Perinatal Healthcare Providers' Perspectives and Experiences During the Early Phase of the COVID-19 Pandemic in Uruguay:

Findings from a cross-sectional online survey

Authors:

L. Vaamonde[1], L. Benova[2], M. Rodríguez[1], V. Silveira[1],

F. Fabra[1], K. Turcatti[1], S. González-Dambrauskas[1],

J. L. Díaz-Rossello[1], F. Blasina[1], A. Semaan[2]

Antwerp, Belgium

September 2022

Author affiliations

[1]Department of Neonatology, Hospital de Clínicas Dr. Manuel Quintela, Faculty of Medicine, Udelar, Montevideo, Uruguay

[2]Deptartment of Public Health, Institute of Tropical Medicine, Belgium

Corresponding author:

Lucía Vaamonde

Department of Neonatology, Hospital de Clínicas, Faculty of Medicine, Udelar

Avda. Italia s/n esq Las Heras, CP 11800, Montevideo, Uruguay

Email: luciavaamonde@gmail.com

Recommended citation: Vaamonde, L, Benova, L, Rodríguez, M, Silveira, V, Fabra, F, Turcatti, K, González-Dambrauskas, S, Díaz-Rossello, J.L., Blasina, F, & Semaan, A. (2022). Perinatal Healthcare Providers' Perspectives and Experiences During the Early Phase of the COVID-19 Pandemic in Uruguay: Findings from a cross-sectional online survey. Zenodo. https://doi.org/10.5281/zenodo.7100157

Table of contents

Spanish summary

Desde noviembre de 2019, la enfermedad producida por SARS-COV2 denominada COVID-19 comenzó a extenderse por el mundo, forzando a la reorganización de los sistemas de salud. Entre marzo y julio de 2020 América Latina fue la región más afectada del mundo, sin embargo, la situación en Uruguay fue diferente, con pocos casos y muertes registradas. En el área perinatal los prestadores de salud debieron adaptar el funcionamiento tomando en cuenta los escasos conocimientos que aún se tenían sobre el impacto de la enfermedad en las gestantes, fetos y recién nacidos. Este estudio se realizó con el objetivo de describir las adaptaciones en la prestación de la atención perinatal en el sistema de salud uruguayo desde la perspectiva de los trabajadores de la salud perinatal.

Se trató de un estudio transversal de trabajadores de la salud perinatal, recopilado entre marzo y julio de 2020, mediante una encuesta en línea.

Se analizaron los datos de 180 proveedores de atención médica; 41% neonatólogos y 50% de hospitales de referencia. La mayoría accedieron a información sobre COVID-19 y salud perinatal a través de orientación informal de colegas, centros de salud y búsqueda personal; casi dos tercios no recibieron capacitación. Casi todos indicaron que los establecimientos de salud en los que trabajaban dedicaron salas de aislamiento para los pacientes (96 %) y establecieron áreas señalizadas de ingreso y detección (93 %). Las preocupaciones más comunes reportadas incluyen acceso inadecuado a la información, pérdida/disminución de ingresos, riesgo de contraer la infección por COVID-19 en el lugar de trabajo, aumento de los niveles de estrés, escasez de recursos necesarios para prevenir, diagnosticar y manejar el COVID-19 e impactos negativos de las medidas de mitigación de la pandemia en el acceso de las mujeres y los recién nacidos a una atención de alta calidad.

Nuestros hallazgos muestran un impacto negativo en la salud mental de los proveedores y el acceso de las mujeres a la atención esencial, aunque la incidencia de COVID-19 fue baja en Uruguay durante los primeros nueve meses de la pandemia.

English summary

Since March 2020, COVID-19 began to spread globally forcing the reorganisation of healthcare systems. Between March and July 2020, Latin America was the most affected region in the world, yet the situation in Uruguay was different, with few cases and deaths recorded due to COVID-19.

This report aims to describe adaptations to the provision of maternal and newborn care in the Uruguayan healthcare system from the perspective of perinatal healthcare providers. This is a cross-sectional study among perinatal healthcare providers in Uruguay, using data collected between March and July 2020 through a global online survey. The questionnaire was available in 13 languages, including Spanish.

Data submitted by 180 perinatal healthcare providers were analysed; 41% were neonatologists and approximately half (51%) worked in referral hospitals. The majority of the respondents reported accessing information on COVID-19 and perinatal health through informal guidance from colleagues, health facilities and personal searches; almost two-thirds did not receive training. Almost all respondents indicated that health facilities where they worked, dedicated isolation rooms for patients (96%) and established sign-posted entrance and screening areas (93%) while 49% reported screening for COVID-19 symptoms among maternity patients. The most common concerns reported by healthcare providers included inadequate access to information, loss/decrease in income, risk of acquiring COVID-19 infection in the workplace, increased stress levels, shortage of resources needed to prevent, diagnose and manage COVID-19, and negative impacts of the pandemic's mitigation measures on women's and newborns' access to high quality of care. This work shows a high percentage of maternal and newborn healthcare providers who had access to information through informal sources and knowledge on the protocols in case of COVID-19. However, our findings show a negative impact on providers' mental health and women's access to essential care, although the incidence of COVID-19 was low in Uruguay during the first nine months of the pandemic.

1 Introduction

Coronavirus disease 2019 (COVID-19) is an emerging viral pandemic of the 20th century. The disease was first identified in December 2019 in Wuhan, the capital of the Chinese province of Hubei, and it is speculated that from there it spread to the rest of the world. The first case was reported to the World Health Organization (WHO) by the Wuhan Municipal Health Commission on 12 December 2019 as an unknown pneumonia. The number of people diagnosed with COVID-19 worldwide crossed the one million mark on 2 April 2020, two million on 16 April 2020, and three million on 29 April 2020. A year later, the figures reached more than ninety million confirmed cases worldwide, and more than two million deaths resulting from this disease.[1]

Many countries in Latin America witnessed an increase in the number of COVID-19 cases in early 2020. For instance, Brazil had more than 4.5 million confirmed cases as of February 2021, the third-highest figure in the world after the United States and India at the time, and has had the highest number of deaths after the United States, up to 3,900 deaths per day at the beginning of April 2021. Argentina, México, Perú and Colombia have also had a significant number of cases, and they are among the countries with the highest number of cases in the world. Latin America was one of the most affected regions in the world, where the number of deaths due to COVID-19 reached one million as of May 2021.[2, 3]

On the other hand, the epidemiological situation and pandemic dynamics in Uruguay were very different in comparison to its neighbouring countries. Although the first four COVID-19 cases were detected on 13 March 2020, the number of daily COVID-19 cases and deaths remained among the lowest in the world until the end of 2020,[4] making Uruguay an "outlier" in the region. In the first four months of the pandemic, the first 1,000 cases were detected; it took five months to reach 10,000 cases, and only one month thereafter, to reach 30,000 cases, with 347 deaths until 21 January 2021.[5] The period between December 2020 and January 2021 was considered the true first wave of the pandemic in Uruguay, nine months after the declaration of a health emergency by the national government. In the worst phase of the pandemic (April–May 2021), there were more than 100,000 cumulative cases in one month, more than 2,000 new cases per day and 1,041 deaths.

COVID-19 resulting from an infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), causes severe and widespread disease in adults (including pregnant women), although, it rarely affects newborns. Perinatal transmission and transmission through breast milk have not been confirmed at present, although postnatal transmission of the virus to the newborn from the infected mother has been confirmed. The new nature of the illness makes it challenging to clinically manage pregnant women, postpartum women and newborns diagnosed with the disease.

In 2020, a global group of researchers launched a global survey aimed to study how maternal and newborn healthcare

providers perceived these new challenges, and how various aspects of the perinatal health system organisation were adapted. Those difficulties were exacerbated by the rapid changes in health systems, which have required an efficient adaptation of health professionals to ensure the adequate management of antenatal, intrapartum and postnatal care.[6] Furthermore, the pandemic and the changes to the care process have affected not only pregnant women or mothers who are diagnosed with COVID-19, but all pregnant women in general. In this manuscript, we present key findings reported by Uruguayan respondents during the early period of the pandemic. We hypothesised that even in this context of a very low disease burden, the impact of the pandemic on changes in practices negatively affected perinatal healthcare providers.

The building of Hospital de Clínicas, Montevideo, Uruguay, captured from the front.

2 Methods

Study setting

Uruguay is a Latin American country with a total surface area of 176.215 km², and a population of 3,462,000.[7] Montevideo, the capital city of Uruguay, is a crowded metropolitan area where more than 50% of the Uruguayan population lives. Since 2007, Uruguay has developed an integrated healthcare system including public and private medical centres. This system guarantees universal access to all medical services and procedures, including perinatal care. Every person can select the institution where they wish to seek care. In the case of pregnant women, antenatal consultations are provided in polyclinics and include visits to obstetricians and some laboratory tests. In some cases, midwives can provide antenatal care for low-risk pregnancies. Childbirth care is provided in second- or third-level healthcare centres (such as hospitals) where both the woman and the newborn remain hospitalised for at least 48 hours after birth. More than 95% of births occur in hospitals in Uruguay, and around 18% of them occur in academic medical centres. Childbirth is usually assisted by a midwife in the case of low-risk births, and/or an obstetrician; a paediatrician or neonatologist usually cares for the newborn.

In 2019, there were 37,468 live births in Uruguay, and the caesarean section rate was 45%. Five cases of maternal death were registered, translating into a maternal mortality rate of 13.3 per 100,000 live births. The infant mortality rate (deaths in the first year of life) was 6.8 per 1,000 live births and the neonatal mortality rate (deaths in the first month of life) was 4.5 per 1,000 live births, representing 168 neonatal deaths. Newborns below 1,500 g represented 1.1%, and preterm births, 9.6% of all live births.[8] In Uruguay, according to the Society of Gynaecology, the perinatal health workforce is composed of about 650 obstetrician/gynaecologists and 830 midwives,[9] 1,172 paediatricians and 254 neonatologists.[10]

Despite the low COVID-19 incidence in Uruguay in early 2020, several modifications in the organisation of maternal and newborn healthcare provision were implemented to avoid an increase in the rate of infection transmission in Uruguay as of March/April 2020. These measures included replacing face-to-face antenatal and postnatal consultations with telemedicine or cancelling the visits altogether, creating isolation beds for patients with suspected or confirmed COVID-19 during hospitalisation and prohibiting visitors for all patients. Patients and healthcare providers had to adapt quickly to these changes that affected almost every step of maternal and newborn care. These modifications altered the natural course of prenatal, intrapartum and postnatal care for the mother and newborn, with unknown impacts on healthcare providers involved in perinatal care. For example, in Uruguay, care providers followed the practice of separating neonates from mothers confirmed with COVID-19 immediately after birth, which was initially practised in the early pandemic globally.[11] These practices changed over time as the knowledge about modes of transmission (especially the very limited extent of vertical transmission) improved, and the WHO

issued guidance to promote non-separation, skin-to-skin practice and breastfeeding for all mothers and newborns, including those with confirmed COVID-19.[12]

Study design

This study is part of a global, cross-sectional survey of healthcare providers providing maternal and newborn healthcare services. We focus on the data provided by respondents who worked in Uruguay at the time they answered the survey. The online survey (available between March and July 2020) targeted health professionals directly providing maternal (antenatal, intrapartum and/or postnatal) or newborn care, including midwives, nurses, obstetricians/gynaecologists, neonatologists, and paediatricians, among others. Due to the unavailability of a global sampling frame for this study population, sampling was non-random and the global study is not intended to produce generalisable nationally-representative results of either health professionals or facilities. An invitation to complete the survey was distributed to healthcare providers through personal networks of the multi-country research team members, maternal/newborn platforms, and social media (e.g., Facebook, Twitter, WhatsApp groups). In Uruguay, the invitation to complete the survey was distributed through social media via personal and institutional accounts from University Hospitals, the Departments of Neonatology of the Faculty of Medicine, and the Paediatric Society. Reminders of the invitation were made each week for two months. Additional details about the study design, sampling and findings of the first round of the survey are available elsewhere.[6]

Questionnaire

The questionnaire was developed in English by a multidisciplinary team including health professionals, experts in health systems, maternal health epidemiologists and public health researchers from various global settings. The questionnaire was translated into several languages, including Spanish, by native speakers who work in the clinical, public health and maternal health fields. The translation was reviewed by Uruguayan co-authors and deemed suitable for local respondents. The questionnaire is provided in online supplementary file 1, including the English and Spanish versions.

We collected data on respondents' backgrounds, including the region where they work (open-text response). Their answers were categorised into three areas: Montevideo, interior north and interior south. The survey was composed of three core modules about the preparedness for COVID-19, response to COVID-19, and their own work experience during the pandemic. All respondents were also invited to participate in a fourth, optional module, which asked about adaptations to 17 care processes and the respondents' perceptions regarding changes in the uptake of care by women and newborns.

Data analysis

We analysed responses from Uruguay collected between 24 March 2020 and 5 July 2020, although 99% of these responses were submitted after 1 May 2020. We analysed close-ended questions by producing descriptive statistics (frequencies and percentages) using Stata/SE V.14 (StataCorp. 2015. Stata Statistical Software: Release 14. College

Station, TX: StataCorp LP). Responses in Spanish to open-text questions were translated to English by the research team and analysed using thematic analysis. We identified codes emerging from the data. All the answers were coded systematically and broad themes were developed by grouping the codes. When possible, we triangulated qualitative and quantitative findings to validate emerging themes.

Ethics

The global study was approved by the Institutional Review Board at the Institute of Tropical Medicine in Antwerp, Belgium under the number 1372/20. Respondents provided informed consent online by checking a box affirming that they voluntarily agreed to participate in the survey.

3 Results

We analysed data submitted by 180 healthcare providers working in Uruguay, the majority of whom worked in Montevideo (76%). Table 1 describes the participants' background and facility characteristics. Most of the respondents (81%) were female. Around two-fifths (41%) were neonatologists, followed by obstetricians/gynaecologists (16%). Three-quarters of the respondents were team members (73%) and 13% were heads of departments or wards. The most common types of care that respondents provided were inpatient postnatal care (64%), neonatal care for small and sick newborns (57%) and inpatient childbirth care (54%). About three-quarters of the respondents worked in hospitals (51% in referral hospitals and 23% in district/regional hospitals). More than half the respondents (58%) worked in public hospitals. The majority of the facilities where respondents worked provide caesarean sections (89%), accept referrals from other facilities (83%), have an intensive care unit (69%) and a neonatal intensive care unit (81%).

Information, training and guidelines on COVID-19 and maternal and newborn health

Figure 1 displays the proportion of healthcare providers who had access to information, guidelines, and training in the early phase of the pandemic. Almost all respondents reported receiving information from their facility on COVID-19 and maternal and newborn health. The most commonly reported themes on which respondents received information were infection-prevention measures, including donning and doffing of personal protective equipment (PPE), screening of patients for COVID-19 symptoms and referral of patients diagnosed with COVID-19 to other health facilities. Moreover, accessing information through informal sources was almost universal in the sample, and included seeking information through personal searches (97%) and asking for guidance from colleagues (99%). Despite the high proportion of respondents who had access to information, several concerns were reported in the open-text questions in this regard. In the early phase of the pandemic, respondents worried about not having a good amount of information because it was a new disease that they lacked experience managing. The evidence on COVID-19 and pregnancy was scarce at the time as a ***nurse reported:***

> *"[I am concerned] over the lack of experience on the management of the disease".*

Therefore, participants expressed that access to high-quality information could have supported them in the provision of care during the pandemic. Additionally, many respondents described that they would have benefitted from participating in trainings and drills. This is due to the fact that while nearly all respondents report receiving information on COVID-19, more than half (57%) did not receive any hands-on training from the facility where they worked (Table 1).

Table 1 - *Survey (n=180) and optional module (n=118) respondent characteristics*

	Survey; n (%)	Optional module; n (%)
Region		
Montevideo	136 (76)	85 (72)
Interior north	13 (7)	12 (10)
Interior south	28 (16)	20 (17)
Gender		
Female	145 (81)	95 (81)
Male	34 (19)	23 (19)
Cadre		
Neonatologist	74 (41)	46 (39)
Obstetrician/gynaecologist	28 (16)	22 (19)
Paediatrician	26 (14)	15 (13)
Nurse	25 (14)	15 (13)
General practitioner/Medical doctor	8 (4)	8 (7)
Medical resident	7 (4)	6 (5)
Other	9 (5)	5 (4)
Position		
Team member	132 (73)	89 (75)
Head of Department or Ward	24 (13)	16 (14)
Head of Team	17 (9)	7 (6)
Other	4 (2)	4 (3)
Type of care provided (multiple responses allowed)		
Inpatient PNC	116 (64)	80 (68)
Neonatal care (small and sick newborns)	103 (57)	66 (56)
Inpatient childbirth care	98 (54)	72 (61)
Inpatient ANC	42 (23)	31 (26)
Outpatient ANC	39 (22)	29 (25)
Outpatient PNC	34 (19)	25 (21)
Home visits	25 (14)	13 (11)
Surgical care	23 (13)	18 (15)
Outpatient Breastfeeding support	18 (10)	9 (8)
Abortion care	14 (8)	12 (11)
Post-abortion care	12 (7)	11 (9)
Community outreach	11 (6)	7 (6)
Other	2 (1)	2 (2)
Health facility level		
Referral hospital	92 (51)	62 (52)
District/regional hospital	41 (23)	28 (24)
Polyclinic	15 (8)	9 (8)
Clinic	15 (8)	10 (8)
Health centre	12 (7)	7 (6)
Other	2 (1)	1 (1)
Health facility sector		
Public (national)	57 (32)	37 (31)
Public (university or teaching)	46 (26)	32 (27)
Private for profit	38 (21)	23 (19)
Health insurance or HMO	18 (10)	14 (12)
Other	16 (9)	9 (7)
Type of area		
Large city (more than 1 million inhabitants)	122 (68)	76 (64)
Small city (100,000 to 1 million inhabitants)	31 (17)	22 (19)
Town (fewer than 100,000 inhabitants)	22 (12)	17 (14)
Village/Rural area	3 (2)	2 (2)
Facility characteristics		
Caesarean section provision	161 (89)	112 (95)
Accept referrals from other facilities	150 (83)	102 (86)
ICU available	125 (69)	84 (71)
NICU available	145 (81)	94 (80)

*Differential number of missing values across variables

Abbreviations: Antenatal care (ANC); Intensive care unit (ICU); Neonatal intensive care unit (NICU); Postnatal care (PNC)

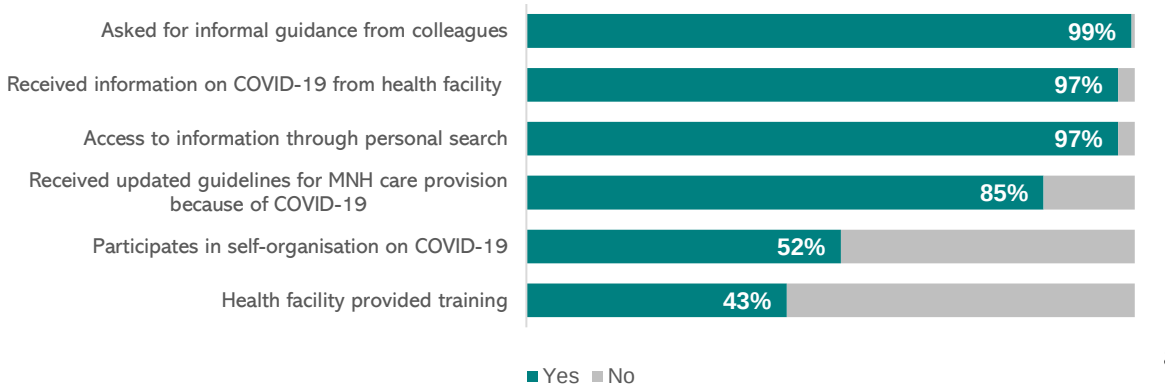

***Figure 1**: Maternal and newborn healthcare providers' access to information, training and updated guidelines, n=180*

Out of the 153 (85%) respondents who received updated clinical guidelines for COVID-19, 55% stated that the guidelines were from more than one source. The most commonly reported source of guidelines was the Uruguayan Ministry of Public Health (42%), followed by the WHO (35%) and internal facility-level guidelines (17%). The majority of respondents reported that it was mostly or very clear to them what to do in case they receive a patient with COVID-19 (Figure 2).

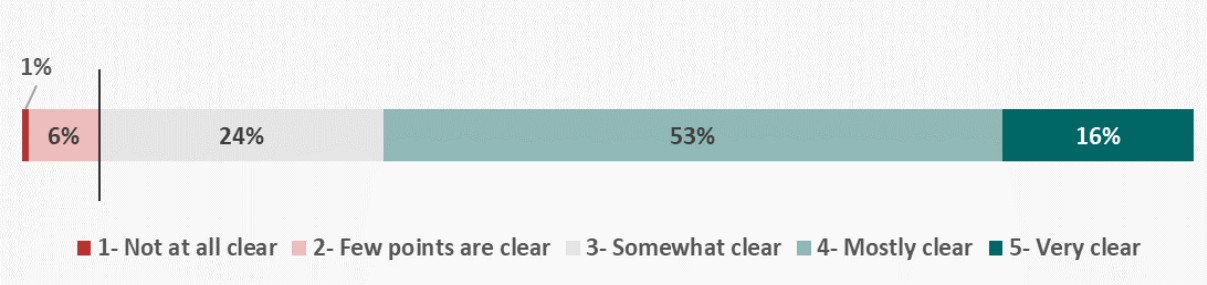

***Figure 2:** Healthcare providers' perception about knowing what to do in case they receive a COVID-19 patient (Likert scale), n=180*

During the early phase of the pandemic captured in this survey, 44% of the respondents from Uruguay indicated that the facility where they worked distributed materials on COVID-19 and maternal and newborn health to women. The most commonly-used means of information dissemination were websites (65%), leaflets (56%), and phone lines with advice (51%). These materials contained information mainly about infection prevention and control measures and information about COVID-19. Some respondents reported that the materials included information on new protocols for providing services instituted at the health facility considering the pandemic, including the use of telemedicine.

Response to COVID-19

Almost all the respondents from Uruguay indicated that the health facilities where they worked had set up isolation rooms for COVID-19 patients (96%) and established a clearly sign-posted entrance and screening area for COVID-19 symptoms (93%; Figure 3). In contrast, screening for COVID-19 symptoms among maternity patients was less commonly reported in our sample (49%), and 80% reported that testing was possible for maternity patients, while 18% reported that they did not know the answer to this question. The timing for obtaining SARS-CoV-2 test results was reported to be more than 48 hours by 44% of the respondents. In the open-text responses, some healthcare providers expressed a fear of the collapse of the healthcare system. Additionally, many healthcare providers were concerned about the lack of resources, such as sufficient isolation rooms, COVID-19 tests and ventilators.

Healthcare providers' experiences and concerns

Around half the respondents (46%) from Uruguay considered that they felt well or completely protected in the workplace in the early phase of the pandemic. Three-quarters of the respondents reported that they had sufficient aprons (75%) and face masks (76%), while almost all healthcare providers (93%) reported having sufficient gloves. The implemented infection prevention and control measures were considered of utmost importance by respondents, as a ***neonatologist mentioned*** the need to continue their application after the pandemic:

"This pandemic caught us off guard; perhaps many hygiene behaviours should be continued over time after this period has passed".

Fifty-five percent of the respondents perceived that the COVID-19 pandemic had affected their work in various ways. Many respondents mentioned that the outpatient clinics or polyclinics closed during the early

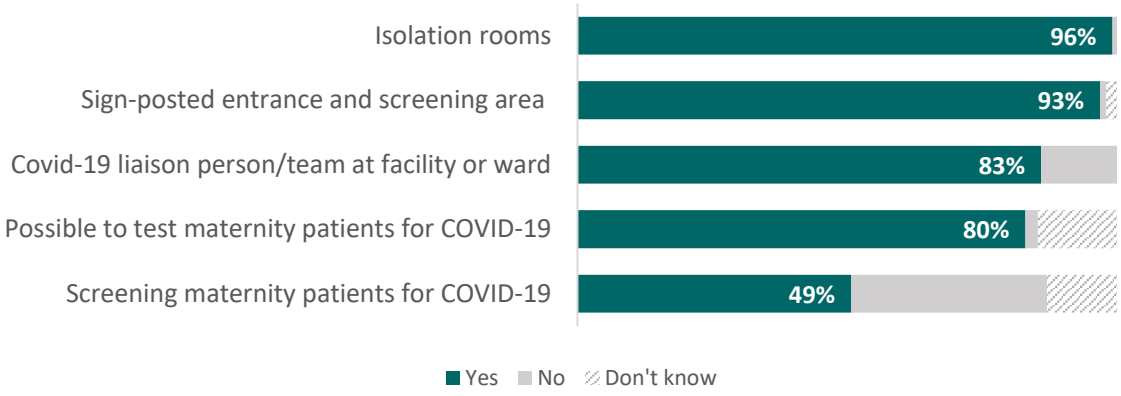

Figure 3: *Response to COVID-19 among maternal and newborn health professionals at respondents' workplaces, n=180*

phase of the pandemic, thus leading healthcare providers to work shorter hours and lose a portion of their income, as *expressed by a neonatologist:*

"I'm a doctor. After getting my degree, I decided to be a neonatologist. I did it. I spent years studying. What for? I don't know. I lost all my hours to personnel reduction. And I don't know what to do with my life now".

Moreover, some respondents reported stopping academic activities such as teaching, while others reported teaching remotely. On the other hand, some healthcare providers reported having to work longer hours. Respondents mentioned that their work had changed due to the redistribution of staff by applying new shift patterns to reduce the contact between healthcare providers themselves, and between healthcare providers and patients. A *paediatrician* living in a city far from the capital Montevideo indicated having *"more hours of work and loss of empathy with the patients*".

Many respondents noted that during the early phase of the pandemic, they were working from home, using the phone to provide care, and having fewer face-to-face interactions with patients. Some respondents expressed that it was difficult for them to communicate and have empathy with patients without seeing them face-to-face. On the other hand, multiple respondents mentioned that there were administrative improvements resulting from the use of technology, such as sending laboratory results over the phone and making appointments using digital systems. These changes were perceived as positive by respondents and considered to be useful to remain in application after the pandemic period, as *expressed by an obstetrician/gynaecologist:*

"[I have a] doubt in which way as a society we will return to the "new normal" and if the positive changes in the use of technology at the service of the user will remain, or we will return to the old administrative demands".

The majority (84%) of respondents reported that their stress levels during this early phase in the pandemic were somewhat or substantially higher than usual (pre-pandemic). Many respondents reported being concerned about the mental health of healthcare providers. The most frequent concerns related to their own risk of COVID-19 infection, mental health wellbeing, and access to emotional and psychological support (Figure 4). Those concerns were accompanied by the lack of PPE and hygiene protocols. For example, an **obstetrician/gynaecologist** was concerned about:

"the high contagiousness [level of the virus] and that we are not physically prepared in regards to materials to care for all health personnel".

Another factor was the awareness level in the community and the willingness of community members to implement infection prevention and control measures.

Neonatologist:

"I spent years studying. What for? I don't know. I lost all my hours to personnel reduction"

Figure 4: *Most commonly mentioned concerns of perinatal healthcare providers from Uruguay in the early phase of the COVID-19 pandemic, n=180*

Many respondents noted that during the early phase of the pandemic, they were working from home, using the phone to provide care, and having fewer face-to-face interactions with patients. Some respondents expressed that it was difficult for them to communicate and have empathy with patients without seeing them face-to-face. On the other hand, multiple respondents mentioned that there were administrative improvements resulting from the use of technology, such as sending laboratory results over the phone and making appointments using digital systems. These changes were perceived as positive by respondents and considered to be useful to remain in application after the pandemic as expressed by an *obstetrician/gynaecologist:*

"[I have a] doubt in which way as a society we will return to the "new normal" and if the positive changes in the use of technology at the service of the user will remain, or we will return to the old administrative demands".

The majority (84%) of respondents reported that their stress levels during this early phase in the pandemic were somewhat or substantially higher than usual (pre-pandemic). Many respondents reported being concerned about the mental health of healthcare providers. The most frequent concerns related to their own risk of COVID-19 infection, mental health wellbeing, and access to emotional and psychological support (Figure 4). Those concerns were accompanied by the lack of PPE and hygiene protocols. For example, an

obstetrician/gynaecologist was concerned about:

"the high contagiousness [level of the virus] and that we are not physically prepared in regards to materials to care for all health personnel".

Another factor was the awareness level in the community and the willingness of community members to implement infection prevention and control measures.

Provision of maternal and newborn care during COVID-19

In this section, we summarise the responses written by 118 (66%, n=180) healthcare providers who agreed to answer the optional module.

The closure of polyclinics and the shift to the provision of care through telemedicine were causes for concern among some respondents, as mentioned by a paediatrician:

"In my country […] the controls of the pregnant [women] and the newborn children are becoming more spaced or have even been suspended, becoming virtual. I am concerned that treatable and preventable pathologies will be overlooked with the distraction of the COVID era".

Paediatrician:

"I am concerned that treatable and preventable pathologies will be overlooked"

This fear was exacerbated by the impression that several healthcare providers had about the decrease in the number of women accessing healthcare, possibly because of the fear of becoming infected with SARS-CoV-2 in healthcare facilities. Many healthcare providers expressed deep concerns about maintaining the provision of high-quality care to women and newborns, including to those infected with COVID-19. Additionally, ensuring that human rights for pregnant women and newborns are respected and not lost was a top priority for respondents who were against the separation of newborns from mothers with COVID-19. For example, a *paediatrician* expressed the need to:

"[…] respect the rights of mothers, babies and families and comply with COVID-19 prevention care at the same time".

The main changes reported regarding the provision of intrapartum care were related to the rules of companionship during labour and childbirth as well as changes in visiting hours and the number of visitors, which meant that women who had given birth in health facilities during the pandemic had less support from their family members. An *obstetrician* indicated as a concern that:

"in case of a C-section the access of the father to the block was forbidden during a period, and visits to the hospital during the puerperal period are forbidden".

There were variations in the report of the changes in providing caesarean sections. Some participants mentioned that there was an increase in the provision of caesareans, others explained that patients scheduled to have an elective caesarean section were tested for SARS-CoV-2 before the procedure, while other respondents noted that elective caesareans were not allowed during that period of time.

Shortened length of stay in facilities after childbirth was the most commonly mentioned change in the postpartum period. Nonetheless, healthcare providers also noted that mothers and newborns were followed-up after discharge either through using technology, particularly phone calls, or by providing care during home visits. The shortage of healthcare providers meant that the follow-ups were not as frequent as they should have been, as expressed by a *paediatrician* from a city far from Montevideo:

"The assistance of the newborn outpatient is in their home but the numbers of controls are diminished because of insufficient medical personnel."

Paediatrician:

"[…] respect the rights of mothers, babies and families"

Newborn intensive care unit at the Department of Neonatology, Hospital de Clínicas, Montevideo, Uruguay

4 Discussion

This is the first study looking at the effect of the COVID-19 pandemic on the provision of maternal and newborn care in Uruguay. We benefited from a global survey of health providers, translated into Spanish, to capture the preparedness, response and effect of the pandemic during the early phase on maternal and newborn healthcare providers. We found that most respondents accessed information related to COVID-19 and maternal health. Despite the low incidence of COVID-19 in Uruguay during the study period, more than half of the respondents perceived that they had adequate levels of knowledge regarding the provision of maternal and newborn care to patients with COVID-19. Our results show that there was a major reorganisation of the models to provide maternal and newborn care, including elements such as decreasing the amount of face-to-face medical consultations, increasing home visits, especially for follow-ups in the postpartum period, and increased use of telemedicine. This substantially affected not only women and newborns, but also the healthcare providers.

The characteristics of the respondents in Uruguay were different in comparison to the global sample.[6] To begin with, in Uruguay, more than half the sample was neonatologists or paediatricians, whereas these cadres consisted of a minority in the global sample. Consequently, the types of care provided by the Uruguayan respondents were inherently different, with inpatient postnatal care and neonatal care being the top two categories. This is due to the questionnaire being mostly distributed by neonatology or paediatric institutions in Uruguay. Additionally, more healthcare providers from Uruguay worked in tertiary hospitals compared to the global sample, perhaps because more than 95% of births occur in hospitals in this country. In terms of preparedness, levels of access to training and information provided by the healthcare facility were similar to the global sample, yet a larger proportion of Uruguayan respondents received updated guidelines for maternal and newborn health provision because of COVID-19 compared to the global sample.[6] The fact that such a high percentage of respondents worked within referral hospitals could explain the high percentage of healthcare providers who had access to information through other informal sources, which was almost universal in our sample, including through personal searches and by asking for guidance from colleagues. Healthcare providers in referral hospitals usually have the habit and are trained on searching for scientific evidence on a personal level to answer clinical questions, beyond having access to hospital guides.

In Uruguay, and although the pandemic was not highly spreading at the time of the survey, our respondents reported that the reorganisation of health services led to a decrease in the number of pregnant women receiving in-person care in health centres. This increased concerns among healthcare providers about overlooked pathologies due to the impossibility of making an adequate clinical assessment, and about guaranteeing the rights of mothers, children and families during the care process.

Healthcare providers had mixed perceptions regarding caesarean sections, as some reported that the procedure increased, while others mentioned that it decreased, depending on the health institution where they worked and the patient's condition of having COVID-19. Postnatal care was affected by shortening the duration of stay in hospitals after birth, increasing home visits and providing care through phone calls or the internet. In this sense, some studies have shown that the reorganisational changes of the health system promoted potential improvements in the use of telemedicine for parents, follow-up of patients including newborns and training of healthcare providers, as well as the better use of scientific evidence for the communication among members of the perinatal health team.[13]

Aspects of the response at the health-facility level were mostly similar between Uruguay and the global sample, except for screening the temperature and COVID-19 symptoms of maternity patients, which was less reported by Uruguayan respondents compared to the global sample. In line with the epidemic situation, a smaller proportion of healthcare providers in Uruguay reported that their work was affected by the outbreak compared to the global sample. Nonetheless, the situation still had an impact on healthcare providers' wellbeing as they reported experiencing higher levels of stress during this period.

Healthcare providers endured working under these conditions for many months without receiving COVID-19 patients and felt that the pandemic negatively affected their professional lives in many ways: number of births, number of patients in hospitals and their incomes. Some physicians referred to losing up to 60–70% of their income. Many of those were junior medical staff who are employed on a contractual basis. This phenomenon was reported in many countries.[14]

As virtual communications were encouraged to reduce the spread of the virus, routine activities such as lectures and other teaching activities increased substantially in both the amount of time and sessions due to the usage of different online platforms. For example, Zoom and Google Classroom's rate of use increased significantly, especially during the lockdown in many cities, raising questions about the effectiveness of learning with these techniques.[15, 16]

In Uruguay, many administrative procedures required for healthcare provision are made only in face-to-face modality and exclusively via written documents. The shift to electronic administrative processes during the pandemic signified a massive change in the system. This highly bureaucratic society linked to inefficiency in many aspects could have improved through the changes implemented during the pandemic, and as a result, administrative efficiency was gained. This could lead to greater user satisfaction and at the same time, decrease the number of individuals involved in every office procedure, previously conducted face-to-face and now shifted to be done remotely.[17] As a result, the conversion of many sources of employment will be a challenge since it is likely that these aspects of the new normal persist.[18] This is particularly considerable for healthcare systems, as was reported for different medicine subspecialties such as the development of telepsychiatry, a key subspecialty to support mental health during the pandemic.[19]

Faced with a pandemic, and particularly during its beginning, even without a high number of cases within the country, respondents shared that induced stress levels increased. The lack of some materials for PPE, flow diagrams for patients or hygiene protocols increases stress. For most

people, stress-related symptoms will resolve without intervention. Some healthcare institutions provide mental health support virtually and without charge to faculty, staff and trainees.[20] However, if not addressed adequately, these symptoms may contribute to burnout and functional impairment among healthcare providers. Therefore, identifying those healthcare providers exposed to high levels of stress is a key issue to maintaining well-functioning healthcare organisations during health system shocks.

5 Conclusion

This study, conducted during the first months of the COVID-19 pandemic, described the response and the preparedness in Uruguay from the perspective of maternal and newborn healthcare providers working in the public and private sectors. Our findings showed that there was a lack of knowledge among healthcare providers about both, the use of materials and the training, as well as the decisions to be made in clinical practice in case of receiving maternity patients confirmed with COVID-19. The most common concerns reported by healthcare providers included inadequate access to information, loss or decrease in income, risk of acquiring COVID-19 infection in the workplace, increased stress levels, shortage of resources needed to prevent, diagnose and manage COVID-19, and negative impacts of the pandemic's mitigation measures on women's and newborns' access to high quality of care. This resulted in an impact on mental health and additional stress for healthcare providers. Additionally, several maternal and newborn care processes changed during the pandemic, including a notable shift to telemedicine and home visits in the postnatal period, and the digitalisation of administrative processes. Knowing this impact can help improve the communication channels of healthcare providers to achieve an improvement in patient care during healthcare system crises such as the pandemic.

Acknowledgements

We would like to thank the study participants who took the time to respond to this survey despite the difficult circumstances and increased workload. We acknowledge the Institutional Review Committee at the Institute of Tropical Medicine for providing helpful suggestions on this study protocol and for the expedited review of this study. We would like to thank all study collaborators and colleagues who distributed the invitation for this survey and provided suggestions on the questionnaire, including the co-authors of this report. We are immensely grateful to all those who volunteered to translate the survey. We are grateful to Mr Ritwik Dahake for English-language editing and Ms Merel van Vuren for report formatting.

Contributors

All authors conceptualised the study. All authors contributed to the design of the study and development of the survey tool. LV, FF and AS analysed the data. AS, LB, FB, LV, VS and MR wrote the original draft of the manuscript. All authors contributed to the development of the manuscript and read and approved the final version.

The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

Funding

This work received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

References

1. World Health Organization. WHO Coronavirus (COVID-19) Dashboard 2021 [Available from: https://covid19.who.int/ accessed June 2021.

2. Litewka SG, Heitman E. Latin American healthcare systems in times of pandemic. *Dev World Bioeth* 2020;20(2):69-73. doi: 10.1111/dewb.12262 [published Online First: 2020/04/20]

3. Pan American Health Organization. Latin America and the Caribbean surpass 1 million COVID deaths 2021 [Available from: https://www.paho.org/en/news/21-5-2021-latin-america-and-caribbean-surpass-1-million-covid-deaths. Accessed June 2021.

4. Taylor L. Uruguay is winning against covid-19. This is how. *BMJ* 2020;370:m3575. doi: 10.1136/bmj.m3575

5. Sistema Nacional de Emergencias. Informe de situación sobre coronavirus COVID-19 en Uruguay 2021 [Available from: https://www.gub.uy/sistema-nacional-emergencias/comunicacion/noticias/informacion-actualizada-sobre-coronavirus-covid-19-uruguay accessed June 2021.

6. Semaan A, Audet C, Huysmans E, et al. Voices from the frontline: findings from a thematic analysis of a rapid online global survey of maternal and newborn health professionals facing the COVID-19 pandemic. *BMJ Glob. Health* 2020;5(6):e002967. doi: 10.1136/bmjgh-2020-002967

7. The World Bank. World Development Indicators [Available from: https://datatopics.worldbank.org/world-development-indicators/. Accessed June 2021.

8. Ministerio de Salud Pública. Estadísticas Vitales 2021 [Available from: https://uins.msp.gub.uy/ accessed June 2021.

9. Sociedad Ginecología del Uruguay. www.sguruguay.org. Accessed June 2021

10. Cavalleri F, León I, Perez W. ¿ Faltan pediatras en Uruguay?: Estudio de la oferta y demanda de pediatras 2012-2025. *Archivos de Pediatría del Uruguay* 2016;87(4):315-22.

11. Puopolo, K., Hudak, M. L., Kimberlin, D. W., & Cummings, J. (2020). Management of infants born to mothers with COVID-19 date of document: April 2, 2020. Am AcadPediatr Comm Fetus Newborn Sect Neonatal Perinat MedComm Infect Dis, 6, 66.

12. World Health Organization. Maintaining essential health services: operational guidance for the COVID-19 context interim guidance (2020) [Available from: https://www.who.int/publications/i/item/WHO-2019-nCoV-essential-health-services-2020.1. Accessed June 2021.

13. Klingenberg C, Tembulkar SK, Lavizzari A, et al. COVID-19 preparedness-a survey among neonatal care providers in low- and middle-income countries. *J Perinatol* 2021;41(5):988-97. doi: 10.1038/s41372-021-01019-4 [published Online First: 2021/04/13]

14. Sim MR. The COVID-19 pandemic: major risks to healthcare and other workers on the front line. *Occup Environ Med* 2020;77(5):281-82. doi: 10.1136/oemed-2020-106567 [published Online First: 2020/04/03]

15. Radha R, Mahalakshmi K, Kumar VS, et al. E-Learning during lockdown of Covid-19 pandemic: A global perspective. *Int. J. Control. Autom.* 2020;13(4):1088-99.

16. Emergency Online Learning at the Universidad De La República, Uruguay: Challenges for the Post-Pandemic Digital University. EDEN Conference Proceedings; 2020.

17. Gofen A, Lotta G. Street-Level Bureaucrats at the Forefront of Pandemic Response: A Comparative Perspective. *J. Comp. Policy Anal.: Res. Pract.* 2021;23(1):3-15. doi: 10.1080/13876988.2020.1861421

18. Sharma M, Luthra S, Joshi S, et al. Developing a framework for enhancing survivability of sustainable supply chains during and post-COVID-19 pandemic. *Int. J. Logist. Res. Appl.* 2020:1-21. doi: 10.1080/13675567.2020.1810213

19. Shore JH, Schneck CD, Mishkind MC. Telepsychiatry and the Coronavirus Disease 2019 Pandemic—Current and Future Outcomes of the Rapid Virtualization of Psychiatric Care. *JAMA Psychiatry* 2020;77(12):1211-12. doi: 10.1001/jamapsychiatry.2020.1643

20. Krystal JH. Responding to the hidden pandemic for healthcare workers: stress. *Nat. Med.* 2020;26(5):639-39.