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Obstetric nursing reorganization in pregnancy during the Covid-19 pandemic: a proposal integrative review of the literature

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ABSTRACT

Introduction. Nursing management aimed to prevent viral infection in order to promote care plans that reduce the SARS-CoV-2 infection as much as possible.

Evidence acquisition. There were different studies focusing on small case series on Covid-19 pregnant women and on logistic management in order to reduce the risk of contagion.

Evidence synthesis. A review of the primary and the secondary literature was carried out in the Clinical Key and the PubMed databases. The bibliographic research was focused on the critical reading of the studies from 1 February 2020 to 30 June 2020. A total of eight articles analyzed special measures necessary to prevent Covid-19 in the pregnant women by implementing algorithms to be shared in a multidisciplinary context, also on challenges in the nursing care and in proposals for future studies.

Conclusions. Since there were few data available on the Covid-19 positive pregnant women, further developments of studies and more appropriate protocols were needed on this particular topic.

SOMMARIO

Introduzione. La gestione infermieristica mira a prevenire l'infezione virale al fine di promuovere piani di cura che possano ridurre il più possibile l'infezione da SARS-CoV-2.

Acquisizione di prove. Ci sono stati diversi studi incentrati su piccole serie di casi su donne gestanti affette da Covid-19 e sulla loro gestione al fine di ridurre il rischio di contagio.

Sintesi delle prove. È stata effettuata una revisione della letteratura primaria e secondaria nei database Clinical Key e PubMed. La ricerca bibliografica è stata focalizzata sulla lettura critica degli studi dall'1 febbraio 2020 al 30 giugno 2020. Un totale di otto articoli hanno analizzato misure speciali necessarie per prevenire il Covid-19 nelle donne in gravidanza implementando algoritmi da condividere in un contesto multidisciplinare, anche sulle sfide nell'assistenza infermieristica e nelle proposte di studi futuri.

Conclusioni. Attualmente sono pochi gli studi disponibili sulle donne in gravidanza positive al Covid-19, pertanto ulteriori sviluppi di studi e di protocolli più appropriati su questo particolare argomento sono auspicabili.

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Key words

Nursing-midwifery assistance; labor management; pregnancy; SARS-CoV-2 infection; birth.

INTRODUCTION

In late December 2019, a new coronavirus pneumonia (Covid-19) began to manifest itself in the Chinese city of Wuhan, and then spread nationally and internationally (1, 2). On 30 January 2020, the World Health Organization declared the global Covid-19 epidemic as an international public health emergency (3). In this scenario literature is unable to define the risk and the lethality index in Covid-19 general population (4), specifically in pregnant women (5). Already during past pandemic viral infections, as SARS in 2004 (6) and MERS in 2009, pregnant women were identified as more vulnerable than general population (7).

At this regard, in 2009, 5% of all H1N1-infection deaths regarded pregnant women and in other cases, SARS-CoV and MERS-CoV infections induced severe complications, such as endotracheal intubation, hospitalization in intensive care, impaired renal function for the pregnant patients. To date 56 pregnant women, Covid-19 positive, during the second and the third trimesters of pregnancy reported symptoms as: fever, cough, two thirds of patients recorded lymphocytopenia and the C-Reactive Protein increasing, and 83% of cases recorded multiple patches of ground-glass opacity in the lungs at the chest computer tomography (8).

Additionally, a case series of 12 Covid-19 pregnant women in Hong Kong, China, reported three maternal deaths; four of seven patients who presented in the first trimester had miscarriage; four of five patients had preterm birth; and two mothers recovered without delivery but their ongoing pregnancies were complicated by FGR (< 8) (9). Furthermore, it was not entirely clear whether and how pregnant transferred the infection to her fetus as all samples testing negative for the Covid-19 and suggesting that there was no evidence of vertical transmission in women who developed Covid-19 pneumonia in late pregnancy. As this regard, only two cases of neonatal Covid-19 infections reported an outcome of postnatal transmission (10). Another study analyzing 38 pregnancies demonstrated that there were no confirmed cases on vertical infection from mothers with Covid-19 to their fetuses (11).

For this reason, nursing management focused on promotion to act care plans to reduce the SARS-CoV-2 infection as much as possible. The present review aimed to analyze the current literature available in order to evidence:

1. any special measures necessary to prevent the SARS-CoV-2 infection in the pregnant woman;

2. how nursing care changed during the Covid-19 pandemic for pregnant women;
3. the management of pregnant women suffered from Covid-19 and further aspects to implement in future studies.

MATERIALS AND METHODS

To answer the research questions, a proposal integrative literature review was carried out including systematic reviews, meta-analyzes and randomized clinical trials, opinion of experts, editorials, regarding nursing management in pregnancy during the Covid-19 pandemic. Clinical Keys and Pubmed databases were consulted, retroactively from 1 February 2020 to 30 June 2020 in order to better analyze the reorganization on nursing care for pregnant women during the Covid-19 pandemic and the effects on them and their children in the containment of the SARS-CoV-2 infection (**table I**).

Table I. The PICO instrument to literature review conduction.

P = Patients/Population	Pregnant women who give birth during the February 2020 - June 2020 period.
I = Interventions	Reorganization of nursing care for pregnancy women during the Covid-19 pandemic period.
C = Comparison	Comparison with periods preceding the pandemic.
O = Outcome	Effect on: <ul style="list-style-type: none"> • women • children • the containment of the spread of the pandemic.

Key words used as free terms combined with the Boolean AND operator were: Coronavirus, Pregnancy, Nursing Management in Pregnant Women and Intrapartum Care (**table II**).

Table II. Combination of keywords used with the Boolean AND operator.

Database	Search string	Results
PubMed 1	Coronavirus AND Pregnancy	650
PubMed 2	Coronavirus AND Nursing Management in Pregnant Women	175
PubMed 3	Coronavirus AND Intrapartum Care	5
PubMed 4	Coronavirus AND Obstetric Management in Pregnant Women	60

Inclusion criteria concerned:

- studies published in the Clinical Keys and PubMed databases;
- studies published from February 2020 to June 2020;
- articles available in the full-text version;

- review, clinical trial, observational and descriptive studies underlining the nursing care in the pregnant women during the Covid-19 pandemic;
- studies published in English language.

Exclusion criteria included:

- nursing studies which did not directly refer to the Covid-19 pandemic period;
- articles published in other languages, excluded English language;
- articles published before February 2020 (before the pandemic period).

All studies recruited from this review were evaluated on the basis of: good description and appropriateness in study design (objective and method), sampling (sufficiently numerous, clarity of treatment allocation

criteria, absence of important bias), intervention, outcomes, statistic analysis and clinical relevance.

RESULTS

The Clinical Key and the PubMed database searches provided a total of 890 studies for potential inclusion in the review (**figure 1**). After adjusting for duplicates and for an irrelevant topic in the title, 33 studies remained. Of these, 19 studies were discarded after reading and reviewing abstracts. The full text of the remaining 9 studies was examined in greater detail. Of these, 1 study did not meet the inclusion criteria. Eight studies were finally included in this systematic review (12).

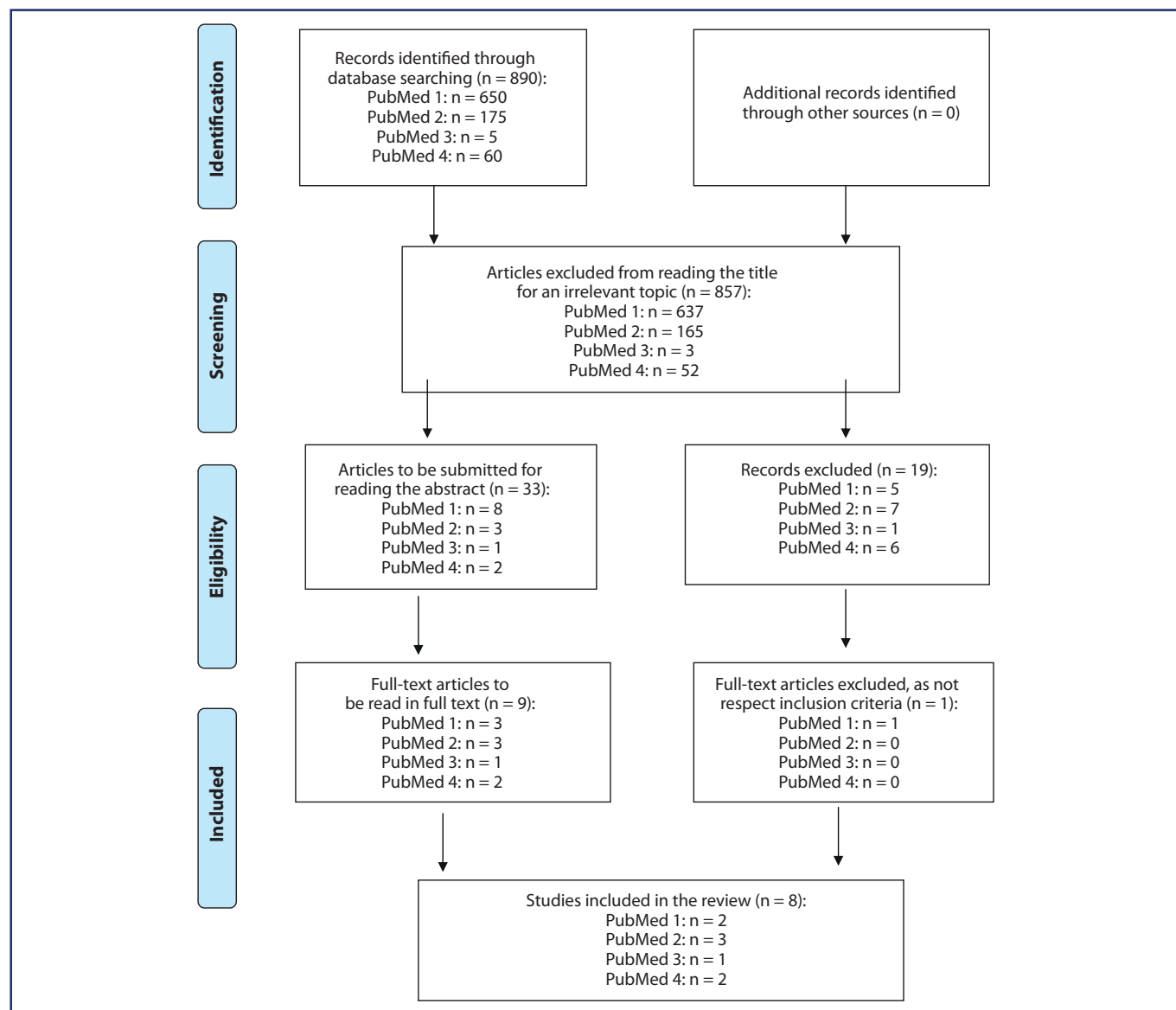


Figure 1. PRISMA 2009 Flow diagram for the proposal integrative review of the literature in: "Obstetric nursing reorganization in pregnancy during the Covid-19 pandemic".

Table III. Special measures preventing SARS-CoV-2 infection in the pregnant woman.

Study Research Question/Statement	Findings	Reference
Maternal health care management strategies in woman who had fever and strategies including care planning and patient triage have been improving.	No nosocomial infection has occurred and none pregnant woman was reported to be infected: this management should be effective to an extent.	9
Could obstetric care provide safe and continuing essential services?	The clinical service model is improved in: workplace segregation; responsible social distancing, containment of cross-infection to healthcare providers; use of PPE; telemedicine.	13
An Italian regional model reorganization in the obstetric care.	The obstetric network was quickly reorganized with a model that guarantees assistance to all pregnant women identifying differentiated approaches according to the level of infectious and obstetric risk.	16

PPE: personal protective equipment.

Among the selected studies two were systematic reviews of the current literature (9, 13), one a retrospective multicenter case (14), two letters to Editor (15, 16), one case report (17), one a guidance (18) and one an opinion of experts (19).

Moreover, three studies (9, 13, 16) focused on the special measures necessary to prevent the SARS-CoV-2 infection in pregnant woman (**table III**), as: the implementation of maternal health care in patient triage to exclude any Covid-19 symptoms (9), or the improvement of work segregation, distancing, containment of cross-infection and the implementation of the personal protective equipment use (PPE) and the telemedicine practice (13). All these protective measures were well personalized to pregnant women in relation to both their level of infectious and their obstetric risk (16).

The other five studies (14, 15, 17-19) analyzed the main nursing care changes in pregnant women during the Covid-19 pandemic (**table IV**), by supporting innovative interventions in this context (14-15, 17-19), as: the earliest detection of severe illness and the individualized decisions on the adjunctive medications (14); the implementation of protocols in the use of PPE, as safety precaution for healthcare workers, the pregnancy management and its complications, including considerations to breastfeeding, mother to child infectious transmission, neonatal isolation devices (15, 17-19).

DISCUSSION

Special measures necessary to prevent the SARS-CoV-2 infection in the pregnant woman

To contain the Covid-19 pandemic a hospital network reorganization was proposed to share a guiding scheme for the entire obstetric hospital system in order to better manage pregnant women with

respect for providers and their own health (9, 13). The gynecology and obstetrics departments in the Italian territorial settings have been divided into Spoke and Hub centers. Specifically, the Spoke center guaranteed periodic prenatal care for pregnant Covid-19 women, while the Hub center performed examinations or a remote consultancy with a greater intensity of care (16). In this regard, a rearrangement in all these centers, both Spoke and Hub, was carried out both in the entry and the exit phase, as well as in the management of pregnant women who went to the laboratory for routine checks during pregnancy in order to minimize the risk of contagion (13, 16). Additionally, to avoid further spread of the epidemic, women were previously advised to stay at home and go to the hospital only in cases of strict necessity with a consequent dilemma for many pregnant women about whether to go to hospital (9), associated to a list of non-antiepидemic hospitals to consider and choose for a safer and a more regular obstetric consultation without complications and relative risk factors associated. Moreover, hospital rooms were reorganized as individually, to contain the SARS-CoV-2 infection with the inevitably consequent of a slowing admission rate. In addition, visitors were not allowed to access in the obstetric wards, except for particular cases in which only one person can be accepted. Also, an admission procedure was performed both for women with normal pregnancy and for urgent conditions, both including body temperature assessment and, if it exceeded 37.3 grades or there were particular respiratory signs, the anamnesis of the pregnant woman's contacts was performed to find the suspected Covid-19, including health professionals. In addition, shared protocols on triage were improved to direct the pregnant women to the right care setting and also, the improvement of the telemedicine approach was implemented, according to the principles of workplace segregation,

Table IV. Challenges in the nursing care for pregnant women during the COVID-19 pandemic.

Study Research Question/Statement	Findings	Reference
Critical care management of obstetrical patients with COVID-19 should generally be guided by the same principles as for the nonpregnant adult population?	The exploring treatment options include: early detection of severe illness and individualized decisions regarding the use of adjunctive medications.	14
Intrapartum care of women with COVID-19.	Management protocols for care providers, the proper utilization of PPE and scenario simulation, such as emergency cesarean section, should be improved in order to ensure efficiency in patient care as well as protective measures.	15
Experience of clinical management in pregnant women and newborns with COVID-19.	Management should include: inspection precautions; drug treatment options; indications and methods of termination of pregnancy; postpartum fever; breastfeeding considerations; mode of mother-to-child transmission; neonatal isolation and advice on neonatal nursing.	17
Recommendation for healthcare professionals on COVID-19 during pregnancy and puerperium.	Four algorithms to manage pregnancy in Covid-19 pandemic were performed: antenatal outpatient care; presentation to triage; intrapartum and postpartum management; neonatal care in women with suspected or confirmed Covid-19 infection.	18
Management of pregnant women infected with COVID-19.	More evidence is needed to establish which approach is safer to deliver and caesarean sections in this patient population.	19

FIGO: The International Federation of Gynecology and Obstetrics.

social distancing and containment of cross-infection (13). Finally, particular importance was given to the use of adequate PPE, with the organization of proper supply and distribution, along with appropriate training of all staff at risk of contagion (13). In all this complex context, a valid psychological support was requested for pregnant women and their families in order to reduce panic emotional conditions (9, 13, 16).

Challenges in the nursing care for pregnant women during the COVID-19 pandemic

All the National Health Institutes published more updated treatment guidelines to contain the Covid-19 diffusion, including special considerations to pregnant women because, with their particular clinical condition, they were not embraced in the various clinical trials investigating treatment options for Covid-19 (15). Most guidelines published included: early detection of severe illness and individualized decisions on the care to be given to pregnant women; inspection precautions, drug treatment options, indications and methods of pregnancy termination, postpartum fever, breastfeeding considerations, mode of mother-to child transmission, neonatal isolation and advice on neonatal nursing in order to better manage the Covid-19 condition in pregnant women and their new born (17, 19).

The pregnant woman management with suspected or confirmed Covid-19 case was planned with a total of 4 algorithms, specifically: the antenatal outpatient care, the presentation to triage, the in-

trapartum and the postpartum management and the neonatal care in women with suspected or confirmed Covid-19 infection. Particularly, the key points for consideration in this plan were: the pregnant woman with an ascertained diagnosis of Covid-19 must be referred to a tertiary hospital and, at the same time, a detailed history regarding exposure relevant to Covid-19 and clinical manifestations should be collected. Suspected or confirmed cases must be treated in specialized hospitals with negative pressure isolation rooms also including neonatal units. In pregnant woman with fever or respiratory symptoms and the reduction in the total number of leukocytes, a swab test was performed and, if the mother was unable to take care of the new-born, he/she will be admitted to the neonatal ward remaining isolated until the successive swab test after 7 days. Finally, during the post-natal period, if the woman was Covid-19 positive and asymptomatic, she will be discharged 2 days after the birth and will be complied with the indications at home in isolation until at least 2 spaced 24 hours' negative tampons (16). Moreover, in occasion of suspected or confirmed cases, women should be quarantined immediately and they should be admitted in the specialized hospital for Covid-19 cases. Additionally, if the temperature reverted to normal for more than 3 days and the respiratory symptoms ameliorated, and the nucleic acid test for respiratory pathogens showed negative for two consecutive times, pregnant women could be discharged from the hospital or be transferred to the appropriate department.

Generally, literature supported that critical care management of obstetrical patients with Covid-19 should be guided by the same principles as for the non-pregnant adult population and was contingent on: the multidisciplinary approach, the close monitoring of maternal vital signs, the continuous fetal heart monitoring, the conservative fluid therapy and the oxygen therapy and, when it was necessary, the early neuraxial anesthesia with the elective instrumental delivery according to maternal condition and the stabilization of the critically ill patients (14, 15, 18, 19). Unique complication included decisions about fetal monitoring since prolonged administration of corticosteroids could in the long run caused lung maturity for fetal on short and therefore, the probability of early preterm delivery was high (15).

Moreover, in order to reduce cross-infection, healthcare institutes have improved the Internet consultation in order to fulfill online consultation and guidance for pregnant women (15, 20). Finally, all healthcare personnel must wear all the PPE necessary to contain the infection and should be trained for respirators (18). Furthermore, it would be desirable if the training already started from university nursing courses to perform trained nurses in the management of maxi emergencies (21, 22).

CONCLUSIONS

Future perspectives

Literature supported that due to the lack of experience they were uncertain of the clinical features, disease progress, outcome and treatment of pregnant Covid-19 patients, more work will be needed to fill in these gaps in the next future (5, 9). Most of the studies selected (14, 15) highlighted the limited availability data. So, clinically recommendations will surely continue to develop studies and more appropriate protocols evolving as regards microbiological, pharmacologic and clinical information about on Covid-19 in pregnant women, especially at the time of delivery. Currently, there was insufficient evidence regarding vertical mother-to-baby transmission in women affected by Covid-19 and regarding the safety of breastfeeding and the need for mother/baby separation (18, 20). Finally, the hope of all the works considered (5, 23) was to improve the available evidence on the condition of Covid-19

in the pregnant woman in order to implement the most appropriate care protocols (5, 23).

CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

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