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Short Communication

A survey of a COVID-19 cluster of charter flight importation

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ABSTRACT

Objectives: Although a number of cases of importation with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection have been reported, there are still no data available concerning the characteristics in the coronavirus disease 2019 (COVID-19) cluster of charter flight importation. Here, we provide an analysis of COVID-19 cases and their close contacts who worked for the same company on a project in Karbala, Iraq, and returned back to Chengdu, China, by a charter flight.

Methods: The data of imported COVID-19 cases and their close contacts were obtained from National Notifiable Disease Report System of Chinese Center for Disease Control and Prevention and field epidemiological investigation reports by Centers for Disease Control and Prevention (CDCs) in Chengdu. The information of general characteristics and laboratory findings of this cluster were collected and summarized.

Results: One hundred and six (66.67%) of 159 charter flight passengers tested positive for COVID-19 before entry. Through treatment, all 159 people tested negative and meet the requirements of taking flights bound for China before boarding. However, there has been still 36 (22.64%) of them tested positive after entry. The median time from entry to confirmation was 1.0 day (Interquartile Range (IQR): 0–4.3). The Cycle threshold value (Ct value) of 36 patients' positive samples are all above 30 and most values are above 35.

Conclusions: In conclusion, there is still a risk that a number of COVID-19 cases can be imported through charter flight. However, the infectivity of confirmed patients of the charter flight was considered to be low. © 2021 The Authors. Published by Elsevier Ltd on behalf of The Royal Society for Public Health. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

In late December 2019, several pneumonia cases of unknown cause in Wuhan, China, were reported and subsequently confirmed to be caused by a novel coronavirus named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).^{1,2} The coronavirus disease 2019 (COVID-19) spread rapidly to all the provinces throughout China and then burst out all over the world. With rapid response and implementation of drastic measures, the government of China contained the disease effectively and the number of domestic cases dropped to zero for the first time on 18 March 2020, while this epidemic was continuously on the rise globally. With the normalization of international air routes to China, the number of incoming flights increase incrementally. Therefore, China is facing a serious situation of imported cases with the arrival of autumn and winter

which are the perfect time for the spread of respiratory infectious disease.

In early October 2020, a charter flight landed in Chengdu, and 36 passengers of this charter flight were confirmed with SARS-CoV-2 infection later on, which is the highest number of one flight to date. We analyzed the epidemiologic characteristics of the cluster of this charter flight importation in an attempt to provide evidence for the prevention and control of imported epidemic.

Apart from the crew and the medical team, there are 159 male passengers who worked for a certain company in the Middle East and returned back to China through this charter flight. The average age of all passengers was 39.65 years old with the standard derivation (SD) of 8.71 years. One hundred and five (66.04%) of them have a habit of smoking. Of all the 159 inbound passengers, 22 (13.84%) are outsourced workers, 85 (53.46%) are independent contractors, and 52 (32.70%) are regular employees. Notably, there were no significant difference between the age group, employment type, and habit in passengers who had been RT-PCR-confirmed since entry or not ($P > 0.05$, respectively).

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One hundred and six (66.67%) of the cluster tested positive for COVID-19 in nucleic acid tests at least once before returning back to China. Through treatment, all 159 people tested negative for COVID-19 in the last four nucleic acid tests successively before the day of entry. However, there has been still 36 (22.64%) of them tested positive in the screening by customs or in later regular tests during quarantine since entry. Fig. 1 shows the timeline of nucleic acid tests, onset of symptoms, admission, and discharge for 159 passengers.

Of all the 36 patients, there were 23 (63.89%) asymptomatic individuals and 13 (36.11%) symptomatic individuals. The median time from entry to confirmation was 1.0 day (IQR 0–4.3). Seventeen (17/36, 47.22%) of the patients tested positive on the day of entry, and the longest period of time was up to 14 days. The median duration of admission of all the patients was 14.0 days (IQR: 10.0–18.0), with 12.0 days (IQR: 11.0–15.0) for symptomatic cases and 14.0 days (IQR: 10.0–18.5) for asymptomatic cases ($P > 0.05$).

This case reflected some problems of health management of overseas employees. On the positive side, immediate measures were taken by the company despite the limited medical conditions. Under the circumstances that the number of dormitories were in acute shortage, the company tried its best to create acceptable quarantine conditions by making flexible use of office space. All people took eight nucleic acid tests and five antibody tests under the unified organization of the company during quarantine. Everyone's temperature was taken and recorded every morning, noon, and evening. In the respect of case monitoring, the company developed a good pattern. However, in the respect of quarantine, accommodation isolation was limited by insufficient rooms and high moving frequency. In the respect of medical treatment for confirmed cases, drug therapy was the sole treatment the patients got before entry. There is a lack of data about blood tests, urine tests, and thoracic imaging results of patients because of

insufficient medical resources locally. No confirmed cases of the company got adequate medical treatment in qualified hospitals before returning back to China. How to make sure that Chinese citizens who are confirmed with SARS-CoV-2 infection receive good treatment overseas is a question remaining to be solved. Not only the detection of COVID-19, but also the follow-up treatment needs more improvements. Even though multiple tests were performed for COVID-19 detection before entry, the number of people of the company who were confirm with SARS-CoV-2 infection still reached an all-time record of 36 after entry. The whole personnel tested negative for the last antibody test and the last four nucleic acid tests before boarding, thus meeting the requirements of taking flights bound for China.³ However, in all 36 confirmed patients, 17 (47.22%) of them tested positive in COVID-19 screening performed by the customs as soon as their flight landed and were confirmed within just two days after entry. By this token, the quality control of these tests for COVID-19 seemed to us to be rather dubious. Thus, to mitigate the risks of cross-border transmission of COVID-19, examining the qualifications of testing institutions overseas is essential.

From the Ct values of 36 patients, we can see that all Ct values are above 30 and most values are above 35. In a study of viral load among hospitalized patients in New York, a sample with a Ct value above 30 was defined as a low viral load sample.⁴ As shown in a study in England, the percentage of positive viral culture of SARS-CoV-2 PCR-positive upper respiratory tract (URT) samples from symptomatic cases from January to May 2020 was under 20% if the Ct value reached 35.⁵ In addition, a research in France showed that the percentage of positive viral culture of SARS-CoV-2 PCR-positive nasopharyngeal samples from COVID-19 patients dropped to 0% if the Ct value reached 34.⁶ Thus, we can infer that the positive results were more likely caused by virus fragments and

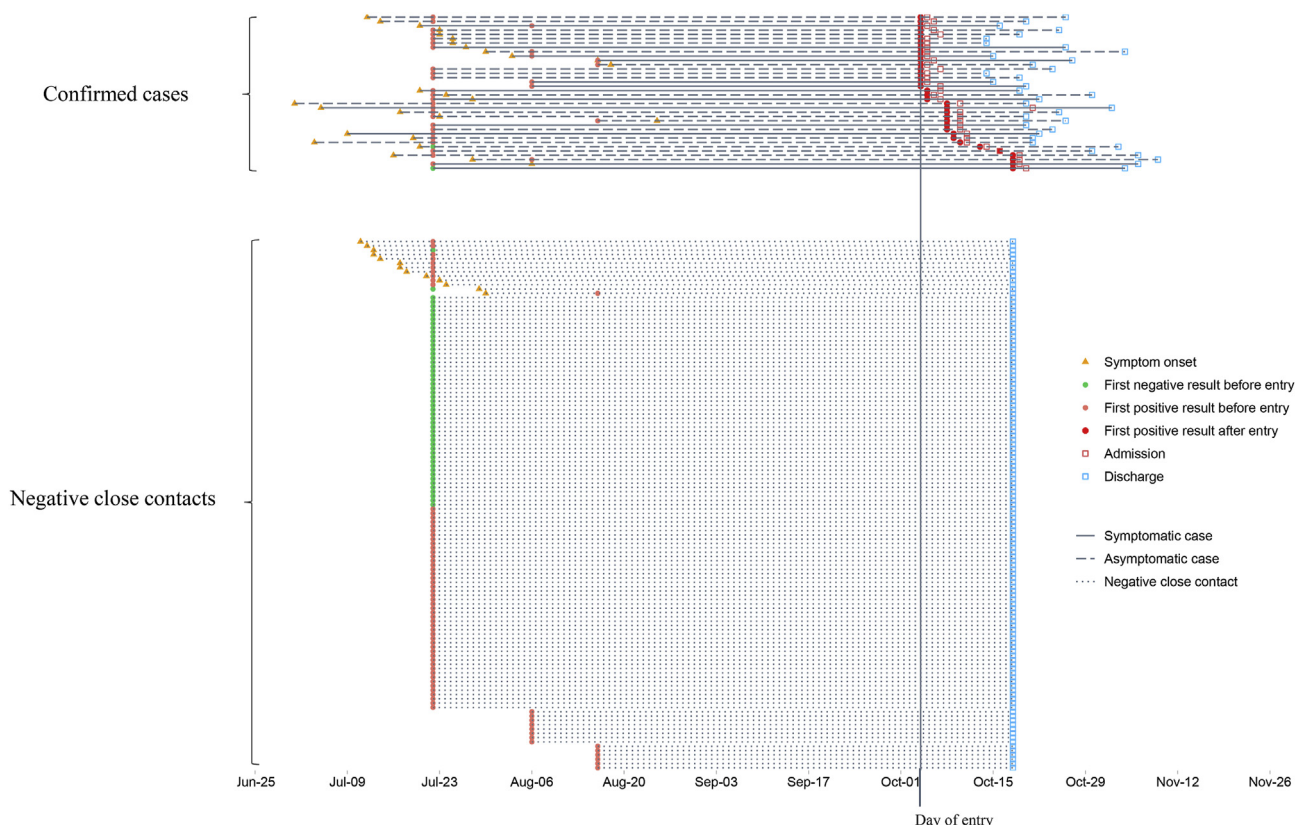


Fig. 1. Timeline of nucleic acid tests, onset of symptoms, admission, and discharge for 159 passengers.

the possibility of positive viral culture of samples from patients in our case can be rather small. Based on the aforementioned conclusions, it can be considered that the infectivity of confirmed patients of the charter flight is rather low. With closed-loop management of quarantine and regular detection, the risk of transmission can be controlled.

In conclusion, under the high pressure of imported cases, such a high percentage of passengers who were confirmed with SAR-CoV-2 infection after entry can be a big concern for the government departments and medical institutions. For further control of cross-boundary transmission, the examination of the qualifications of testing institutions overseas is a big subject to discuss. It is just as important that we strengthen the monitoring mechanism to minimize the risk of undetected cases.

Author statements

Ethical approval

Ethical approval was not required.

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Competing interests

The authors have no conflicts of interest to declare.

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Review Paper

Long-term quality of life among breast cancer survivors eligible for screening at diagnosis: a systematic review and meta-analysis

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ABSTRACT

Objectives: This study aimed to explore the long-term quality of life (QoL) among breast cancer survivors eligible for mammographic screening at diagnosis and compare that to QoL among women with no history of breast cancer.

Study design: Systematic review and meta-analysis.

Methods: A systematic review of randomised controlled trials and observational studies published between January 2000 and July 2019 was performed. Eight studies were included in the review. Six studies with QoL measurement scales (0–100) were included in the meta-analysis. We used fixed and random effects models to obtain Cohen's *d* with 95% confidence interval (CI). Heterogeneity among studies was evaluated by the *I*² statistics.

Results: Information about 6145 breast cancer survivors diagnosed between 1995 and 2012 and followed for >1–10 years was analysed. Four studies used SF-36/RAND-36, three studies used EORTC QLQ-C30, one study used FACT-G and one study used FACT-B. The mean score of QoL for breast cancer survivors varied from 63.0 (RAND SF-36, 0–100) to 110.5 (FACT-B, 0–123). Two studies showed better, three studies showed similar and two studies showed poorer mean scores for breast cancer survivors compared with women with no history of breast cancer. The meta-analysis showed no significant differences in QoL for breast cancer survivors compared with women with no history of breast cancer (Cohen's *d* = −0.07, 95% confidence interval [CI] −0.14 to 0.00 and *I*² = 83.7% for the fixed effect model; Cohen's *d* = −0.00, 95% CI −0.18 to 0.17 and *I*² = 82.4% for the random effects model).

Conclusion: QoL did not differ between breast cancer survivors eligible for mammographic screening at diagnosis and followed for >1–10 years and women with no history of breast cancer.

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Introduction

Breast cancer is the most common cancer and cause of cancer death among women worldwide.¹ Organised mammographic screening aims to reduce breast cancer mortality by detecting tumours at an early stage and decreasing the side-effects of treatment.² Screening and improved treatment have been considered the main reasons for the increase in survival from breast cancer during the last decades.^{3,4} However, long-term side-effects of the treatment represent a major harm.^{5–13} Moreover, the detection of

dormant and small, low proliferation tumours by screening brings another challenge to this secondary prevention because of the potential for overtreatment and accompanying long-term side-effects.^{14,15}

Long-term quality of life (QoL) among breast cancer survivors has been evaluated in numerous studies,^{10,16–20} whereas the results from studies on women diagnosed with ductal carcinoma in situ or early-stage invasive breast cancer are limited.^{18,21,22} However, as far as we are aware, no studies based on individual data investigated long-term QoL among women with screen-detected breast cancer and women with no history of breast cancer.^{23,24} Therefore, the objectives of this review were to explore long-term QoL among breast cancer survivors eligible for mammographic screening at diagnosis between 1995 and 2018 and to compare the long-term QoL between these women and women with no history of breast

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cancer eligible for mammographic screening. Similar long-term QoL for women with screen-detected breast cancer and women with no history of breast cancer might imply that organised breast cancer screening and modern treatment positively affected the management and consequences of the disease.

Materials and methods

We carried out a systematic review of peer-reviewed papers published between January 2000 and July 2019. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses guideline's checklist was used to ensure that relevant considerations were taken in all parts of the study.²⁵

The long-term QoL was defined as perceived physical and mental health for >1–10 years since breast cancer diagnosis for breast cancer survivors or over a corresponding follow-up period for women with no history of breast cancer. A period of more than 1 year was chosen as a cutpoint for a long term, as we intended to include women with an early-stage breast cancer, which treatment, except the long-lasting hormonal therapy, might last less than 6 months and the effects of the treatment might be considered long-term effects for 14–18 months since diagnosis.^{26,27,28} QoL represented scores for general or global health scores²⁹ obtained by various patient-reported outcome instruments (EORTC-QLQ-C30 [European Organization for Research and Treatment of Cancer Quality of Life Core Questionnaire], SF-36 [Short-Form Health Survey], FACT [Functional Assessment of Cancer Treatment Questionnaire], VAS [Visual Analogue Scale] and EQ-5D [EuroQual Questionnaire Five Dimensions]). Women residing in the countries where mammographic screening had been available since 1995 and the treatment of the disease had improved regardless of stage at diagnosis were considered eligible for screening.^{30,31} Women's age was not restricted, but women aged 45–75 years were included in the analyses from the studies that performed stratification by age, as women of this age range are recommended mammographic screening.³² Furthermore, we restricted the search to early-stage breast cancer and the length of follow-up from >1 to 10 years since diagnosis or corresponding time frame for women with no history of breast cancer. Early-stage breast cancer included ductal carcinoma in situ, small invasive tumours (<20 mm) and/or early-stage invasive breast cancer (stages I and II).

Literature search

We conducted a search in MEDLINE, Embase, Google Scholar and Cochrane from 1 to 25 July 2019. We used the 'PICOS' (Population, Intervention, Comparison, Outcome and Study design) framework to identify the main terms for the literature search.³³ The review aimed to explore the long-term QoL (O) among women with breast cancer (P) who were eligible for mammographic screening (I). Women eligible for screening with no history of breast cancer was an optional criterion for comparison (C). Each search included a combination of the following terms: quality of life, treatment, treated, breast cancer, breast neoplasm, breast carcinoma, screening, screen-detected, mass screening and early detection. The combination of terms used is shown in Appendix A.

The study design included randomised controlled trials and observational studies. Systematic reviews and meta-analyses were used for literature check. Abstracts or poster presentations were not included. All titles of the identified papers were reviewed independently by N.M. and S.H. and discussed when the opinions were discordant (Fig. 1). The same authors read the abstracts of the papers with relevant titles and agreed on the papers that fulfilled the 10 criteria for inclusion in the review (Fig. 1). An additional optional criterion was inclusion of women diagnosed at the

recommended screening age (45–75 years) if the differentiation of the results by age groups was performed.³⁴ After reading the full text of the remaining papers, eight papers were included in the study.^{21,35–41}

Literature analysis

For all included studies, data on aims, country and design, age and number of women studied and included in the review, data source, data collection method, month and year of breast cancer diagnosis, study period and coverage of organised breast cancer screening were extracted, tabulated and analysed (Table 1). Furthermore, data on breast cancer types/stages, long-term definition, comparison groups, methods to evaluate QoL and main findings were analysed (Table 2). Types and risk of biases in the studies were described in Appendix B, Table B1. The main results were defined as scores for QoL, including general or global health, and functioning scales. The scores were presented as means with standard deviation (SD), 95% confidence interval (CI), or standard error (SE), based on the available data. The higher scores for QoL and all functioning scales corresponded to better QoL, whereas the higher scores for bodily pain corresponded to worse QoL. The mean scores for QoL were used to compare breast cancer survivors and the reference groups. The reference groups were defined as healthy women with no history of breast cancer, eligible for mammographic screening.^{21,35–40} The *P* values for comparison in the included studies were two sided and were obtained using *t*-tests and unadjusted or age-adjusted analysis of variance.^{21,35–40} For the purpose of this review, all breast cancer survivors from the included studies were assumed to have screen-detected breast cancer, and women with no history of breast cancer were assumed either screening attendees or those who had attended screening and never been diagnosed with the disease.

We performed a meta-analysis for QoL assessed on scales 0–100 (EORTC-QLQ-C30 and SF-36) using fixed and random effects models. Two studies were excluded from meta-analysis; one study used FACT-G with a scale of 0–108, and the other one did not have any comparison group.^{37–41} For each study included in the meta-analysis, Cohen's *d* effect size with 95% CI and weights (percentage) was calculated as the mean difference between QoL scores for breast cancer survivors compared with the reference groups divided by the pooled SD; negative effect sizes reflected deficits compared with the reference groups.⁴² The results from the study by Klein et al. were used for the longest follow-up (10 years) performed with EORTC-QLQ-C30, as SF-36 was not considered breast cancer specific.³⁹ Solely crude scores for QoL were included in the meta-analysis from Klein et al. Information on SD for the mean score from the studies by van Gestel et al. and Koch et al. was imputed using predictive mean matching for a continuous variable.^{36,40} Statistical heterogeneity among studies was assessed through the *I*² statistics, where a value of ≥75% was interpreted as high heterogeneity.⁴³ The funnel plot was used to estimate small-study effects. A *P* value of <0.05 was considered statistically significant. All statistical analyses were performed using STATA/MP 16.0 (College Station, TX). The quality of the included studies was assessed according to the Cochrane guidelines and the CONSORT-PRO criteria, and the main limitations were presented.^{44,45}

Results

A total of 1558 papers were identified, whereas 1459 were excluded due to irrelevant titles (Fig. 1). Of the 25 papers eligible for full-text review, 17 were excluded, leaving eight papers representing eight studies for the review and six for the meta-analysis.

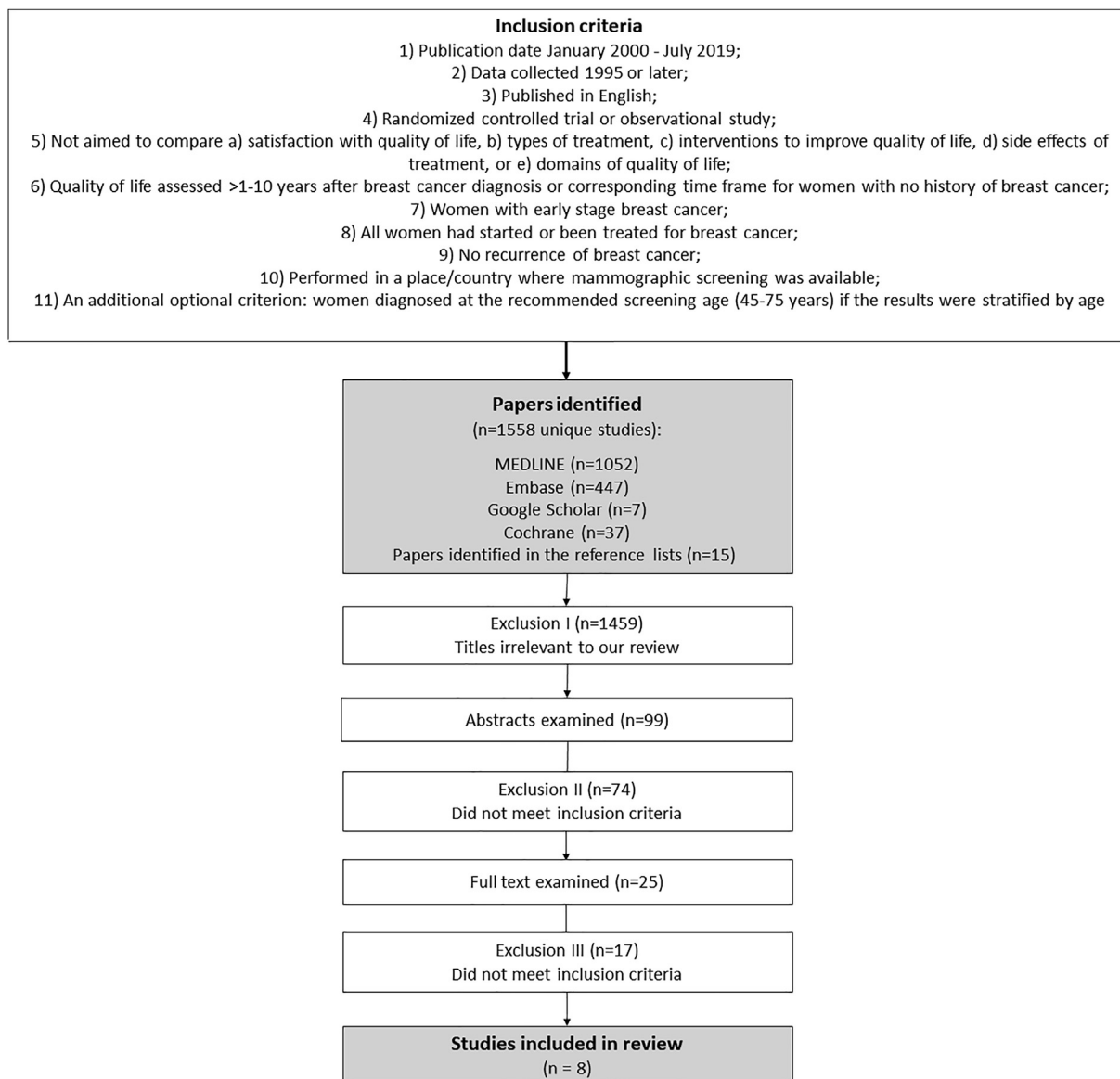


Fig. 1. Selection process with inclusion criteria.

The reasons for the exclusion of the papers read in full are described in [Appendix C, Table C1](#).

Characteristics of the studies

The eight studies included information about 6145 breast cancer survivors aged 21–80 years, diagnosed 1995–2012, and data collected during the period from 1996 to 2014^{21,35–41} (Tables 1 and 2). The screening coverage in the countries where the included studies were performed varied from 40.0% to 91.5%.^{46,47} Two studies aimed to explore QoL among women with early-stage breast cancer,^{21,36} and the other included data from women with various stages of breast cancer at diagnosis.^{35,37–41} Five studies originated from Europe,^{35,36,38–40} one from Australia,³⁷ and two from North America.^{21,41} Four studies used SF-36/RAND (Research and Development Corporation)-36,^{21,36,38,39} three EORTC studies used QLQ-C30,^{35,39,40} one study used FACT-G³⁷ and one study used FACT-B.⁴¹ The studies reported QoL >1–10 years after diagnosis or surgical treatment^{21,35–41} (Table 2). The reference groups included

predominantly women aged ≥ 18 years with no history of breast cancer.^{21,35–41} One study did not use a reference group but compared the results on QoL scores for early-stage breast cancer, locally advanced and metastatic breast cancer patients using FACT-B⁴¹ (Table 3).

QoL components

In six studies, women followed >1–10 years postdiagnosis or since surgical treatment had lower mean scores for physical, cognitive, social and emotional functioning or well-being and higher mean scores for bodily pain compared with the reference groups^{21,35,36,38–40} (Table 2). However, in the study from Australia, women followed for 1.5 years postdiagnosis reported higher mean scores for social (23.4, 95% CI: 22.6–24.2 vs 19.8, 95% CI: 19.1–20.5) and functional well-being (22.5, 95% CI: 21.7–23.2 vs 20.2, 95% CI: 19.5–20.9; $P < 0.05$) compared with the reference group.³⁷ In the study from the United States, women followed for 1.5–3 years since surgical treatment

Table 1
Characteristics of the studies included in the review.

First author, publication year, ref #	Study aim	Study country and design	Women studied (age, n)	Women included in the review (age, n)	Data source	Data collection method	Diagnosis of breast cancer (month, year)	Study period (month, year)	Screening coverage (%) ^b
Schou et al., 2005 ³⁵	To compare HRQL of women diagnosed with breast cancer with the general female population at diagnosis and 12 months since surgical treatment (≥ 14 months postdiagnosis)	Norway; longitudinal cohort study	Age 21–78 years (n = 161)	Age 21–78 years (n = 161)	Ullevål University Hospital	Self-reported questionnaire	2002–2003	2003–2004	91.5 ⁴⁷
Van Gestel et al., 2007 ³⁶	To compare the HRQL, perceived disease impact and risk perception of recurrence and dying of breast cancer in patients with DCIS and EIBC 2–3 years posttreatment	The Netherlands; cross-sectional study	Age 30–80 years (n = 135)	Age 50–69 years (n = 75)	Eindhoven Cancer Registry of the Comprehensive Cancer Centre South	Self-reported questionnaire	January 2002 to December 2003	May to June 2005	85.0 ⁶¹
DiSipio et al., 2008 ³⁷	To describe the HRQL among breast cancer survivors at 6, 12 and 18 months postdiagnosis compared with the general female population in Queensland	Australia; cohort study	Age 20–74 years (n = 287)	Age 50–74 years (n = 193)	Brisbane, Queensland and Queensland Cancer Registry	Self-reported questionnaire	January to December 2002	2002–2004	58.0 ⁴⁶
Klein et al., 2011 ³⁹	To compare QoL of breast cancer survivors 5 and 10 years since diagnosis with QoL of healthy controls	France; cross-sectional study	Aged <54 and 75+ years (n = 652)	Age <54 and 75+ years diagnosed 10 years ago (n = 210)	Population-based cancer registries of Bas-Rhin (North-Eastern France), Calvados (North-Western France), and Doubs (Eastern France)	Self-reported questionnaire	1995	2005	40.0 ⁶²
Jeffe et al., 2012 ²¹	To examine changes in QoL in a cohort of incident early-stage breast cancer and of women with no history of breast cancer (controls)	U.S.; longitudinal case–control study	Age 40+ years (n = 549)	Age 40+ years (n = 549) ^a	Siteman Cancer Center at Barnes-Jewish Hospital, Washington, and St Louis University School of Medicine	Computer-assisted telephone interviews	<i>Information not available</i>	October 2003 to June 2007	71.4 ⁶³
Browall et al., 2013 ³⁸	To compare HRQL in postmenopausal		Age 55–80 years (n = 102)	Age 55–80 years (n = 102)	Sahlgrenska University	Self-reported questionnaire	2003–2005	2003–2010	70.0 ^{64 c}

	women with breast cancer receiving adjuvant treatment after surgery and five years posttreatment, with a general population	Sweden; longitudinal cohort study			Hospital: Department of Breast Surgery, Gothenburg; Karolinska University Hospital: Department of Oncology, Stockholm; Skövde Hospital, Dep of Surgery, Skövde				
Koch et al., 2013 ⁴⁰	To explore in detail whether and to what extent restrictions in breast cancer survivors persist in the long run and whether changes or aggravations in QoL occur over time	Germany; longitudinal cohort study	Age 18–80 years or older (n = 387)	Age 50–64 years (n = 76)	Population-based study in Saarland	Self-reported questionnaire	October 1996 to February 1998	1996–2010	n/a ^d
Hamer et al., 2017 ⁴¹	To examine the symptom burden and QoL of different patient groups across the breast cancer continuum	Canada; cross-sectional study	Age <49 to ≥70 years (n = 1489)	Age 51–70 years (n = 857)	Louise Temerty Breast Centre	Self-reported questionnaire	2012 or earlier	January to August 2014	68.0 ⁶⁵

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HRQL, health related quality of life; QoL, quality of life.

^a The study was included in the review as the age when women typically start screening in the United States is 40 years, and the mean age for breast cancer survivors and the reference group was 58.9 (standard deviation, SD: 10.7) years and 57.2 (SD: 10.6) years, respectively, indicating that the majority of the included women were aged >50 years at enrolment.

^b Screening coverage is the percentage for screening attendance among eligible groups of women for the period when breast cancer was diagnosed.

^c Data available solely for Stockholm county.

^d Information is not available.

Table 2
Study population, methods and main findings on quality of life and its components among breast cancer survivors eligible for screening from the studies included in the review.

First author, publication year, ref #	Women included in the review (n, %) ^b	Breast cancer types/stages included in the study	Long-term definition	Reference groups (n)	Methods to evaluate the QoL	Main findings on QoL and QoL components
Schou et al., 2005 ³⁵	Age 21–78 years (n = 161, 100%)	Invasive BC stage I-II (n = 161)	1 year after surgical treatment	Normal population without diseases aged 18–93 years (data from 1998), using EORTC QLQ-C30 (n = 949)	EORTC QLQ-C30	BCS had a lower mean score for cognitive ^a (82.0, SD: 18.3 vs 86.6, SD: 19.2, <i>P</i> = 0.008 ^c) and social functioning (80.0, SD: 23.4 vs 84.6, SD: 22.4, <i>P</i> = 0.009 ^c) compared with the reference group.
Van Gestel et al., 2007 ³⁶	Age 50–69 years (n = 75, 64%)	DCIS (n = 21) and invasive BC stage I, T1, N0 and M0 ^b (n = 54)	1.5–3 years postdiagnosis	Normal population without diseases (data from SF-36, collected 1992–1996), from the National study, averages for SF-36 domains, age and gender adjusted	RAND SF-36	Women with DCIS had a higher mean score for bodily pain (85.4 vs 75.2, <i>P</i> = 0.02 ^f) and general mental health (77.8 vs 70.5, <i>P</i> = 0.05 ^f) compared with women with early-stage BC, and for bodily pain (85.4 vs 67.1, <i>P</i> < 0.001 ^f) and the physical component scale (49.6 vs 44.9, <i>P</i> < 0.05 ^f) compared with the reference group. Women with early-stage BC had a higher mean score for bodily pain (75.2 vs 67.1, <i>P</i> < 0.05 ^f) compared with the reference group.
DiSipio et al., 2008 ³⁷	Age 50–74 years (n = 193, 74%)	Unilateral invasive BC	1.5 years (18 months) postdiagnosis	Normal population without diseases, aged 30–74 years were interviewed using QoL data from 2004 (n = 675)	FACT-G	BCS had a higher mean score for social (23.4, 95% confidence interval, CI: 22.6–24.2 vs 19.8, 95% CI: 19.1–20.5) ^g and functional well-being (22.5, 95% CI: 21.7–23.2 vs 20.2, 95% CI: 19.5–20.9) ^g compared with the reference group. BCS had a clinically better mean score for QoL (91.0, 95% CI: 88.9–93.1 vs 86.0, 95% CI: 84.5–87.5) ^g compared with the reference group.
Klein et al., 2011 ³⁹	Age <54–75+ years diagnosed 10 years ago (n = 210, 100%)	BC with no treatment during the last 5 years	10 years postdiagnosis	Normal population matched by age and place of residency to patients using QoL data from 2005 (n = 1188)	EORTC QLQ-C30	BCS had a lower mean score for physical (81.6 vs 84.6), role (80.3 vs 84.5) and social (85.8 vs 88.6) functioning compared with the reference group (<i>P</i> < 0.0001 for all) ^d .
Jeffe et al., 2012 ²¹	Age ≥40 years (n = 549, 100%) ^f	DCIS (n = 148) and a first primary stage 0-IIA breast cancer without neoadjuvant chemotherapy (n = 365)	2 years following definitive surgical treatment	Normal population frequency-matched by age (40–49, 50–69, ≥70 years) to patients were interviewed 2 years and 2 weeks after normal/benign screening (n = 547)	RAND 36-Item Health Survey 1.0	Women with early-stage BC had a lower mean score for physical functioning (76.3, SD: 25.3 vs 83.8, SD: 20.2) and role limitations due to physical functioning (70.3, SD: 41.8 vs 78.2, SD: 36.0), and a higher mean score for emotional well-being (82.2, SD: 16.8 vs 79.0, SD: 16.9) compared

Table 2 (continued)

First author, publication year, ref #	Women included in the review (n, %) ^b	Breast cancer types/stages included in the study	Long-term definition	Reference groups (n)	Methods to evaluate the QoL	Main findings on QoL and QoL components
Browall et al., 2013 ³⁸	Age 55–80 years (n = 102, 100%)	Invasive breast cancer stage I-III (n = 102)	5 years postdiagnosis	Normal population matched by age (55–80 years) to patients using QoL data from 2003 to 2010 (n = 426)	SF-36	with the reference group ($P < 0.05^h$ for all). BCS had a higher mean score in physical functioning (78.7, SD:20.5 vs 67.8, SD:27.0), physical role functioning (77.9, SD: 33.9 vs 61.2, SD: 43.0), bodily pain (77.3, SD: 23.8 vs 64.8, SD:29.5), vitality (70.5, SD: 20.9 vs 62.8, SD: 25.0), social functioning (88.8, SD:20.9 vs 82.7, SD:24.8) and mental health (82.7, SD:18.7 vs 76.6, SD: 22.5) compared with the reference group ($P < 0.05^h$ for all)
Koch et al., 2013 ⁴⁰	Age 50–64 years (n = 76, 42%)	Stage at diagnosis local, regional and distant BC	10 years postdiagnosis	Normal population aged 18 to 65+ years selected by random-route-technique, interviewed 1998, using EORTC QLQ-C30 (n = 968)	EORTC QLQ-C30	BCS had a lower mean score for physical (84.5, standard error, SE: 2.0 vs 89.4, SE: 0.9), role (74.0, SE: 3.8 vs 87.9, SE: 1.3), emotional (60.2, SE: 3.3 vs 77.4, SE: 1.3), cognitive (72.8, SE: 3.6 vs 91.1, SE: 1.2) and social functioning (79.9, SE: 3.3 vs 91.1, SE: 1.2) compared with the reference group ($P < 0.05^i$ for all).
Hamer et al., 2017 ⁴¹	Age 51–70 years (n = 857, 58%)	DCIS (n = 83), invasive BC T1-T2 (n = 464), T2N3 or T3 ^c (n = 214) and metastatic BC (n = 98)	1–10 years postdiagnosis	Comparison between the BC groups (stages)	FACT-B	No significant differences in the overall mean QoL score were found for women with different breast cancer stages. The overall mean QoL score reduced by stage for those aged 51–70 years (120.0, SD: 18.6 for DCIS, 117.4, SD: 20.3 for early-stage invasive BC 112.6, SD: 20.8 for locally advanced and 101.4, SD: 23.7 for metastatic BC).

SF, short form; QoL, quality of life; BC, breast cancer; EORTC QLQ-C30, European Organisation for Research and Treatment of Cancer quality of life questionnaire-core 30-item; DCIS, ductal carcinoma in situ; EIBC, early-stage invasive breast cancer; FACT-G, functional Assessment of cancer therapy-general; FACT-B, functional assessment of cancer therapy-breast; BCS, breast cancer survivors.

^a The higher scores for QoL and all functioning scales except bodily pain corresponded to better QoL, whereas the higher scores for bodily pain corresponded to worse QoL.
^b Number and percentage of the entire sample of breast cancer survivors for each study.
^c Based on *t*-tests.
^d Adjusted for registry area, age, place of residence (urban/rural), marital status, education level, employment status, mean household monthly income, comorbidities and hospitalisation during the last 12 months (analysis of variance).
^e Based on TNM Classification of Malignant Tumours (Union for International Cancer Control. J Brierley, M Gospodarowicz and C Wittekind. Wiley Blackwell, 2017).
^f Based on *t*-tests; standard deviation values were not available.
^g *P*-values were not available; data were presented with 95% confidence intervals.
^h Based on unadjusted analysis of variance.
ⁱ Based on age-adjusted analysis of variance.

reported better emotional well-being (82.2, SD: 16.8 vs 79.0, SD: 16.9; $P < 0.05$) compared with the reference group.²¹ In the study from Sweden, women followed for 5 years post-diagnosis had higher mean scores for physical functioning

(78.7, SD: 20.5 vs 67.8, SD: 27.0), social functioning (88.8, SD: 20.9 vs 82.7, SD: 24.8) and mental health (82.7, SD: 18.7 vs 76.6, SD: 22.5) compared with the reference group ($P < 0.05$ for all).³⁸

Table 3

Mean values of quality of life among breast cancer survivors eligible for screening, in a long term, assessed using visual analogue scale (0–100), FACT-B and FACT-G, compared with the reference groups of women.

First author, publication year, ref #	Years since diagnosis to assessment	Measurement instrument	Age of breast cancer survivors	Mean quality of life of breast cancer survivors	Age of reference group	Type of the reference group	Mean quality of life of reference group	P-value for comparison between breast cancer survivors and reference group
Schou et al., 2005 ³⁵	>1 year ^a	EORTC QLQ-C30 (0–100)	21–78 years	75.7 ^b (standard deviation, SD: 21.4) (n = 161)	18–93 years	Healthy women	72.0 (SD: 24.5) (n = 949)	0.28 ^m
Van Gestel et al., 2007 ³⁶	1.5–3 years	RAND SF-36 (0–100)	50–69 years	63.0 ^c (n = 75)	50–69 years	Healthy women	63.0 (not available)	–
DiSipio et al., 2008 ³⁷	1.5 years	FACT-G (0–108)	50–74 years	91.0 (95% confidence interval, CI: 88.9–93.1) ^h (n = 193)	30–74 years	Healthy women	86.0 (95% CI: 84.5–88.4) ^h (n = 675)	Significant clinical difference ^j
Klein et al., 2011 ³⁹	10 years	EORTC QLQ-C30 (0–100)	<54–75+ years	66.3 ^g (n = 210)	<54–75+ years	Healthy women	69.2 (n = 1188)	0.0035 ^k
Jeffe et al., 2012 ²¹	2 years ^l	RAND 36-Item Health Survey 1.0 (0–100)	≥40 years	68.0 ^c (SD: 22.6) (n = 549)	≥40 years	Healthy women	73.4 (SD: 21.1) (n = 547)	0.0017 ^k
Browall et al., 2013 ³⁸	5 years	SF-36 (0–100)	55–80 years	70.5 ^f (SD:20.9) (n = 102)	55–80 years	Healthy women	62.7 (SD: 25.0) (n = 426–475)	<0.001 ^k
Koch et al., 2013 ⁴⁰	10 years	EORTC QLQ-C30 (0–100)	50–64 years	68.0 ^e (standard error, SE: 2.6) (n = 76)	50–64 years	Healthy women	68.1 (SE: 2.1) (n = 968)	0.86 ^l
Hamer et al., 2017 ⁴¹	1–10 years	FACT-B (0–123)	51–70 years	110.5 ^d (SD: 21.6) (n = 857)	–	–	–	–

^a Time since surgical treatment was at least 12 months.^b Women with early stage (I-II) breast cancer.^c Women with early-stage invasive breast cancer.^d Mean quality of life score for women with all types of breast cancer excluding ductal carcinoma in situ.^e Women with all types of breast cancer including ductal carcinoma in situ.^f Women with stage I-III breast cancer.^g Adjusted for registry area, age, place of residence (urban/rural), marital status, education level, employment status, mean household monthly income, comorbidities and hospitalisation during the last 12 months (analysis of variance).^h Mean health-related quality of life score for women with invasive breast cancer.ⁱ Time since surgical treatment.^j Based on 95% confidence intervals.^k Based on unadjusted analysis of variance.^l Based on age-adjusted analysis of variance.^m Based on linear regression analysis.

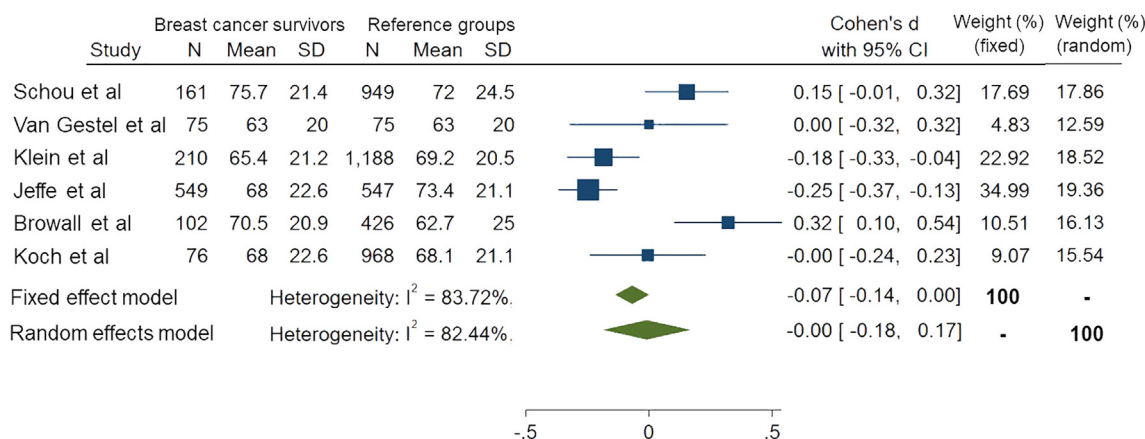


Fig. 2. Meta-analysis of six studies comparing self-reported quality of life among breast cancer survivors eligible for screening in a long term, assessed using a scale 0–100, compared with the reference groups of women. N, number; SD, standard deviation.

Quality of life

A mean score for QoL among breast cancer survivors followed for >1–10 years postdiagnosis or since surgical treatment varied from 63.0 (on a scale of 0–100) to 110.5 (on a scale of 0–123)^{37,38} (Table 3). Seven studies compared QoL among breast cancer survivors and the reference groups.^{21,35–40} In three studies, the mean score for QoL did not differ between breast cancer survivors followed for >1–10 years postdiagnosis and the reference groups.^{35,36,40} In two studies, breast cancer survivors reported a higher mean score for QoL compared with the reference groups (91.0, 95% CI: 88.9–93.1 vs 86.0, 95% CI 84.5–87.5 on a scale of 0–108; and 70.5, SD: 20.9 vs 62.7, SD: 25.0 on a scale of 0–100, $P < 0.05$, respectively).^{37,38} In two studies, breast cancer survivors reported a lower mean score for QoL compared with the reference groups (68.0, SD: 22.6 vs 73.4, SD: 21.1 on a scale of 0–100; $P < 0.05$; and 66.3 vs 69.2 on a scale of 0–100, $P < 0.05$, respectively).^{21,40} In the study from Canada, the mean score for QoL for women aged 50–71 years with all types of invasive breast cancer was 110.5, SD: 21.6, on a scale of 0–123.⁴¹

Pooled effect measured from six studies presented by a Cohen's d was -0.07 (95% CI -0.14 to 0.00) with $I^2 = 82.4\%$, and -0.00 (95% CI -0.18 to 0.17) with $I^2 = 83.7\%$ for the fixed effect and random effects models, respectively (Fig. 2). The funnel plot did not show any small-study effect, as no differences between the comparison groups were found in the small studies (Appendix D, Fig. D1).

Discussion

Our review identified a mean score for long-term QoL among breast cancer survivors eligible for mammographic screening and followed for >1–10 years since diagnosis to vary from 63.0 (on a scale of 0–100) to 110.5 (on a scale of 0–123).^{37,38} The studies showed better,^{37,38} similar,^{35,36,40} or poorer^{21,39} QoL among breast cancer survivors compared with women with no history of breast cancer (the reference group). The effect size model based on six studies using a scale from 0 to 100 to measure the mean QoL did not show any statistically significant differences between breast cancer survivors and women with no history of breast cancer, eligible for mammographic screening.

The better results for breast cancer survivors could be explained by the study settings, implying that most of the women had early-stage breast cancer diagnosed in screening programmes.^{37,38} Furthermore, women attending screening might be healthier and have a higher breast awareness than non-attendees.^{48–51} On the other side, women

usually consider screening as a check and might thus not be prepared for a diagnosis of breast cancer in contrast to women seeking mammography due to symptoms. However, the better results might also have been associated with a relatively short follow-up (1.5–5 years since diagnosis).^{37,38} Furthermore, no matching by age with the reference group and the possibility of various chronic diseases in the reference group might have resulted in higher scores for QoL and the functioning components for the breast cancer survivors compared with the reference group in one of the studies.^{37,52}

Similar results for breast cancer survivors and women with no history of breast cancer were found in three studies.^{35,36,40} In one of these studies, the length of the follow-up might have been too short to show any differences (≥ 14 months since diagnosis).³⁵ In the other study, the data from the reference group were obtained for a long time before the study start, which might have limited health perceptions, as different health awareness, treatments and methods of care were present in that period compared with the study period.³⁶ Furthermore, a small number of women ($n = 75$) in each group and the length of follow-up of 1.5–3 years might have contributed to the lack of differences. In the other study, the differences in the disease-specific symptom burden implied a less favourable pattern for breast cancer survivors compared with the reference group.⁴⁰ However, a small number of women ($n = 76$) with breast cancer vs a large number of women in the reference group ($n = 968$), and using a 10-year follow-up with a study period 1996–1998, when the treatment recommendations differed from those used in 2000s, might have led to the lack of differences in QoL scores between the groups.^{40,41} The similar results on QoL, but clinically relevant deterioration in symptoms and several QoL components, could be explained by the response shift or the adaptive mechanisms influencing the overall QoL perception, but not functioning or symptom burden.^{40,53}

The poorer QoL among breast cancer survivors compared with that of women with no history of breast cancer was expected.^{21,39} However, such results were shown in the study from the United States, including women aged ≥ 40 years, where younger women were known to have more advanced breast cancer compared with older women.²¹ The main reasons for this are more aggressive treatment associated with high proliferative aggressive tumours and a stronger impact of treatment on the everyday life of women aged < 50 years.^{54,55} On the other side, screening of women in their 40s is more common in the United States compared with Europe and might mirror the insurance coverage.⁵⁶ The poorer results of the QoL of breast cancer survivors eligible for screening compared with the reference group in a large population-based study with a

10-year follow-up might be considered the most relevant result of this review,³⁹ assuming that the majority of women in the study population were in the age group 54–75 years. However, the study started in 1995 and was associated with more aggressive treatment for women with early-stage breast cancer and might have impacted the lower scores of QoL among breast cancer survivors compared with women with no history of breast cancer.^{26,30}

Various study settings and periods, numbers of women and lengths of follow-up might have contributed to the results of the meta-analysis, showing no difference between breast cancer survivors and women with no history of breast cancer, eligible for screening.^{21,35,36,38–40}

Limitations of the studies included in the review

The quality of the reporting in the included studies was rather low with regard to the CONSORT-PRO criteria, as the main limitations included non-reporting the baseline outcomes and underreporting the characteristics of comparison groups^{21,36–41} (Appendix B). Bias due to confounding was observed in three studies and was associated with different types of treatment and therefore QoL perceptions among women with early-stage breast cancer, and not adjusting for possible comorbidities not pertaining to breast cancer.^{36,38,41} Selection bias was found in all included studies and was associated with small sample sizes and differences in the age ranges between the reference groups and breast cancer survivors, different social and race status of participants and non-participants, and including solely women who participated in all follow-ups.^{21,35–41} Bias due to missing data was presented in four studies and indicated low response and lack of information about loss due to follow-up, underreporting of the poorest cases, and association of the data collection methods with the respondents who could be reached by telephone and whose participation might be associated with insurance coverage.^{21,35–41} Bias in measurement outcome was observed in all included studies and was associated with the lack of baseline information, using only one time point to measure the outcome, and limitations of the self-reported questionnaire and computer-assisted telephone interviews.^{21,35–38,40,41} Bias in the selection of the reported results was found in three studies and included the older data collection period for the reference (1992–1996) vs the study sample (2002–2003), use of clinical but not statistical significance and comparing the findings for women diagnosed at different points of time between 1996 and 2010.^{36,37,40} According to the assessment of the risk of bias, the studies by Schou et al. and by Klein et al. could be considered the most reliable, as these did not show any serious risk of bias.^{35,39}

Limitations of the review and meta-analysis

Women eligible for screening were aged 21–80 years in our review and solely four studies included women of typical screening age in Europe, at diagnosis.^{36,37,40,41} The overall age range of the review might have been associated with lower scores for QoL and functioning scales due to the inclusion of women aged <45 years and >75 years,^{41,54,57} who might have reported poorer QoL compared with women of screening age.^{58–60} However, in all the included studies, the majority of the women were of the typical screening age (45–75 years) at diagnosis, except for the study from Norway and the United States, where it was not possible to differentiate women by age groups. The inclusion of studies performed between 1995 and 2018 might have resulted in the poorer scores for breast cancer survivors in the studies, started in 1995–1996 compared with those started in the 2000s, due to improved breast cancer treatment, including reconstructive and breast conserving surgery and neoadjuvant chemotherapy.²⁶ Furthermore, the pure impact of participation in mammographic screening was not

investigated in this review. However, based on the screening coverage in the included studies, the majority of the women might have been diagnosed due to screening.^{46,47,61–65} Future research is needed to compare QoL between women with screen-detected breast cancer and women with no history of breast cancer in the areas, where mammographic screening is available.

We have not included a study using FACT-G (0–108) questionnaire in the meta-analysis, which might have contributed to the less favourable results for breast cancer survivors' QoL. SF-36/RAND and EORTC-QLQ-C30 were included in the meta-analysis on the equal basis because of the same measurement scale, 0–100, despite their content differed.⁶⁶ This could have resulted in overestimation as well as underestimation of the outcome. Furthermore, the differences in study design, length of follow-up, number of women included and periods when treatment was performed might have influenced the overall effect. Meta-regression was not performed because fewer than 10 studies were included.⁶⁷

In conclusion, this review did not identify differences in QoL between women diagnosed with breast cancer and followed for >1–10 years compared with women with no history of breast cancer among those eligible for mammographic screening.

Author statements

Ethical approval

None declared.

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Competing interests

All the authors declare no conflict of interest.

Authors' contributions

Each author can take responsibility for the content of the article. The literature search was performed by all the authors of the article. All the authors have made substantial contribution to the conception and design of the study, acquisition of data, analyses and interpretation of findings. N.M. worked with drafting the article, and all the authors contributed to revising it critically for important intellectual content. The final approval of the version to be submitted was given by all authors.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.puhe.2021.08.008>.

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Original Research

‘Why are you not dead yet?’ – dimensions and the main driving forces of stigma and discrimination among COVID-19 patients in Sri Lanka

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ABSTRACT

Objectives: To explore the experiences, and main driving forces of stigma and discrimination among COVID-19 patients, following hospital discharge, in Sri Lanka.

Study design: A qualitative study was used in order to gain insight and explore the depth and complexity of COVID-19 patients' experiences.

Methods: Semi-structured interviews were conducted via telephone in a purposively selected sample of 139 COVID-19 patients. Participants were interviewed during the first 3 weeks following discharge from four main state hospitals that were treating COVID-19 patients during the early phase of the pandemic. Questions on stigma and discrimination were open-ended, enabling patients to provide responses about their different experiences and settings; results were analysed using thematic analysis.

Results: The majority of participants were men ($n = 80$; 57.6%), with a mean age of 43 years ($SD = 11.2$). In total, up to one-third of the study participants experienced stigma related to COVID-19 and were discriminated against by the community, co-workers and healthcare workers in Sri Lanka. Social discrimination included barriers in accessing basic needs, insulting, blaming, defaming, spreading rumours and receiving no support during emergencies. Workplace discrimination included loss of jobs, not allowing re-entry and loss of earnings due to self-employment. Discrimination by healthcare workers included breaching of confidentiality, lack of respect, not providing health services and communication barriers. Discrimination has led to social isolation, not seeking help and severe psychosocial issues impacting their family relationships. Irresponsible media reporting and sensationalism of news coverage leading to breaching of privacy and confidentiality, defaming, false allegations and reporting household details without consent were perceived as the main factors underlying the views and opinions of the general public.

Conclusions: Stigma and discrimination experienced by COVID-19 patients in society, workplaces and healthcare facilities have serious negative consequences at the individual and family level. Regulations on responsible media reporting, including an effective risk communication strategy to counteract its effects, are strongly recommended.

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Introduction

After 18 months, the COVID-19 pandemic continues to spread across the globe, with >180 million cases and >3.9 million deaths reported.¹ Each country heavily relies on collective actions of the

society at all levels, from political leadership to the adoption of safety recommendations by the public. Despite these efforts, the pandemic has caused substantial physical, as well as mental health problems across all segments of the global population.^{2,3}

Sri Lanka, a South Asian country, experienced its first wave of COVID-19 in March 2020, which was contained successfully with stringent control measures.⁴ Mandatory hospital admission of all confirmed patients, active surveillance in high-risk populations,

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home/institutional quarantine of primary contacts and establishing an effective risk communication strategy in the early phase of the outbreak^{5,6} led the country to secure a place within the top 100 safest countries during the pandemic.⁷ Despite this substantial achievement, adverse impacts of the pandemic on mental health, which has been reported in other countries, are also apparent in the Sri Lankan population.

Past experiences indicate that the psychological impact of a pandemic can be devastating.⁸ With regards to COVID-19, patients, as well as those without the disease, such as family, close associations and the society at large, have witnessed diverse mental health problems, ranging from mild forms of stress and anxiety to more severe forms, such as depression and deliberate self-harm.^{9–11} Studies around the world comprehensively describe how the fear of death, social isolation, loss of employment and impending or actual socio-economic hardships have resulted in disturbances to mental well-being, particularly among COVID-19 patients. In addition, stigma and discrimination shown by some individuals towards COVID-19 patients have been identified as a major cause of psychological ill-health among patients in the current pandemic.^{12–16} Stigma and discrimination towards COVID-19 patients has been reported in Sri Lanka.¹⁵ In Sri Lanka, stigma towards infectious diseases, such as tuberculosis and acquired immunodeficiency syndrome (AIDS), as well as towards mental health problems, is not uncommon and has been reported among the general public, as well as healthcare professionals.^{18–20}

Stigma refers to a set of negative beliefs that a society/a group of people hold against a condition/situation persisting in an individual.²¹ Health-related stigma is characterised by labelling, stereotyping and separation related to a specific disease condition, while discrimination is portrayed by the prejudicial treatment of different categories of people as a result of the stigma attached.²²

In addition to the direct effects on the patients themselves, the most severe consequences of stigma and discrimination during epidemics can be at the population level. Individuals with symptoms may show reluctance in seeking medical care, coming forward for voluntary testing and revealing their contact histories, which, in turn, could invariably hamper the community participation in reducing transmission. Public engagement is especially important in the COVID-19 pandemic as it plays a pivotal role in the control of viral spread. Reduced public engagement would have a major impact on countries that have been intensely impacted, such as those in South Asia.

Although many diverse dimensions and driving forces of COVID-19-related stigma and discrimination have been identified in developed countries, these can be quite different from those existing in developing countries, owing to socio-cultural differences.^{23–26} Currently, there is limited literature from South Asia on COVID-19-related stigma and discrimination, which had prevented an understanding of the situation and subsequently a lack of preventive measures.^{17,22,27} Moreover, the majority of reported studies do not have an in-depth analysis of the different aspects of the impact of stigma on patients in different settings and have paid little attention to determining the driving forces for stigma.

Therefore, we conducted this study to explore the extent of stigma and discrimination experienced by COVID-19 patients in different settings and to describe the main underlying determinants in Sri Lanka. Findings from this study aim to provide recommendations to programme managers to help plan and implement measures to prevent stigma and discrimination towards patients with COVID-19. The results and recommendations

are applicable to other countries in South Asia that have similar socio-cultural backgrounds.

Methods

Study design and participants

In this qualitative study, semi-structured interviews were performed with laboratory-confirmed COVID-19 patients who had been discharged from four state hospitals of Sri Lanka; namely, the National Institute of Infectious Diseases (NIID), Colombo East Base Hospital (CEBH), Mulleriyawa; Base Hospital (BH), Welikanda; and BH, Homagama. These are the four main hospitals that have been designated to treat COVID-19 patients in Sri Lanka. Patients who were non-Sri Lankan and those in the medical and nursing professions were excluded from the study, as they may have been treated differently from Sri Lankan COVID-19 patients.

Study instrument and data collection

Patients eligible for the study were identified from discharge registers of the four hospitals as part of a larger study conducted on their clinical course and management in the early phase of the pandemic (March–June 2020). By using the contact details retrieved from hospital records, 182 patients were purposively selected based on the availability of contact details, sex, ethnicity and geographical region. Potential participants were approached for the study via telephone within the first 3 weeks after their hospital discharge. Those who could not be contacted after three attempts were considered to be non-respondents.

Patients providing verbal informed consent underwent semi-structured interviews via telephone on their postdischarge health status. To avoid inter-observer bias, one researcher (a female pre-intern medical graduate) conducted the interviews for all selected patients. The interviews were carried out at a time and place convenient to the participant and took approximately 20–30 min to complete.

Initially, information on their sociodemographic characteristics and new/persisting symptom profiles related to the COVID-19 infection was obtained using a structured questionnaire. Subsequently, specific information on stigma and discrimination experienced by the participants and their perceptions on underlying drivers were explored with open-ended questions. An interview guide was designed for this purpose by the research team in consultation with a consultant physician, community physician and psychologist. The face validity of the questionnaire was established with a few patients representing the target group and its content validity by another panel of experts. During interviews, the interviewer listened carefully for inconsistent or vague comments and clarified them by probe questions at the time of the interview. Each interview was recorded using a separate digital audio recorder and later transcribed into the English language.

As the participants were questioned on sensitive issues, such as stigma and discrimination, all possible measures were taken to minimise any potential psychological harm to participants. All the transcriptions were anonymised to secure the confidentiality of the respondents. The questions were worded to ensure the participant never felt that contracting the disease or any consequence was their fault. If a participant implied the need for any psychological assistance, a referral was arranged through public health teams to a consultant psychiatrist in the region. Ethical clearance was obtained from the Ethics Review Committee of the University of

Table 1
Subthemes on stigma and discrimination by neighbours/community.

Subthemes	Example of quotes
Social ostracism; insulting and blaming	<p><i>Our neighbours try to avoid me and my family as much as possible, they even tried to set fire to my house claiming that we are spreading corona; we are being isolated and we have lost our status in the society due to this disease. People label us as 'Corona infected' ...</i> (A 52-year-old male tourist guide)</p> <p><i>My own children are ignoring me after I got corona. Even after recovery, nobody wants to take care ... I am facing financial hardships as well.</i> (A 53-year-old married female)</p> <p><i>When I came home after recovery from COVID-19, my neighbours said hurtful things and ignore me. Some even asked 'why aren't you dead yet?'. They asked how I survived COVID and cancer both. I feel frustrated ...</i> (A 63-year-old married female [breast cancer patient])</p> <p><i>My father and mother were abused by our own villagers using harsh words and some even tried to hit them claiming that we spread corona in the village. They had even called the police and made a complaint about my family breaking quarantine laws ...</i> (A 43-year-old married male)</p>
Character defamation	<p><i>My wife and children were discriminated due to me being COVID positive. Villagers spread rumours about my wife. The nearby shops didn't allow us to visit and buy any goods.</i> (A 40-year-old married male navy officer)</p> <p><i>Our next-door neighbour tried to change their residence because I was returning home from hospital after COVID-19. Although they had been very friendly with me before, they did not even look at us after I returned. They spread rumours claiming that I got this infection because my character is not good. I was frustrated and depressed, I could not face the society</i> (A 46-year-old married housewife)</p>

Colombo and administrative permission from the Director General of Health Services, Ministry of Health, Sri Lanka.

Data analyses

The interview transcripts were analysed using framework analysis. The transcripts, prepared in a question-by-question format, including quotes, were first read and re-read by the data collector to become familiar with the content and then translated into the English language. All transcripts were re-reviewed independently by another investigator. Three independent investigators coded the transcripts deductively to identify ideas and concepts, which belonged to *a-priori* themes on perceived stigma, discrimination and underlying drivers. Differences in the themes that emerged were resolved by consensus.

Results

Of the 182 patients initially contacted for the study, 139 agreed to participate in the postdischarge interviews, giving a response rate of 76.4%. There were 80 (57.6%) male and 59 (42.4%) female patients, with a mean age of 43 years (SD = 11.2). The majority of participants were of Sinhalese ethnic origin (n = 94, 67.6%), which represents the main ethnic group in the country, followed by 38 (27.3%) Muslim patients and 3 (0.02%) Tamil patients.

In total, 54 (38.8%) study participants stated that they had experienced stigma and discrimination after being diagnosed with COVID-19. Of these individuals, 64% were male (n = 35), with a mean age of 44 years (SD = 8.9). The majority were of Sinhalese ethnic origin. With regard to postdischarge health status, almost all participants stated that the physical symptoms had resolved after 2–3 weeks. However, the majority of participants complained of relatively new non-specific symptoms, such as 16 (11.5%) having difficulties with mild exertion and 15 (10.7%) experiencing body aches and myalgia even 2 weeks postdischarge. In terms of psychological symptoms, only 6 (4.3%) patients reported symptoms related to anxiety and depression.

The dimensions of stigma and discrimination experienced

Different dimensions related to stigma and discrimination were revealed. Many participants claimed that they are being labelled, set apart and are facing the loss of status and discrimination because of the stigma attached to their illness. It is interesting to

note that, in addition to active cases of COVID-19, those who had recovered from the disease were frequently being discriminated. Many of the recovered patients have been stigmatised, discriminated, denied entry into the community that they were living in or workplaces, with the perception that they may still be infective and could transmit the virus to others.

The themes that emerged during the interviews on patients' experiences of stigma and discrimination were categorised into the following three main domains:¹ social discrimination by neighbours and community;² workplace discrimination; and³ discrimination by healthcare workers.

Stigma and discrimination by neighbours/community

Under social discrimination, barriers in accessing basic needs, insulting, blaming, defaming, spreading rumours and not providing support during emergencies and social ostracism were noted. Table 1 gives a description of selected quotes from individuals.

Many participants described perceived stigma based on the reactions of the community and neighbours. Many participants felt that they were victims of social ostracism. Some participants, who were in rented houses, were even evicted due to COVID-19.

Character defamation was commonly encountered. An example of this was when the media revealed that the close contacts of several clusters of young males were traced back to commercial sex workers. This led to the public developing certain attitudes and opinions, especially about women having COVID-19.

Rejection was noted at the village and even family levels. A breach in the social network system has led to many repercussions, including social and financial insecurity. In addition to emotional abuse associated with stigma and discrimination, some responses were suggestive of physical abuse/attempted physical abuse and damage to livelihood. Table 1 gives a description of quotes from individuals.

Stigma and discrimination at the workplace

In terms of workplace discrimination, loss of jobs, not allowing re-entry and loss of earnings due to self-employment were noted. Table 2 gives a description of selected quotes from individuals.

Participants were excluded, isolated and discriminated from the workplace and community due to COVID-19, even after full recovery. Loss of earnings as a result of workplace stigma and discrimination has led to multiple social and financial problems for the affected families.

Table 2
Subthemes on stigma and discrimination at workplace.

Subthemes	Example of quotes
Loss of jobs	<i>I was not summoned to work after full recovery even though I gave several calls requesting for a working shift, I feel desperate without a job.</i> (A 55-year-old male security officer) <i>I didn't receive my salary since I was contacted with Corona. Even after recovery, my employer has informed us that they will not take us back to work.</i> (A 44-year-old female who works in a cleaning service)
Loss of earnings due to self-employment	<i>Those who gave orders prior to COVID-19, did not return to collect their clothes. I reminded them once after recovery, they told they don't want it anymore. Even the new ones, hesitate to come for the dressmaking. Now, I am having financial difficulties as well</i> (A 46-year-old self-employed female [dress maker])

Stigma and discrimination by healthcare workers

When questioned about discrimination by healthcare workers, breaching of confidentiality, lack of respect, not providing health services and communication barriers were noted. Table 3 provides a description of selected quotes from individuals.

In healthcare settings, stigma and discrimination were mostly observed from healthcare workers in the lower ranks of the hospital, such as hospital labourers and public health sectors from public health midwives (PHM) and public health inspectors (PHI).

Psychological impact due to stigma and discrimination

Stigmatised individuals have experienced pervasive stress, anxiety and depression. Furthermore, they experienced a sense of social worthlessness due to discrimination. Table 4 provides a description of selected quotes from individuals on psychological impact.

A few participants were found to be depressed and were referred for psychiatric assistance.

Table 3
Subthemes on stigma and discrimination by healthcare workers.

Subthemes	Example of quotes
Not providing health services	<i>The area Public Health Midwife has informed my wife not to bring the child for field weighing when I was at the hospital and even after recovery.</i> (A 35-year-old male navy officer)
Breaching of confidentiality	<i>The public health inspector and Grama Niladhari [officer in charge of the smallest administrative unit of a region] scared all other villagers and discriminated me and my family; neighbours have shown a kind of displeasure towards us.</i> (A 49-year-old male [returnee from abroad])
Lack of respect	<i>We were treated badly at hospital; doctors and the staff are seeing and treating us from a distance; even the food used to be thrown at us, not served.</i> (A 55-year-old female)

Table 4
Psychological impact due to stigma and discrimination.

Example of quotes
<i>My next-door neighbour who was very close to me before corona, is not even looking at me now. They try to avoid me and my family. I feel so worried and desperate for some company ... (This patient started crying when describing her status).</i> (A 49-year-old married female)
<i>Villagers have spread rumours about the way I contracted the disease, they claimed that I have extramarital affairs. I feel ashamed and frustrated. I can't go out as usual even after full recovery. I can't bear this anymore, sometimes I feel like ending my life.</i> (A 30-year-old married female)

Table 5
Underlying drivers of stigma and discrimination.

Example of quotes
<i>Actions of the journalists are disgusting, appalling and stressful; worse is the social media reporting false information revealing privacy.</i> (A 27-year-old female)
<i>My house was shown on media and even my job was stated incorrectly, It's such a shame, me and my family members are finding it very difficult to make up our minds.</i> (A 43-year-old female)
<i>Media videoed us without our consent, they have revealed all the personnel details in news and also created false stories about the contact ...</i> (A 50-year-old male)

The underlying drivers of stigma and discrimination

Irresponsible media reporting and sensationalism of news coverage leading to breaching of privacy and confidentiality, defaming, false allegations and reporting household details without consent were perceived as the main drivers shaping public views and opinion. The majority of patients who have experienced stigma and discrimination complained about the irresponsible behaviour of the media.

Stigmatising language (e.g. 'COVID patient') frequently used by the media has the power to influence attitudes and behaviour of the community. Table 5 gives a description of selected quotes from individuals on the underlying drivers of stigma and discrimination.

Media reports highlighted the transportation of confirmed patients to designated COVID-19 hospitals and their contacts to quarantine centres. These stories, which were recorded by journalists without obtaining permission from the patients, were aired during news programmes on almost all of the local television

channels. Most patients felt shame and self-rejection (internalised stigma) due to negative media publicity.

Discussion

This study provides evidence on the experiences related to stigma and discrimination experienced by patients following COVID-19 infection. The extent of the problem is highlighted, and irresponsible media is identified as one of the main driving forces behind the stigma and discrimination in society, the workplace and healthcare settings, and the resulting psychological impacts. The findings of the present study, as shown in Fig. 1, are in line with the ‘Health Stigma and Discrimination Framework’.²⁸ To the best of our knowledge, this is the first in-depth study to explore stigma towards COVID-19 in Sri Lanka.

The extent of stigma and discrimination related to COVID-19

According to our findings, up to one-third of patients experienced stigma related to COVID-19 and were discriminated against by the community, co-workers and healthcare workers in Sri Lanka. Social discrimination included barriers in accessing basic needs, insulting, blaming, defaming and spreading rumours; whereas, workplace discrimination included loss of jobs, not allowing re-entry and loss of earning due to self-employment. Discrimination by healthcare workers included breaching of confidentiality, lack of respect, not providing health services and communication barriers.

The current study findings further showed that all types of discrimination led to social isolation, not seeking help and complex issues affecting family relationships among patients. Especially in Sri Lanka, where the general public (particularly the poor) rely on free health services, the implications are particularly disruptive because patients who had COVID-19 may be reluctant to seek care

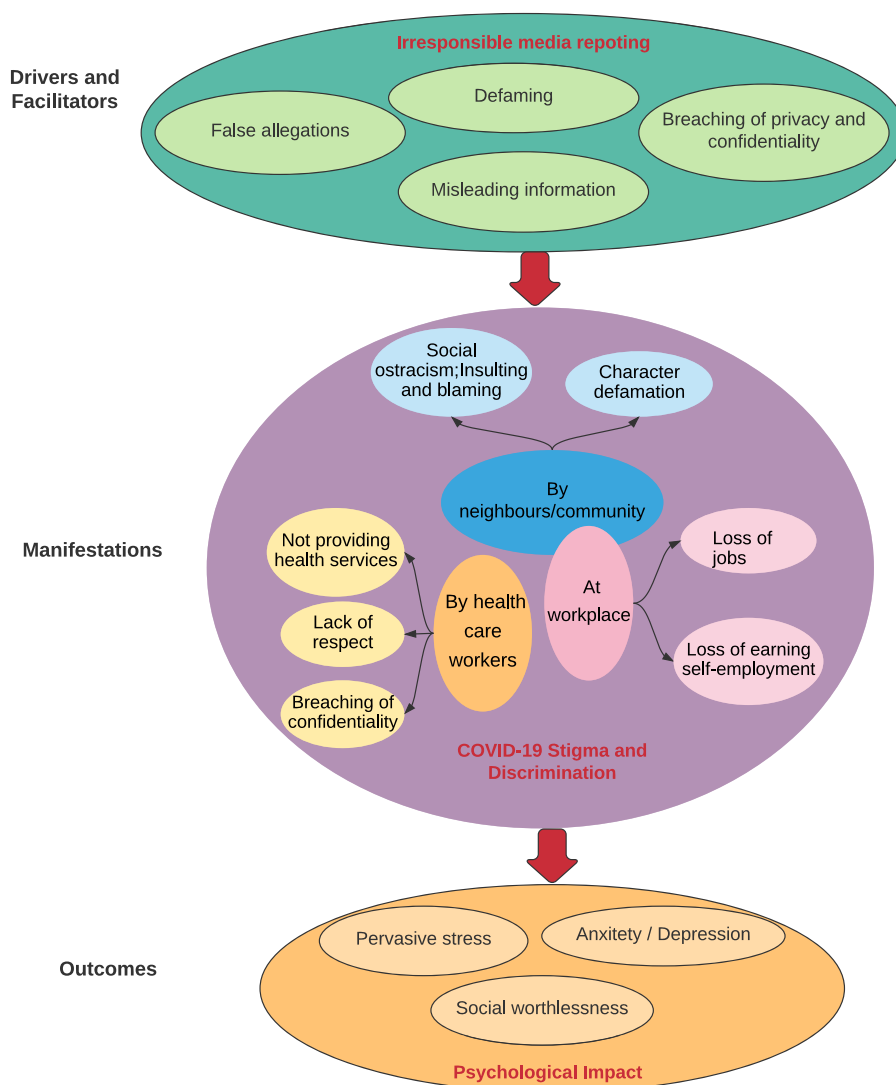


Fig. 1. Drivers and facilitators, manifestations and outcomes of stigma and discrimination among COVID-19 patients in Sri Lanka.

for non-COVID-19 health problems, while individuals with probable COVID-19 may decide to conceal their disease status simply to evade stigma and discrimination. Therefore, support strategies should be put in place for patients diagnosed with COVID-19 aimed at coping with fear and anxiety and dealing with stigma, even after recovery.

Discrimination associated with COVID-19 has been documented as part of ‘witch hunt’ hysteria, in which both the infected persons and their contacts are labelled and treated differently.²⁹ However, during the early phase of the pandemic, accusations of spreading the disease were mainly directed towards certain population groups, leading to racial discrimination. For example, verbal and physical harassment had been documented against patients of Chinese and Asian origins³⁰ and African Americans.³¹ The current study also revealed similar discrimination based on class and ethnicity. At the beginning of the epidemic, individuals returning from overseas were targeted for discrimination in Sri Lanka, as the majority of COVID-19 cases were in this population group. However, over time, discrimination was directed towards specific population groups practising communal living, such as Muslim communities, from which cases and contacts were more frequently reported.³² This suggests that risk communication strategies in a country should be sensitive towards people of different classes, races and ethnicities.

Stigma and discrimination as a result of COVID-19 have been well documented among healthcare workers in Europe, the US, Africa and some parts of Asia, where they are considered as ‘disease spreaders’.³³ In contrast, such discrimination among frontline healthcare workers was not apparent to a great extent in our study. This could be in line with the cultural norms of the general public in Sri Lanka, where frontline workers are respected in society as key stakeholders of the health and safety of the country.⁶ In particular, following the successful containment of the disease during the first wave, the doctors, nurses, public health inspectors, armed forces and police are ‘national heroes in COVID-19’ in recognition of their substantial contribution to COVID-19 control in Sri Lanka.

Media as the main driving force of stigma and discrimination

Stigma in the context of COVID-19 is mainly attributed to fear and excessive anxiety about the disease, along with a lack of proper awareness about its spread.¹⁶ In this regard, irresponsible media reporting is directly related to public views on COVID-19 patients and their contacts. For example, stigmatising language (e.g. ‘Chinese virus’, ‘Chinese syndrome’) used in printed and visual media had largely contributed to fuelling discrimination against COVID-19 among the Chinese.³⁰ In concurrence, irresponsible media reporting and sensationalism of news coverage leading to breaching of privacy and confidentiality, defaming, false allegations and reporting household details without consent were perceived as the main drivers of discrimination by the current study participants. This perception is supported by frequent media headlines that are discriminatory towards COVID-19 patients, especially in popular social media and print media published in all major languages in the country.^{34–36}

Media, through its various portals, contributes substantially to health awareness during an epidemic. However, its versatility as the most powerful tool for sharing information also results in it having a greater potential to disseminate exaggerated information at the same speed. The COVID-19 pandemic has resulted in a complementary ‘infodemic’, in which waves of misinformation on the pandemic have resulted in public anxiety and fear. Such misinformation plays an important role in shaping negative attitudes of the public and ultimately leading to stigma and discrimination.³⁷ In 2018, Heidi Larson predicted that the impact of the next major outbreak would be magnified by emotional contagion that

would be digitally enabled.³⁸ Thus, governments should develop public health policies to address the role of media portals in propagating correct information, especially during disasters.

The World Health Organisation has developed coronavirus myth-busting strategies aimed at fighting misinformation.³⁹ However, governments worldwide have responded differently to the infodemic.³⁴ The Sri Lankan Government has identified the importance of dissemination of accurate information regarding the disease and has introduced several risk communication strategies to allay fear and prevent erroneous assumptions on COVID-19.⁴⁰ However, its implementation at the ground level has been less regulated. In this regard, the Infodemic Response Checklist is a novel tool for promoting more efficient health communication strategies to alleviate the effects of misinformation.³⁷ Such tools should be adopted within cultural contexts while adopting a sensitive style of communication for managing public anxiety. Such communication can further strengthen societal adhesion and unity.

Furthermore, Sri Lanka lacks a strong media policy that safeguards the privacy and rights of individuals and families affected by any disaster, including COVID-19. Media policies should also adopt measures to communicate valid information through effective communication strategies between scientists and the public, thus protecting the public against infodemics.⁴¹ Social media platforms should also be strictly monitored and closely reviewed on the contents shared to ensure that false information does not promote harmful perceptions or practices.

Some limitations to this study should be noted. Patients were questioned using telephone interviews, and therefore, we were not able to retrieve as much information as in face-to-face interviews. More in-depth data collection and comprehensive understanding, body language and non-verbal expressions could not be identified and understood. In addition, stimulus material and visual aids could not be used to support the interviews.

Conclusions and recommendations

The results of this study show that stigma and discrimination experienced by COVID-19 patients in society, workplaces and healthcare facilities have serious negative consequences in Sri Lanka at both the individual and family levels. In this regard, irresponsible media reporting and sensationalism of news coverage leading to breaching of privacy and confidentiality, defaming and false allegations without consent have been identified as the main drivers of discrimination. Therefore, regulations on responsible media reporting, including an effective risk communication strategy to counteract its effects, are strongly recommended. Moreover, support strategies should be put in place for patients diagnosed with COVID-19 aimed at coping with fear and anxiety and dealing with stigma, even after recovery. Further research using mixed methods is recommended to corroborate the findings of the current study.

Author statements

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Ethical approval

The study was approved by the Ethics Review Committee, Faculty of Medicine, University of Colombo, Sri Lanka. Informed verbal

consent was obtained from all study participants prior to data collection.

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Competing interests

The authors declare that they have no competing interests.

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