Özgün Araştırma | Original Article

Jinekoloji - Obstetrik ve Neonatoloji Tıp Dergisi
The Journal of Gynecology - Obstetrics and Neonatology

DOI: 10.38136/jgon.102350

Perceptions of Obstetricians, Midwives, and Patients Towards the Delivery Table Shield: Survey on a Novel Protective Equipment

Kadın Doğum Uzmanları, Ebeler ve Hastaların Doğum Masası Siperliğine Yönelik Algıları: Yeni Bir Koruyucu Ekipman ile İlgili Anket Çalışması

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ÖZ

Amaç: Bu çalışma, COVID-19 şüphesi olan veya doğrulanmış kadınların vajinal doğumlarının ikinci aşaması sırasında kullanımı için tasarladığımız doğum masası siperliğine (DTS) ilişkin doktorların, ebelerin ve hastaların algılarını değerlendirmeyi amaçladı.

Gereç ve Yöntemler: Bu kesitsel çift merkezli çalışmada, ikinci evrede DTS kullanımı deneyimi olan doktorlara/ebelere (n = 224) ve COVID-19 şüphesi olan veya doğrulanmış COVID-19 hastalarına (n = 154) yarı yapılandırılmış anketler uygulandı. . Tüm istatistiksel analizler, kategorik değişkenleri karşılaştırmak için ki-kare testi kullanılarak yapıldı ve ikili karşılaştırmalar ki-kare testi ile yapıldı. p değeri < 0.05 istatistiksel olarak anlamlı kabul edildi.

Bulgular: Örneklemdeki sağlık hizmeti sunucularından 180'i (%80,4) DTS ile güvende hissettiğini belirtti; 204 (%91,1)'ü DTS kullanımında herhangi bir sorunla karşılaşmadığını; 171 (%76.3) DTS'nin herhangi bir obstetrik aciliyette müdahaleyi karmaşıklaştırmadığını düşündüğünü bildirdi. Hastaların 131'i (%85) kendilerini güvende hissettiklerini ve herhangi bir sorun yaşamadıklarını; 141 (%91,6)'i DTS'nin anne-bebek bağını etkilemediğini belirtmiş ve anne adaylarına DTS ile vajinal doğumu önermişlerdir.

Sonuç: Çalışma, COVID-19 şüphesi olan veya doğrulanan kadınların vajinal doğumlarının ikinci evresinde DTS kullanımının, optimal doğum koşullarından ödün vermeden kadın doğum uzmanları ve ebeler için avantajlı olduğunu desteklemiştir.

Anahtar Kelimeler: COVID 19; doğum; ebelik; kişisel koruyucu ekipman

ABSTRACT

Aim: This study aimed to evaluate perceptions of doctors, midwives, and patients regarding our designed delivery table shield (DTS) during second stage of vaginal deliveries of women with suspected or confirmed COVID-19.

Materials and Methods: In this cross-sectional double-center study, semi-structured questionnaires were administered to doctors/midwives (n = 224) and patients with suspected or confirmed COVID-19 (n = 154) with experience on use of DTS during second stage. All statistical analyses were performed using the chi-square test to compare the categorical variables and pair-wise comparisons were performed via the chi-square test. A p-value < 0.05 were considered statistically significant.

Results: Of the sample healthcare providers, 180 (80.4%) stated being safe with DTS; 204 (91.1%) stated not encountering any problem using the shield; 171 (76.3 %) thought the DTS does not complicate the intervention in any obstetric urgency. 131 (85%) of patients stated feeling safe and not having any problem; 141 (91.6%) stated that DTS did not affect mother-baby bonding and suggested vaginal delivery with DTS to expectant mothers.

Conclusion: The study supported that using DTS during second stage of vaginal delivery of women with suspected or confirmed COVID-19, is advantageous for obstetricians and midwives without compromising optimal labor conditions.

Keywords: COVID-19; delivery; midwifery; personal protective equipment

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Başvuru tarihi : 01.12.2021
Kabul tarihi : 14.02.2022

INTRODUCTION

The global outbreak of COVID-19, transmitted by acute respiratory syndrome coronavirus 2 (SARS-CoV-2), caused unpredictable challenges to medical professionals, required immediate intensive care management and application of modern medical equipment. Healthcare workers face uncertainty about disease spectrum, safety, and capacities of health care systems in addition to increased viral infective dose (viral load), which is an independent factor responsible for the illness severity (1). Additional difficulties to manage are anxious mental state, heavy workload, the prospects for fulfilling their duty efficiently, and anxiety of being infected and infecting their family members. Persistent exposure to stress and ongoing mental health symptoms can lead to long-term professional burnout (2). Inefficient strategies for staff protection, problems of personal protective equipment (PPE), and working on frontline by face-to-face communication with patients weaken healthcare workers (3). Although access to PPE significantly reduced clinical infections, availability, standards, and the rationing of PPE is still a dilemma globally (4,5). A systematic review of 19 randomized studies showed that continuous use of respirators was more protective than medical masks in healthcare settings. Furthermore, the effectiveness of masks depends on the fabric and the design (5,6). Additionally; lack of scientific data has raised concerns regarding PPE standards, as the documents are not based on rigorous evidence (7).

The second stage of labor is the riskiest period in obstetrics in terms of transmission (8). Innovations providing satisfaction for not only healthcare workers but also expectant mothers and newborn babies will facilitate the vaginal delivery management of women with suspected/confirmed COVID-19.

This study aimed to evaluate perceptions of doctors, midwives, and patients toward usage of delivery table shield (DTS) during second stage of vaginal deliveries of women with suspected or confirmed COVID-19.

MATERIALS AND METHODS

This cross-sectional, double-center study was conducted between 1st July to 30th September 2020. The study is complied with all relevant national regulations, institutional policies and is in accordance with the tenets of the Helsinki Declaration (as revised in 2013), and has been approved by the authors' 'Institutional Review Board' (No: 72300690-799). Informed consent was obtained from all participants.

Since May 2020, during the pandemic, our delivery shield has routinely been used for the second stage of labor for patients with suspected or confirmed COVID-19. This study is complementary to the study in which the delivery table shield was first described (9). Current study was planned with the co-authors of referenced study to assess perceptions of healthcare professionals and patients (9). This protective equipment consists of transparent 180-micron nylon clothing and polypropylene random copolymer pipes that allow it to hold onto the delivery table. Its upper nylon component is disposable and poses no barrier to the respiration of the mother. In addition, it provides eye contact between the mother and physician (Figure 1).

Figure 1. Application of the delivery table shield (simulation)

Ankara City Hospital, one of the study centers, is a new tertiary reference center in the capital of Turkey. The Department of Obstetrics and Gynecology is one of the main national pandemic centers in our country. A total of 1111 pregnancies with suspected or diagnosed COVID-19 have been followed up since the beginning of the pandemic. In this period, 269 pregnant women with confirmed COVID-19 were delivered; 186 cases by cesarean section and 83 cases by vaginal delivery (10, 11). Kanuni Sultan Suleyman Education and Research Hospital, other participating center, is one of the largest public hospitals in İstanbul actively working since the beginning of the pandemic. During the pandemic, 928 pregnant women with COVID-19 were put in obstetric care, and 425 of them delivered with a vaginal delivery rate of 44 %.

Self-administered, semi-structured questionnaires for doctors and midwives were designed to evaluate the safety and availability of DTS. Healthcare professionals (n=225; 90 specialists, 96 residents, and 40 midwives) who manage and patients (n=154) who experienced the vaginal delivery with DTS, were delivered the questionnaires. Tables 1 and 2 listed the questions. Questionnaires were applied immediately after birth, and the participants were asked not to declare their identity to ensure objectivity. Patients with COVID-19 were diagnosed with real-time polymerase chain reaction (PCR) and grouped as confirmed cases. Cases with clinical manifestations (fever and/or respiratory symptoms, laboratory, and imaging features) and epidemiological history were grouped as suspected cases.

Statistical analyses were performed using SPSS version 21 (IBM Corp., Armonk, NY, USA). Continuous variables were presented as mean and standard deviations. Categorical variables were presented as numbers and percentages. A Chi-square test was conducted to compare the categorical variables of the study groups. When statistically significant differences were found between the main study groups, pairwise comparisons were performed via the chi-square test. A p-value less than 0.05 was regarded as statistically significant.

RESULTS

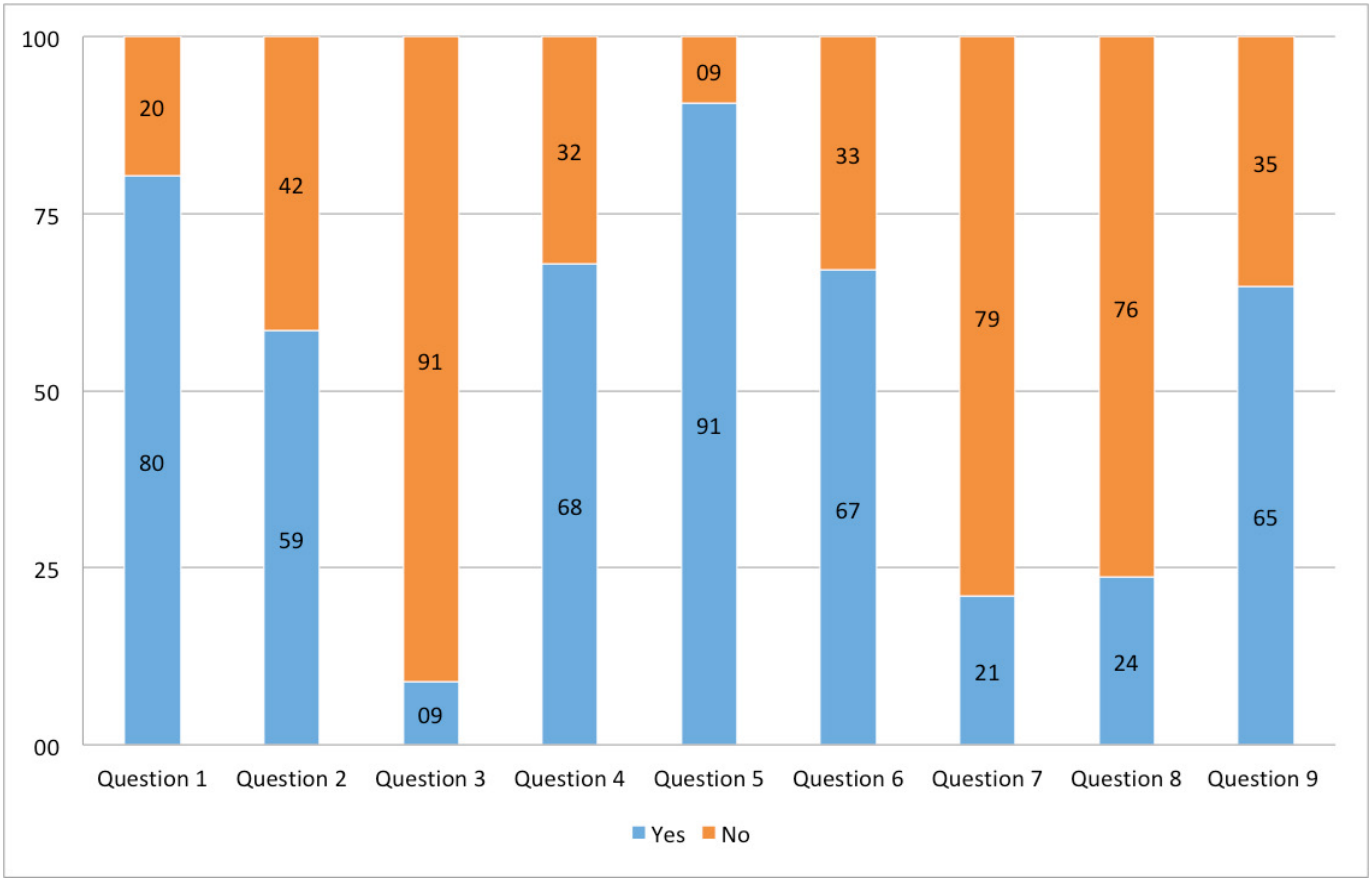
224 healthcare professionals participated in the survey: 90 (40.2%) obstetrics and gynecology specialists, 96 (42.9%) obstetrics and gynecology residents, and 38 (17%) midwives. The mean age was 34.12 (range 21- 53); 44 (19.6%) of participants had more than 10-year experience, and 113 (50.4) had 5-10 years of experience. 131 (58.5%) of healthcare professionals stated that they felt more anxious when managing the delivery of women with suspected or confirmed COVID-19 than disease-free pregnancies. A total of 180 (80.4%) healthcare professionals stated that they felt safe with the DTS during the second stage of labor. 204 (91.1%) of the healthcare professionals did not encounter any problem using the shield, 20 (8.9%) healthcare professionals complained about the problems regarding patient compliance (6.2%) and difficulty in communicating with patients (2.7%). A total of 152 (67.9%) healthcare professionals considered the delivery shield to be suitable for maternal and fetal adaptation, 150 (67%) mentioned that vaginal delivery with DTS is safer compared to the cesarean section or vaginal delivery without the protective shield. In addition, 171 (76.3 %) participants agreed that the DTS did not complicate the intervention in any obstetric urgency. 203 (90.6%) respondents thought that DTS was advantageous during the second stage of labor, and 145 (64.7%) of them supported the routine use of all deliveries in the pandemic, regardless of the women's COVID-19 status. Table 1 and Figure 2 show the responses of doctors and midwives. The responses of the specialists, residents, and midwives were similar except for the responses of the two questions. When we compared the response of residents with that of specialists, the residents were more anxious with the delivery management of pregnant women with COVID-19 (54% vs. 30%, $p < 0.01$). Of the participants, 4.4% of specialists, 15.6% of residents, and 2.6% of midwives stated that they had problems using DTS. In comparison, residents stated having more problems than that of specialists ($p = 0.02$) (Table 1).

Table 1. Responses of obstetricians and midwives to questionnaire

	Yes, n/N (%)			No, n/N (%)			
	Specialist	Resident	Midwife	Specialist	Resident	Midwife	p
Q1. Did you feel safe with DTS during the second stage of labor?	78/90 (86.7%)	71/96 (74%)	31/38 (81.6%)	12 /90 (13.3%)	25/96 (26%)	7 /38 (18.4%)	0,091
Q2. Is the labor of a patient with COVID-19 more anxious to manage than a COVID-19 negative pregnant?	27/90 (30%)	52/96 (54.2%)	14/38 (36.8%)	63/90 (70%)	44/96 (45.8%)	24/38 (63.2%)	**0,003**
Q3. Did you have any problem while using the DTS?	4/90 (4.4%)	15/96 (15.6%)	1/38 (2.6%)	86/90 (95.6%)	81/96 (84.4%)	37/38 (97.4%)	**0,009**
Q4. Is DTS suitable for maternal- fetal adaptation?	65/90 (72.2%)	57/96 (59.4%)	30/38 (78.9%)	25/90 (27.8%)	39/96 (40.6%)	8/38 (21.1%)	0,47
Q5. Is it advantageous to use DTS during the second stage of labor?	84/90 (93.3%)	83/96 (86.5%)	36/38 (94.7%)	6/90 (6.7%)	13/96 (13.5%)	2/38 (5.3%)	0,174
Q6. Do you think that vaginal delivery with DTS is safer than the vaginal delivery without DTS or cesarean section?	67/90 (74.4%)	55/96 (57.3%)	28/38 (73.7%)	23/90 (25.6%)	41/96 (42.7%)	10/38 (26.3%)	0,110
Q7. Do you think that facemask alone is safer than the DTS?	15/90 (16.7%)	25/96 (26%)	7/38 (18.4%)	75/90 (83.3%)	71/96 (74%)	31/38 (81.6%)	0,267
Q8. Does DTS complicate the intervention in case of any obstetric urgency?	23/90 (25.6%)	26/96 (27.1%)	4/38 (10.5%)	67/90 (74.4%)	70/96 (72.9%)	34/38 (89.5%)	0,109
Q9. Is it reasonable to use the DTS in all deliveries during pandemic regardless of COVID 19 status?	59/90 (65.6%)	65/96 (67.7%)	21/38 (55.3%)	31/90 (34.4%)	31/96 (32.3%)	17/38 (44.7%)	0,388

Q: question, DTS: delivery table shield

Figure 2. Responses of healthcare professionals in percentages (Table 1 lists the question 1-9).



The number of patients who participated in the survey was 154. The mean age was 28.2□5.7. 118 (77%) were diagnosed with COVID-19 before delivery. The remaining 36 were suspected cases at the time of delivery and 10 of them were confirmed in the postpartum period. 131 (85.1%) patients stated they felt safe with DTS during second stage of labor. On the other hand, 23 (14.9) patients mentioned at least 1 complaint. Of these 23 patients, 10 had one complaint, 8 patients had 2, and 5 patients had 3 or more complaints. 17 (11%) patients complained about trouble regarding communication with doctors/midwives, 13 (8.4%) patients complained of shortness of breath and feeling incomfort; 8 (5.2%) complained of sweating, and 9 (5.8%) stated that they had the feeling of stigmatization. Of the patients, 141 (91.6%) stated that DTS did not affect mother-baby bonding, and 143 (92.9%) mentioned that DTS was healthy for the baby. Of the patients, 141 (91.6%) suggested vaginal delivery with DTS to expectant mothers. Table 2 presents details of patients' responses.

Table 2. Responses of patients to questionnaire

	Yes n (%)	No n (%)
Q1. Did you feel safe during the delivery?	131 (85.1%)	23 (14.9%)
Q2. Did you have any problem with DTS during delivery?	23 (14.9%)	131 (85.1%)
Q3. Would you prefer a caesarean section instead of vaginal delivery with DTS?	30 (19.5%)	124 (80.5%)
Q4. Do you think it affects mother- baby bonding negatively?	13 (8.4%)	141 (91.6%)
Q5. Do you think DTS is healthy for the baby?	143 (92.9%)	11 (7.1%)
Q6. Would you recommend vaginal delivery with DTS to expectant mothers?	141 (91.6%)	13 (8.4%)

Q: question, DTS: delivery table shield

DISCUSSION

The results confirmed that our delivery shield can support obstetric management during the pandemic. The majority of obstetricians and midwives stated they felt safe with DTS during the second stage of labor, and only 8.9 % mentioned a problem using the device. Of the obstetricians and midwives, 90.6% stated that DTS facilitated the management of labor, and 65% mentioned that the device should be used in all deliveries during the pandemic, regardless of COVID-19 status. Additionally, 85% of patients stated feeling safe with DTS during the second stage of labor. Over 90% of patients stated that DTS did not affect mother-baby bonding and suggested using DTS for vaginal delivery to expectant mothers.

COVID-19 virus is transmitted between people through respiratory droplets and contact routes (12). The potential for aerosolization caused by forceful exhalation during the second stage of labor must be taken into consideration when planning intrapartum care (13). In delivery units, regulatory actions to increase access to PPE for obstetricians are crucial (13). In the perspective of the real possibility of next waves and mutations, in addition to clarifying the guidelines, improving the measures to be taken in terms of protective equipment is also important to encourage healthcare providers in fight against COVID-19 and other possible outbreaks in the future.

Although the majority of pregnant women suspected or confirmed COVID-19 delivered through cesarean section during pandemic, the mode of delivery should be based on obstetric indications and vaginal delivery should be considered for multiparous patients with available effacement and dilatation (13-15). Reducing the risk of transmission during vaginal delivery will make obstetricians and midwives feel safe and contribute their orientation to vaginal delivery. In the current survey, 67% of the professionals mentioned that labor with DTS was safer compared to the cesarean section or vaginal delivery wit-

hout a protective shield. However, 8.9% of healthcare professionals stated having problems using DTS. The residents who have problems with the DTS were higher than that of specialists (p = 0.02). Thus, professional experience and expertise may influence the objectivity. A novel device may have caused discomfort due to tendency on regular practices. We believe these problems could be solved with routine use of the device. Patient compliance and difficulty in communication are the problems participants mentioned rather than a hindrance or restriction. When we asked this group whether the problems prevented them managing the labor, they stated that the DTS was not an inhibitor.

US Centers for Diseases Control and Prevention and the European Centre for Disease Prevention and Control recommend airborne precautions to care for COVID-19 patients (16, 17). Obstetricians are at high risk of COVID-19 transmission due to the nature of their work. COVID-19 patients should deliver in special isolated rooms with negative pressure. However, the provision is inaccessible in all centers. Accessible and cost-effective protective equipment, like the DTS, will facilitate the operation of departments of obstetrics. The DTS is favorable against all other infectious agents that carry the risk of respiratory transmission.

In this cohort, 131 (58.5%) of healthcare professionals stated that they were more anxious when delivering pregnant women suspected/diagnosed with COVID-19 than disease-free pregnancies, and 180 (80.4%) participants stated that they felt safe with the DTS during the second stage of labor. In addition, 65% mentioned that the device should be used for all deliveries, regardless of COVID-19 status. The findings provide strong empirical confirmation that protective equipment/devices make healthcare professionals feel safe and motivate them to work effectively during the pandemic. Challenges of healthcare providers include fear of spreading infection, infecting family members, failing to provide optimal care for patients and stigmatization (18, 19). The additional workload creates an anxious mental state for healthcare professionals (18, 19). Unfortunately, anxiety can be resulted with undesirable behaviors including unnecessary use of resources such as unrequired medical tests and care, hoarding of medical or personal protective equipment, and failure to provide adequate care for patients (18, 20). The outcomes weaken the health system during the pandemic. Therefore, future research is required for the protection of healthcare workers and the prevention of the spreading of infection. The research will contribute to the success of health systems in fighting COVID-19.

The multi-center design is the strength of the present study. The centers have been providing care for patients diagnosed with COVID-19 since the pandemic outbreak, and over 1000 pregnant women have been followed up clinically (10, 11, 21). The experience of participants in care management also strengthens the study results. The total population of healthcare workers in the two centers was 268 and 224 (84%) of them answered the questions. Thus, participation ratio is convincing to exclude possible bias. For the limitation, the study does not investigate if the shield provides additional protection against SARS-COV2 compared to standard measures. This point can be revealed with a future study however the pandemic hinders the study design due to the fact that healthcare providers are actively working not only in delivery rooms but also in outpatient clinics, intensive care units, and taking part in cesarean deliveries of Covid-19 positive patients for continuity of healthcare system.

Orgnanhi et al. stated their concerns about the use of DTS in clinical practice, underlining it might have a negative effect on the psychology, mobility, and breathing of pregnant women during delivery. Hopefully, this cross-sectional study provides objective data from pregnant women and decreases concerns about clinical practice (22). Reflecting the results, 85% of mothers stated that they had no problem during delivery with DTS, and 23 (14.9%) mentioned at least one complaint. Contrarily to concerns, only 13 (8.4%) patients, (9 of them were PCR positive) complained of shortness of breath and feeling incomfort; 8 (5.2%) complained of sweating, and 9 (5.8%) stated that they had the feeling of stigmatization. It's the most important point that the delivery table shield is used only in the second stage of labour during the mothers are pushing their babies. Furthermore, the DTS provides eye contact between physician and expectant mother due to its transparent structure. In addition, DTS designed with a special opening at its posterior part to prevent problems regarding breathing (23). Ankara City Hospital follows a mother- friendly protocol in the maternal care unit; hence, healthcare professionals support all mothers in all stages of labor.

The present study demonstrated perceptions of obstetricians, midwives and patients regarding the DTS, revealing that it is advantageous to use DTS during second stage of vaginal delivery of women with suspected or confirmed COVID-19. The DTS facilitates vaginal delivery management, prevents the uncontrolled spread of the virus, and reduces anxiety among

professionals without complicating optimal labor conditions and the comfort of mother and baby. Additionally, our device could provide benefits not only in COVID-19 infection, but also in other airborne infections, especially when isolation is required.

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