Research Open

Archives of Women Health and Care

Volume 6 Issue 4

Short Report

Impact of the COVID-19 Pandemic on Breast Incidence and Stage during the COVID-19 Pandemic in the Netherlands, and a Comparison with Other Countries

Anouk Eijkelboom[1,2], Linda de Munck[1] and Sabine Siesling[1,2]*

[1]Department of Research and Development, Netherlands Comprehensive Cancer Organisation (IKNL), Utrecht, The Netherlands

[2]Department of Health Technology and Services Research, Technical Medical Centre, University of Twente, Enschede, The Netherlands

Corresponding author: Siesling S, Department of Research and Development, Netherlands Comprehensive Cancer Organisation (IKNL), Utrecht, The Netherlands

Received: November 30, 2023; **Accepted:** December 06, 2023; **Published:** December 11, 2023

Short Report

In the Netherlands, the first COVID-19 patient was confirmed on February 27th, 2020. Thereafter, the number of infected patients quickly increased, just as the number of hospitalized COVID-19 patients. In March, 2020, the first policy measures were taken to prevent the spread of the virus. Those measures included, amongst others, the recommendation to keep 1.5 meters distances and for elderly and vulnerable people to stay at home. Additionally, the Dutch national breast cancer screening program was suspended in week 12 of 2020. In week 26 of 2020 it was resumed at 40% capacity, which was slowly increased to a capacity of 100% in the spring of 2021. These policy measures and decisions in healthcare were made without, or with little, prior knowledge of the consequences on breast cancer detection and care. Therefore, this short report aimed to give an overview of the effect of the COVID-19 pandemic on breast cancer incidence and stage in the Netherlands, and compared those results with other countries.

First results of the effect of the COVID-19 pandemic on breast cancer detection showed a decrease in breast cancer incidence (expressed as the number of breast cancer diagnoses per 100,000 women) in women diagnosed with breast cancer in weeks 2-17 of 2020, compared with women diagnosed in weeks 2-17 of 2018 or 2019. This effect was seen in all age groups and tumor stages, except stage IV [1-3]. As expected, the incidence of DCIS and stage I tumors decreased to the largest extent, as these are the tumors mainly detected by the breast cancer screening program.

When we focus on women in the screening age, 50-74 years, 67% fewer screen-detected tumors were diagnosed in weeks 9-35 of 2020, compared to week 9-35 of 2018/2019 [4]. The incidence of screen-detected tumors was significantly lower in all age groups during weeks 14-35 of 2020, and the incidence of all tumor stages, except stage IV, was significantly lower during weeks 14-25. During weeks 26-35 the incidence of DCIS and stage I-II tumors stayed significantly lower. Less pronounced effects were observed for the incidence of clinically-detected breast cancer. Compared to weeks 9-35 of 2018/2019, 7% fewer clinically-detected breast tumors were diagnosed in weeks 9-35 of 2020. The incidence decreased in all age groups in weeks 12-16. Incidence of stage I-II tumors was significantly lower in weeks 12-13 and incidence of DCIS and stage I-III tumors was significantly lower during weeks 14-16.

Follow-up research of our group investigated the effect of the pandemic on breast cancer incidence and stage during January 2020 till December 2021 [5]. This study showed that the incidence was significantly lower in women eligible as well as not eligible for screening (i.e., those aged <50 and >74 years). This suggests that the decrease in incidence was caused by both the suspension of the screening program and the reluctance of patients to visit the general practitioner. During the second wave, i.e., October 2020-April 2021, the incidence of clinically-detected tumors was significantly higher in Dutch women aged 50-74 years [5]. This suggests that the method of detection in some women changed from screen-detected to clinically-detected. Additionally, a small and temporary increase in the incidence of stage IV tumors was seen in Dutch women aged 50-69 years. However, it is unclear whether this increase is due to the COVID-19 pandemic or other factors. The increased incidence could also be a result of the increase in the usage of improved diagnostic methods, such as the PET-CT scan which is highly accurate in detecting distant metastases compared to conventional methods [6].

Comparable to our studies, studies from other countries also showed a decrease in both the absolute number of breast cancer patients [7-14] and in the crude breast cancer incidence rate [15,16] at the beginning of the pandemic. The largest decrease in breast cancer incidence was seen in women in the screening age groups [3,4,8,16]. Part of the decrease in breast cancer incidence can be explained by the suspension of the national breast cancer screening program. Many countries had to suspend their screening program to reduce the pressure on healthcare [17]. A previous meta-analysis showed a 41% decline in mammogram rates between 2019 to 2020 according to data of three registry-based studies, and a 53% decline based on data

of ten non-registry-based studies [18]. Another part of the decrease in breast cancer incidence could be explained by a decline in the number of women visiting the General Practitioner (GP) due to fear of contracting the virus or overburding the healthcare system [1,2]. The decrease in the number of women visiting the GP in the Netherlands did not differ by age group [2].

Studies from Norway and New Zealand only showed a minimal decrease in the number of breast cancer diagnoses during the start of the pandemic [5,19]. Both Norway and New Zealand had a low COVID-19 infection rate and low COVID-19 death rates compared to other countries [20-25]. This indicates that the stable incidence in Norway and New Zealand could be due to the low severity of the pandemic, resulting in a minimal decrease of breast cancer diagnoses.

Comparable to our results, some studies from other countries showed that breast cancer incidence quite quickly reached pre-COVID levels after the first wave [7-9,14-16]. However, a couple of countries/regions had more difficulties in reaching pre-COVID incidence levels. These include Italy [10], Hungary [11], the United States [12], and Bavaria [13]. The level of political regulation and the number of COVID-19 infections or deaths were comparable between those four countries/regions and other countries [26-28]. Hence, this probably does not explain the difference in incidence. One reason for the decreased incidence in Italy could be that Italian women were still hesitant to visit screening after the end of the first wave [29]. A Italian study showed a 20% decrease in the number of women attending screening between October-December 2020, compared to the same period in 2019, while the number of women invited reached pre-COVID levels [29]. The decrease in incidence in Hungary might be explained by the relatively high number of COVID-19 patients in the hospitals, compared to other countries [30]. Also, the breast cancer screening program was suspended a second time in April 2021. The decrease in Bavaria (Germany) could have been caused by a relatively high number of patients at the Intensive Care Units (ICU) in Germany during the second wave, compared to other countries [31]. A negative association between the number of patients at the ICU and the diagnostic capacity at the oncological care was found in Germany [32]. The potential cause for the decrease in incidence found in the study from the United States is unknown. These cross-country comparisons show that the cause for the decline in incidence varies from country to country.

In the Netherlands, the maximum allowed screening interval between two invitations increased from two to three years in November 2020. The increase in the screening interval was both due to the COVID-19 pandemic and due to a shortage in mammography technologists. As a result, the mean screening interval was 32.2 months in 2021 [33]. This increased screening interval probably caused the method of detection in some women to change from screen-detected to clinically-detected, as a significant higher number of women were diagnosed with a clinically-detected cancer during October 2020-April 2021 compared to the same period in 2017-2019 [5]. A Dutch modelling study showed that a three-months suspension of the screening program, without catch-up, might already cause a 19% increase in the number of interval tumors detected between the last and first screening after interruption, compared to no suspension [34].

The majority of studies on tumor stage investigated whether the proportion of women diagnosed with a certain stage tumor changed during the pandemic [10,21-25]. However, as the suspension of the breast cancer screening program mainly led to a decrease in the incidence of DCIS and stage I tumors it was expected that a lower proportion of women would be diagnosed with these tumors, and that a higher proportion would be diagnosed with late-stage tumors. It would have given more insight if these studies investigated the effect of the pandemic on the incidence of breast cancer by tumor stage, as we did in our studies.

In our studies we did not adjust for the aging of the population or the increase in risk factors associated with breast cancer, while those factors might have led to an increase in the number of cancer patients. However, as the crude breast cancer incidence rate stayed rather constant in the Netherlands during the seven years before the pandemic (2013-2019) [35], and the study period used in our studies is relatively small, it is not expected that this influenced the results.

This report showed the effect of the COVID-19 pandemic on breast cancer incidence and tumor stage in the Netherlands, and a comparison with other countries. More studies on the effect of the COVID-19 pandemic on breast cancer incidence, both in total and per tumor stage, are needed to determine the association between delays in diagnosis and tumor stage.

References

1. Quinn-Scoggins HD, Cannings-John R, Moriarty Y, Whitelock V, Whitaker KL, et al. (2021) Cancer symptom experience and help-seeking behaviour during the COVID-19 pandemic in the UK: a cross-sectional population survey. *BMJ open* 11: e053095. [crossref]

2. Grant MP, Helsper CW, Stellato R, van Erp N, van Asselt KM, et al. (2022) The Impact of the COVID Pandemic on the Incidence of Presentations with Cancer-Related Symptoms in Primary Care. *Cancers (Basel)* 14: 5353.

3. Eijkelboom AH, de Munck L, Peeters M-JTV, Broeders MJ, Strobbe LJ, et al. (2021) Impact of the COVID-19 pandemic on diagnosis, stage, and initial treatment of breast cancer in the Netherlands: a population-based study. *J Hematol Oncol* 14: 1-12. [crossref]

4. Eijkelboom AH, de Munck L, Lobbes MBI, van Gils CH, Wesseling J, et al. (2021) Impact of the suspension and restart of the Dutch breast cancer screening program on breast cancer incidence and stage during the COVID-19 pandemic. *Prev Med* 151: 106602. [crossref]

5. Eijkelboom AH, de Munck L, Larsen M, Bijlsma MJ, Tjan-Heijnen VC, et al. (2023) Impact of the COVID-19 pandemic on breast cancer incidence and tumor stage in the Netherlands and Norway: A population-based study. *Cancer Epidemiol* 87: 102481.

6. Paydary K, Seraj SM, Zadeh MZ, Emamzadehfard S, Shamchi SP, et al. (2019) The evolving role of FDG-PET/CT in the diagnosis, staging, and treatment of breast cancer. *Mol Imaging Biol* 21: 1-10. [crossref]

7. Gurney JK, Millar E, Dunn A, Pirie R, Mako M, et al. (2021) The impact of the COVID-19 pandemic on cancer diagnosis and service access in New Zealand-a country pursuing COVID-19 elimination. *The Lancet Regional Health-Western Pacific* 10: 100127. [crossref]

8. Peacock HM, Tambuyzer T, Verdoodt F, Calay F, Poirel HA, et al. (2021) Decline and incomplete recovery in cancer diagnoses during the COVID-19 pandemic in Belgium: a year-long, population-level analysis. *ESMO open* 6: 100197. [crossref]

9. Ramanakumar AV, Annie B, Frederic L, Christine B, Cathy R, et al. (2022) Evaluating the impact of COVID-19 on cancer declarations in Quebec, Canada. *Cancer Medicine* 2022. [crossref]

10. Mentrasti G, Cantini L, Vici P, D'Ostilio N, La Verde N, et al. (2022) Rising incidence of late stage breast cancer after COVID-19 outbreak. Real-world data from the Italian COVID-DELAY study. *The Breast* 65: 164-171. [crossref]

11. Elek P, Csanádi M, Fadgyas-Freyler P, Gervai N, Oross-Bécsi R, et al. (2022) Heterogeneous impact of the COVID-19 pandemic on lung, colorectal and breast cancer incidence in Hungary: results from time series and panel data models. *BMJ open* 12: e061941. [crossref]

12. Drescher CW, Bograd AJ, Chang SC, Weerasinghe RK, Vita A, et al. (2022) Cancer case trends following the onset of the COVID-19 pandemic: A community-based observational study with extended follow-up. *Cancer* 128: 1475-1482. [crossref]

13. Voigtländer S, Hakimhashemi A, Grundmann N, Radespiel-Tröger M, Inwald EC, et al. (2023) Impact of the COVID-19 pandemic on reported cancer diagnoses in Bavaria, Germany. *J Cancer Res Clin Oncol* 2023: 1-11. [crossref]

14. Vrdoljak E, Balja MP, Marušić Z, Avirović M, Blažičević V, et al. (2021) COVID-19 Pandemic Effects on Breast Cancer Diagnosis in Croatia: A Population-and Registry-Based Study. *The oncologist* 26: e1156-e1160. [crossref]

15. Caswell-Jin JL, Shafaee MN, Xiao L, Liu M, John EM, et al. (2022) Breast cancer diagnosis and treatment during the COVID-19 pandemic in a nationwide, insured population. *Breast Cancer Res Treat* 194: 475-482. [crossref]

16. Greene G, Griffiths R, Han J, Akbari A, Jones M, et al. (2022) Impact of the SARS-CoV-2 pandemic on female breast, colorectal and non-small cell lung cancer incidence, stage and healthcare pathway to diagnosis during 2020 in Wales, UK, using a national cancer clinical record system. *Br J Cancer* 2022: 1-11. [crossref]

17. Perin DMP, Elfström KM, Bulliard J-L, Burón A, Campbell C, et al. (2021) Early assessment of the first wave of the COVID-19 pandemic on cancer screening services: The International Cancer Screening Network COVID-19 survey. *Prev Med* 151: 106642. [crossref]

18. Ng JS, Hamilton DG (2022) Assessing the impact of the COVID-19 pandemic on breast cancer screening and diagnosis rates: A rapid review and meta-analysis. *J Med Screen* 29: 209-218. [crossref]

19. Mitchell H, Mclean J, Gavin AT, Visser O, Millar E, et al. (2023) Impact of COVID-19 control on lung, breast, and colorectal pathological cancer diagnoses. A comparison between the Netherlands, Aotearoa New Zealand, and Northern Ireland. *BMC Cancer* 23: 1-8. [crossref]

20. Our World in Data. Total confirmed COVID-19 deaths and cases per million people. https://ourworldindata.org/grapher/total-covid-cases-deaths-per-million?time=2020-01-04..2021-12-31&facet=metric&country=NOR~NLD. Accessed 22-09-2023.

21. Rocha AFBM, Freitas-Junior R, Ferreira GLR, Rodrigues DCN, Rahal RMS (2023) COVID-19 and Breast Cancer in Brazil. *International Journal of Public Health* 2023: 48.

22. Kang Y-J, Baek JM, Kim Y-S, Jeon YW, Yoo T-K, et al. (2021) Impact of the COVID-19 Pandemic on the Diagnosis and Surgery of Breast Cancer: A Multi-Institutional Study. *J Breast Cancer* 24: 491. [crossref]

23. Purushotham A, Roberts G, Haire K, Dodkins J, Harvey-Jones E, et al. (2021) The impact of national non-pharmaceutical interventions ('lockdowns') on the presentation of cancer patients. *ecancermedicalscience* 15: 1180. [crossref]

24. Li T, Nickel B, Ngo P, McFadden K, Brennan M, et al. (2023) A systematic review of the impact of the COVID-19 pandemic on breast cancer screening and diagnosis. *The Breast* 2023. [crossref]

25. Knoll K, Reiser E, Leitner K, Kögl J, Ebner C, et al. (2022) The impact of COVID-19 pandemic on the rate of newly diagnosed gynecological and breast cancers: a tertiary center perspective. *Arch Gynecol Obstet* 2022: 1-9. [crossref]

26. Our World in Data. COVID-19 Containment and Health Index. https://ourworldindata.org/grapher/covid-containment-and-health-index?tab=chart&time=earliest..2021-02-28&country=USA~ITA~NLD~HUN~BEL~DEU~CAN~NOR~NZL~HRV~GBR. Accessed 05-25-2023.

27. Our World in Data. Biweekly confirmed COVID-19 deaths per million people. https://ourworldindata.org/grapher/biweekly-covid-deaths-per-million-people?tab=chart&time=2020-01-15..2021-03-08&country=USA~GBR~ITA~NLD~NOR~NZL~HRV~HUN~BEL~DEU. Accessed 30-05-2023.

28. Our world in Data. Biweekly confirmed COVID-19 cases per million people. https://ourworldindata.org/grapher/biweekly-covid-cases-per-million-people?tab=chart&time=2020-01-15..2021-12-31&country=FRA~DEU~ITA~USA~NOR~NLD~GBR~HRV~HUN~CAN~NZL~BEL. Accessed 26-06-2023.

29. Rossi PG, Carrozzi G, Falini P, Sampaolo L, Gorini G, et al. (2023) The impact of the COVID-19 pandemic on Italian population-based cancer screening activities and test coverage: Results from national cross-sectional repeated surveys in 2020. *Elife* 12: e81804. [crossref]

30. The New York Times. Europe's Deadly Second Wave: How Did It Happen Again? https://www.nytimes.com/interactive/2020/12/04/world/europe/europe-covid-deaths.html. Accessed 25-05-2023.

31. Our World in Data. Number of COVID-19 patients in ICU per million. https://ourworldindata.org/grapher/covid-icu-patients-per-million?country=CAN~DEU~NLD~ITA~USA~Wales. Accessed 05-25-2023.

32. Arndt V, Doege D, Fröhling S, Albers P, Algül H, et al. (2023) Cancer care in German centers of excellence during the first 2 years of the COVID-19 pandemic. *J Cancer Res Clin Oncol* 149: 913-919. [crossref]

33. Netherlands Comprehensive cancer organisation (IKNL). national monitoring of the breast cancer screening programme in the Netherlands 2020/2021. 2022.

34. Poelhekken K, Greuter MJ, de Munck L, Siesling S, Brokken FB, et al. (2023) Long-term effects of the interruption of the Dutch breast cancer screening program due to COVID-19: A modelling study. *Prev Med* 166: 107376. [crossref]

35. Netherlands comprehensive cancer organisation (IKNL). NCR Data. https://nkr-cijfers.iknl.nl/#/viewer/665a7495-c6fd-415c-9e62-afd630859b20. Accessed 22-02-2023.

Citation:

Eijkelboom A, de Munck L, Siesling S (2023) Impact of the COVID-19 Pandemic on Breast Incidence and Stage during the COVID-19 Pandemic in the Netherlands, and a Comparison with Other Countries. *ARCH Women Health Care* Volume 6(4): 1-3.