhi and reduce the burden at higher levels of facilities. Mohalla clinics are pre-fabricated structures in Delhi's primary health system. But these are single roomed which is a drawback w.r.t. cervical screening that demands proper privacy and needs to be addressed. Strengthening pre-existing dispensaries/PUHC with multiple rooms for cervical screening is an alternative. Converting dispensaries to polyclinics for secondary care may help.[32]

State governments' efforts towards introducing the HPV vaccine in Delhi have been promising but there seems a lackadaisical political interest in strengthening screening services for addressing cervical cancer. Implementing screening, vaccination, early detection, and prompt treatment can reduce cancer cases in Delhi. Control of modifiable risk factors associated with cancers to be ensured. It is also important to provide education, information, and communication about cervical cancer prevention and control for girls, boys, parents, and the community.

Limitations

A limitation of this review is that we have relied only on secondary data. The assessment of the situation of Delhi w.r.t. cervical cancer would remain incomplete without relevant primary data depicting current infrastructure and service availability at the health facilities for cervical cancer screening and treatment.

CONCLUSION

Although cervical cancer incidence and mortality trends have shown a downward trajectory in Delhi, it remains the 2nd most common cancer. Delhi's situation in terms of the management of cervical cancer is not very promising despite the availability of a sufficient number of health facilities at multiple levels (both private and government) indicating concerns regarding the organization of the national program and service delivery. Screening rates in Delhi are abysmally poor. The readiness of facilities for cervical screening in Delhi needs to be identified. While mohalla clinics are offering basic consultations and medicines, polyclinics offer specialist care and a wider spectrum of diagnostics. Both can optimally be exploited for spreading awareness of risk factors of cervical cancer and ensuring screening services. Decentralized implementation research aimed at identifying the challenges and enhancing the delivery of cervical cancer services at the district level at multiple tiers, would help in strengthening the system significantly.

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