Effects of SARS Cov-2 epidemic on the Obstetrical and Gynecological Emergency Service accesses. What happened and what shall we expect now?

Chiara Dell'Utri [a], Elisabetta Manzoni [b], Sonia Cipriani [a] Claudio Spizzico [c], Andrea Dell'Acqua [b], Giussy Barbara [a], Fabio Parazzini [b], Alessandra Kusterman [d]

[a] *Gynecology Unit, Fondazione IRCCS Ca' Granda-Ospedale Maggiore Policlinico, Milan, Italy;*

[b] *Department of Clinical Sciences and Community Health, Università degli Studi, Milan, Italy.*

[c] *Emergency Department Unit, Fondazione IRCCS Ca' Granda-Ospedale Maggiore Policlinico, Milan, Italy;*

Corresponding author:
Fabio Parazzini Department of Clinical Sciences and Community Health, Università degli Studi, Milan, Italy., via Commend 12 20100 Milan Italy. Fabio.parazzini@unimi.it

Key words: COVID-19, emergency service, birth, fetal death, pregnancy

Conflict of interest

The authors report no conflict of interest

Funding

No funding

Abbreviations

ES= Emergency Service

OBGYN= Obstetrics and gynecology

CI= Confidence Interval

Key message

During the COVID-19 epidemic lockdown period, the frequency of intrauterine fetal deaths diagnosed at admission increased and that of natural deliveries decreased.

Abstract.

Objective: During the lockdown period, the fear about the risk of infection in hospital has reduced the admission to Emergency Services (ES) with possible negative health effects. We have investigated the changes in the emergency flow occurred during SARS-CoV-2 pandemic in an obstetrics and gynecological ES and the short-term adverse outcomes on women's and reproductive health.

Study design: The study was conducted in the OBGYN ES of the Clinica Mangiagalli, the largest maternity clinic of Milan, Lombardy, Northern Italy. We analyzed retrospectively the records of all women consecutively admitted at the ES from February 23rd to June 24th 2019, and compared them with the admissions during the lockdown executive order from February 23rd to June 23rd, 2020. Patients were assessed in terms of demographic features, presentation times, triage classification (urgent/not urgent), reason for admission and outcome of the visit (discharge/admission to the ward). A total of 9291 data were retrieved from ES files and automation system, 5644 from 2019 and 3647 from 2020. Categorical variables were compared by the chi-square test calculating the p value and computed were percentage changes (with 95% Confidence interval, CI).

Results: During the period February 24 th - May 31 th 2020 the admissions at the ES decreased by 35.4% (95% CI—34.1 to 36.6) compared with the corresponding period in 2019. The reduction was more marked for gynecological complaints (-63.5%, 95%CI -60.5 to -66.5): in particular we observed a reduction of admissions for genital infection/cystitis of 75.7% (95%CI -71.4 to -80.1). The admission for complaints associated with pregnancy decreased by 28.5% (95%CI -27.2 to-29.9). In the index period, five fetal deaths were diagnosed compared with

one observed in the reference period in 2019 (chi square computed using as denominator all observed pregnancies= 4.29, p=0.04). The frequency of admission for elective caesarean section/labor induction increased from 47.5% in 2019 to 53.6% in 2020: this difference was statistically significant.

Conclusion: The lockdown negatively influenced ES admissions and consequently the women's/reproductive health. As possible short-term consequences, we observed an increase of intrauterine deaths and a decrease of natural births.

1.Introduction

The respiratory disease that emerged in December 2019 caused by a novel coronavirus SARS-COV-2 rapidly spread from the Chinese city of Wuhan worldwide, causing a serious public health emergency [1]. The World Health Organization (WHO) issued a warning and declared a world health emergency on January 31st 2020, and on March 11th 2020 declared the state of pandemic. Northern Italy became one of the epicenters of SARS CoV-2 pandemic in Europe, Lombardy being the most affected region. On 23th February 2020, the Italian National Health Authority imposed in Lombardy limitations to movement of the population followed on 9th March by a national lockdown, including also the temporary closure of non-essential shops and businesses. In the period 18th May to 2nd June, factories, bars, restaurants and barbers were reopened, but limitations to social contact were still present. During the whole period any movement for health reasons was always allowed.

During the lockdown period the national health system faced a difficult situation. With the purpose of managing the state of emergency the National Health system had to relocate resources in order to reorganize human and logistic aids. Most of the health workers had to deal with the severe cases, threated in the intensive care units. Thus, causing a decrease of healthcare resources for the treatment of mild or nonurgent cases. Further, the lockdown and the fear about the risk of infection in the hospital has lowered the admission to Emergency Services (ES) [2,3]

The scientific community questions the possible effects of these changes on the population health. Oncologists have warned of possible future increases in the diagnosis of colorectal

cancer due to a reduction in screening programs leading to a diagnostic delay with a detection of cancers at more advanced stages [4]. Two studies conducted in Northern Italy recorded a significantly decreased rate of hospital admissions for Acute Coronary Syndrome (ACS) and described a reduction rate in ED visits for angina or myocardial diseases of 30% and 50% depending on the study [2,3]. Paediatricians warned the population about the possible complications of the underdiagnosed Kawasaki Disease (KD) and its potentially severe SARS-Cov-2 infection related inflammation syndrome. the hesitation of the parents to go to the hospital, influenced by the fear of in-hospital contagion, lead to the manifestation of more severe forms [5].

Limited data on the impact of lockdown on obstetrics and gynecological ESs are available so far. This study analyses all the patients' visits of the Obstetrics and Gynecology ES in the major maternity hospital in Milan, Lombardy, Italy, during the lockdown period and retrospectively compares the clinical data with the same period in the previous year. The main objective was to investigate the changes in the emergency flow occurred during SARS-CoV-2 pandemic compared to the same period in the previous year. Secondarily we tried to identify short term measurable adverse outcomes on women/reproductive health.

2. Material and methods

We retrospectively collected the data of women who were admitted respectively from February 23rd to June 24th, 2019, and 3647 during the lockdown executive order from February

23rd to June 23rd, 2020, in the Obstetrics and Gynecology ES of the Clinica Mangiagalli, the largest maternity clinic in Milan, Lombardy, Italy,

The difference between dates is due to the presence of the leap year in 2020, total days of observation where the same.

All consecutive women admitted to the ES during the considered periods were included, independently of their age or reason for admission.

We retrieved data from ES files and automation system. Patients were assessed in terms of demographic features, presentation times, triage classification (urgent/not urgent), reason for admission and outcome of the visit (discharge/admission to the ward).

The staff of the ES comprises registered obstetricians and gynecologists. Triage was conducted using a-four-level-classifications with corresponding colors (red/immediate priority, yellow/urgent priority; green/ less urgent priority, white/not urgent).

The number of newly diagnosed of SARS-CoV-2 infected cases in Lombardy was obtained by official data of Regional Health Authority [6.]

Categorical variables are presented as absolute numbers, percentages and compared by the chi-square test calculating the p value.

Percentage changes (with the corresponding 95% Confidence interval) in the absolute numbers observed in 2020 vs 2019 were also computed.

Given the retrospective observational nature of the study based on anonimous routine data base, approval by the Local Ethics Committee was not necessary.

3. Results.

During the period February 24 th - May 31 th 2020 a total of 3647 admissions were registered at the ES with a 35.4% reduction (95% CI -34.1 to-36.6) compared with the equivalent period in 2019.

The highest reduction rate was observed during the 5th week analyzed, from March 22nd to March 28th 2020, which corresponds to the maximum increase of newly infected cases registered in Lombardy (Fig.1).

Table 1 shows the distribution of admissions according selected demographic characteristics and reported complaints.

The decrease was about double among Italian than foreign women. In particular no decrease was observed among African women.

The reduction was more marked for gynecological complaints (-63.5%, 95%CI: -60.5 to -66.5) : in particular the admissions for vulvovaginal infections, uro-gynecological conditions and/or cystitis decreased of 75.7% (95%CI: 71.4 to -80.1)

Regarding the gynecological visits for menorrhagia/atypical blood loss we observed a reduction of -41.4% (95%CI: -31.7% to 51.1%). Despite the reduction of the visits, the number of hospitalizations for blood transfusion increased from 4 to 6 during quarantine, this difference, however, was not statistically significant (chi square 2.43, p= 0.12.)

The reduction observed during the lockdown for ectopic pregnancy was of -20.6% (95%CI: -11.0% to-30.2%), and the absolute number of hospitalizations decreased from 20 to 16 in 2020.

Of those 9 and 11 respectively in 2019 and 2020 underwent urgent laparoscopy for salpingectomy and drainage of abdominal free fluid and 11 and 5 were treated with methotrexate, this difference, however, was not statistically significant (chi-square 2.0306. p= 0.15)

Finally, we observed 13 cases of pelvic inflammatory disease in 2019 and 5 in 2020, corresponding to reduction of 61.5% (95%CI: -35.1 to -88.0).

The admission for complaints of pregnancy decreased of 28.6% (95%CI: -27.2 to 29.9).
In the study period five fetal deaths were diagnosed at our ES, in comparison with one fetal death observed in the corresponding period in 2019 (chi square computed using as denominator all observed pregnancies= 4.29, *p*=0.04).
We have also considered the changing trends in the main reasons of admission among pregnant women. The admissions due bleeding in pregnancy decreased by -46.6% (95%CI -51.9 to -41.3; from 339 cases to 181 cases) and those for gestational diabetes by -47.1% (95%CI -0.57 to -0.38; from 104 to 55 cases). Otherwise, the admissions for hypertensive disorders/preeclampsia/eclampsia were substantially unchanged being increased of 2.1% (95%CI-1 to+11.0; from 48 to 49 cases). Finally, the cases of threat of preterm-birth increased of +13.7% (95%CI +4.1 to +22.3; from 49 to 53 cases).

Table 2 shows the distribution of women admitted for delivery according the planned mode of delivery in 2019 and 2020. The frequency of elective caesarean section and labour induction increased respectively from 20.4% and 27.1% in 2019 to 23.6% and 30.0% in 2020: this difference was statistically significant (chi square= 8.52, p= 0.014).

4. Discussion

This study analyzes the impact of the COVID-19 epidemic on an OBGYN ES.

In comparison to 2019, the ES admission rate observed during the lockdown period decreased significantly by 35.4%, the frequency of intrauterine fetal deaths diagnosed at admission increased and of natural deliveries decreased. The highest reduction rate was observed during the 5th week analyzed, from March 22nd to March 28th 2020, which corresponds to the maximum increase of newly infected cases registered in our region.

During that weeks, the frightening effect that aroused from the media campaign reporting the struggle of the National Health Service, the constant display of dramatic images of hospitalized patients in intensive care units and the daily report of increasing number of deaths, critically increased the fear of the population and thus influenced the attitudes of women toward the search of care. This phenomenon has been recognized in Italy also for other specialties, such as cardiology[2,3].

The reduction of the patient visits was higher in Italian than in foreign women. In particular no reduction was observed among African women. This difference may be due to the fact that African women live in a closed community, and most of them have less access to media information due to a language barrier. Moreover, analyzing the reasons for visits to ES of African women it appears that they seek urgent care either for pregnancy related complications or for delivery and/or for severe menorrhagia, not for nonurgent issues (data not shown). During the whole lockdown period, private practice was allowed. Thus it is possible that Italian women, to avoid hospital access, chose more frequently a safer environment by asking for their General Practitioner or private gynecologist.

196 The reduction observed was allocated primarily to visits for minor gynecological problems (such
197 as vulvovaginal infections, menstrual-cycle irregularities, uro-gynecological conditions) and
198 secondly for obstetric controls of an uncomplicated pregnancy
199 Regarding the gynecological visits, despite the observed reduction of visits for menorrhagia/
200 atypical blood loss, the number of hospitalizations for blood transfusion increased from four to
201 six during quarantine, although this increase was not statistically significant. This opposite
202 trend can be explained by the fear of in-hospital contagion: this reluctance caused a worsening
203 of patients' physical conditions, resulting in an increase of blood transfusion and potentially
204 serious adverse effect.

205 Women showing with suspected pelvic inflammatory disease were less than half compared to
206 the previous year. This reduction in numbers may be due to the quarantine, that forced people
207 to stay home, reducing promiscuous relationships. Nevertheless, some women may not have
208 adequately treated the infection, increasing the risk of possible long-term complications, which
209 can negatively impact women's quality of life and increase the risks of complications and
210 repercussions on fertility. [8]

211 Within all pregnant women, there was a decrease related to issues during the first and second
212 trimester (up until week 24). On the other hand, as expected, the number of hospitalizations
213 for births was substantially unchanged.

214 The number of women diagnosed with intrauterine fetal deaths at the ES confirmed by the
215 absence of the heartbeat during the ultrasound at admission was relevant, increased from one
216 case in 2019 to five cases in 2020. We hypothesize that the increase could have been due to

the inclination of the women to wait longer for the visit, which resulted in underestimating important signs, such as the reduction of fetal movements felt by the mother, for hours or days.

The data shows a change in the mode of delivery, favoring the pre-planned induced births and the hospitalizations for chosen c-sections, compared to the natural births. It could have been due to the doctors advising the pregnant women to preplan their birth, so that they could feel safer knowing they would have a prefixed birth plan, given the uncertainty and the continuous changes related to the emergency situation of COVID-19.

Potential limitations of this analysis should be considered. We have analyzed data obtained by a routine data base, including only the main diagnosis/complaint of the woman attending the ES. This limitation is, however, similar in both the considered periods. Among strengths we have to considered the large sample size.

5. Conclusion

In conclusion, our analysis shows that lockdown has had relevant impact on ES admission and consequently on the woman's health such as an increase of intrauterine fetal death, a decrease of natural birth and an increase, although in a not statistically significant way, of admission for menorrhagia requiring blood transfusion.

At the moment it is not possible to estimate the effect that the reduction of patient visits at the ES have on the long term health of the women general population, but some consequences due to under- or delayed diagnosis, for example of infections, can be expected.

We believe it's necessary to raise awareness to the correct use of hospitals and ESs, informing the population on how and when to use hospital services. An important focus should be teaching not to underestimate important signs and symptoms that could bring serious consequences, in the medium and long run, putting the mother and the fetus at risk also in case of a new lockdown.

References

1 Zhu, N. et al. (2020) 'A Novel Coronavirus from Patients with Pneumonia in China, 2019', New England Journal of Medicine, 382(8), pp. 727–733. doi: 10.1056/NEJMoa2001017.

2 De Filippo, O. et al. (2020) 'Reduced Rate of Hospital Admissions for ACS during Covid-19 Outbreak in Northern Italy', New England Journal of Medicine, 383(1), pp. 88–89. doi: 10.1056/NEJMc2009166.

3 Toniolo, M. et al. (2020) 'Unpredictable Fall of Severe Emergent Cardiovascular Diseases Hospital Admissions During the COVID-19 Pandemic: Experience of a Single Large Center in Northern Italy', Journal of the American Heart Association, 9(13). doi: 10.1161/JAHA.120.017122.

4 Del Vecchio Blanco, G. et al. (2020) 'The impact of COVID-19 pandemic in the colorectal cancer prevention', International Journal of Colorectal Disease. doi: 10.1007/s00384-020-03635-6.

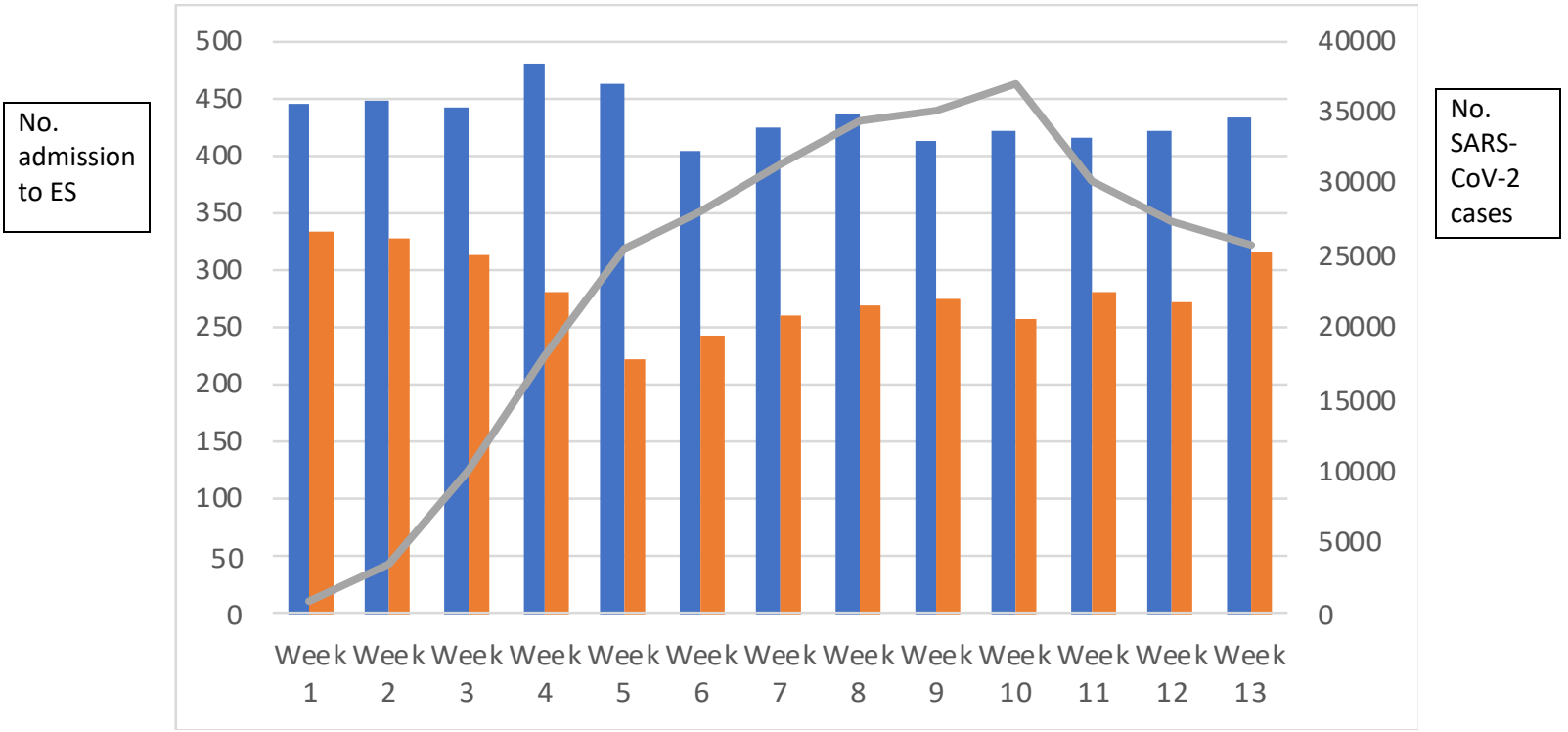
6 Xu, S., Chen, M. and Weng, J. (2020) 'COVID-19 and Kawasaki disease in children', Pharmacological Research, 159, p. 104951. doi: 10.1016/j.phrs.2020.104951.

7 Ministero della Salute www.salute.gov.it/imgs/C_17_notizie

8Curry A, Williams T, Penny ML. Pelvic Inflammatory Disease: Diagnosis, Management, and Prevention. Am Fam Physician. 2019;100(6):357-364.

Fig. 1 Distribution of study subjects according to week of lockdown and number of newly infected cases registered in Lombardy by Health Authority.

Green line= number of registered cases of SARS-CoV2- infection in Lombardy; blue bar=2019, red bar=2020



Calendar year	1	2	3	4	5	6	7	8	9	0	11	12	13	Total
2019	445	448	441	479	463	402	425	436	413	421	416	422	433	5644
2020	332	326	313	280	222	242	261	270	274	258	281	271	317	3647
Difference	-25.4	-27.2	-29.0	-41.6	-52.1	-39.8	-38.6	-38.1	-30.7	-38.7	-38.7	-35.8	-26.8	-35.4
95% CI LL	-21.6	-23.3	-25.0	-37.2	-47.5	-35.1	-34.1	-33.6	-23.3	-34.2	-28.1	-31.4	-22.8	-24.1
95% CI UL	-29.6	-31.5	-33.4	-46.0	-56.6	-44.7	-43.3	-42.7	-38.4	-43.5	-37.1	-40.3	-31.2	-36.6

CI= confidence interval UL= upper limit LL= lower limit

.

Table 1. Distribution of women admitted to Emergency Service during the period February 24-May 31 2019 and 2020 according to selected factors.

	2019	2020	% difference	95%CI LL	95%CI UL
	No. (%)	No. (%)			
Total	5644	3647	-35.4	-34.1	-36.6
Nationality					
Italy	4771 (84.5)	2923 (80.1)	-38.7	-37.4	-40.1
European countries	250 (4.4)	206 (5.6)	-17.6	-12.9	-22.3
African countries	165 (2.9)	168 (4.6)	+1.8	-0.2	+3.9
Asian countries	205 (3.6)	160 (4.4)	-22.0	-16.3	-27.6
South American countries	214 (3.8)	174 (4.8)	-18.7	-13.5	-23.9
Others	39 (0.7)	16 (0.5)	-59.0	-43.5	-74.4
Age (years)					
<18	99 (1.8)	30 (0.8)	-69.7	-60.6	-78.7
18-29	1277 (22.6)	790 (21.7)	-38.1	-35.5	-40.8
30-39	3036 (53.8)	2102 (57.6)	-30.8	-29.1	-32.4
40-49	993 (17.6)	617(17.0)	-37.9	-34.8	-40.9
50-59	150 (2.7)	73 (2.0)	-51.3	-43.3	-59.3
60+	89 (1.6)	35 (0.9)	-38.2	-50.5	-70.8
Triage colour					
White/green	4607 (81.6)	2854 (78.2)	-38.1	-36.6	-39.5
Jellow/red	1037 (18.4)	793(21.8)	-23.5	-20.9	-26.1
Reason of admission					
Gynecological complaints	980 (17.4)	358(9.8)	-63.5	-60.5	-66.5
Genital infection/cistitis	*347 (6.1)*	*89(2.4)*	-75.7	-71.4	-80.1
Menometrorrahagia	*99 (1.8)*	*58(1.2)*	-41.4	-31.7	-51.1
Pelvic pain/dysmenorrea	*291(5.2)*	*114(3.1)*	-60-8	-55.2	-66.4
Others°	*243(4.3)*	*97(2.7)*	-60.0	-53.9	-66.2
Pregnancy	4295(76.1)	3068(84.1)	-28.6	-27.2	-29.9
<12 wg (mainly bleeding during the first trimester of pregnancy)	*1164 (20.6)*	*569(15.6)*	-51.1	-48.2	-54.0
12-24 wg	*451(8.0)*	*247(6.8)*	-45.2	-40.6	-49.8
25-34 wg	*861(15.3)*	*685(18.8)*	-20.4	-17.7	-23.1
>34wg	*550(9.7)*	*302(8.3)*	-45.1	-40.9	-49.2
Delivery°°	*1103(19.5)*	*1126(30.9)*	+2.1		+1.2
Post partum *(mainly fever, wound infection, mastitis)*	166 (2.9)	1398(3.8))	-16.3	-10.7	-21.9
Other *(including not obstetrics or gynecological complaints/sexual and domestic violence)*	369 (6.5)	221(6.1)	-40.1	-35.1	-45.1

Wg: week of gestation

°including cases of pelvic inflammatory disease. °°including spontaneous labour, premature rupture of membranes, planned induced labour, planned elective c section

Table 2. Distribution of study subjects according to the planned mode of delivery at admission and study period.

	2019 No. 1103	2020 No. 1126	Chi square 2df
Planned mode of delivery at admission			
Spontaneous vaginal delivery°	579 (52,5%)	522 (46.4%)	
Induced vaginal delivery	299(27.1%)	338 (30.0%)	
elective c-section	225(20.4%)	266 (23.6%)	p= 0.014

° including women with premature rupture of membranes

df= degree of freedom