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ORIGINAL ARTICLE

Investigation of Unplanned Out-of-Hospital Births

ABSTRACT

Objectives: The aim of this study was to retrospectively examine the demographic characteristics, reaction times, and outcomes of out-of-hospital birth cases received by the Ankara 112 Emergency Health Services Emergency Health Automation System and transported to Etlik City Hospital. The study aims to help improve the prehospital health services provided.

Methods: In this study, out-of-hospital delivery calls made to the Ankara 112 Emergency Health Services Emergency Health Automation System (ASOS) between October 1, 2022, and June 1, 2024, and delivery cases brought to the Ankara Etlik City Hospital Gynecology Clinic were examined. A total of 49 cases were included. Data were analyzed using IBM SPSS 27.0 software; descriptive statistical methods and various comparison tests were applied.

Results: The mean age of the cases included in the study was 27.4±5.7 years. The majority of the cases (71.4%) occurred outside of working hours. The nationality of 23 cases was the Republic of Türkiye. Patients with other nationalities had lower hemoglobin values. The mean hemoglobin value of the cases was 11.2±1.5. Forty-two cases were transferred to hospitals, and seven of them requested transfer between hospitals.

Conclusion: This study shows that Ankara 112 Emergency Health Services intervenes quickly and effectively in prehospital delivery cases. A difference was found between patient nationalities in terms of hemoglobin values. Although the time to reach the case in prehospital health services is below the quality standards, further shortening of these times will have a positive impact on patient outcomes. Expanding such studies will improve the quality of prehospital emergency health services.

Keywords: Emergency health care, out-of-hospital delivery, reaction time

In cases of out-of-hospital deliveries classified as planned and unplanned, managing complications becomes difficult because there is no immediate healthcare service. In these cases, where both the mother and the newborn are vulnerable to different complications, the duration of hospitalization and mortality rates increase (1). Complications that occur in out-of-hospital deliveries due to a lack of hygiene and basic postnatal care, especially in the absence of healthcare personnel, are preventable. When complications requiring rapid intervention occur, the reaction time of the 112 command and control center, the departure and arrival times of the ambulance, the vital interventions applied at the first contact with emergency health services, and the arrival time of the case to the hospital are of vital importance.

Out-of-hospital births can occur in different ways. Some of these cases are due to the inability to reach the hospital, while others can be classified as out-of-hospital emergency deliveries (2). Another reason for out-of-hospital deliveries is planned home births. Although outcomes in planned home deliveries are similar to in-hospital deliveries, outcomes after an unplanned out-of-hospital birth are significantly worse (3).

The literature shows that out-of-hospital deliveries lead to deficiencies in antenatal care and increase maternal and infant mortality and morbidity rates, regardless of the reason (4,5).

The aim of our study was to contribute to the literature by retrospectively examining unplanned out-of-hospital deliveries in terms of demographics, the time zone of cases, the reaction time of the 112 command and control center, the departure and arrival times of the ambulance, and the arrival time of the case to the hospital. Thus, it will be possible to evaluate the situation in terms of prehospital emergency health services and unplanned out-of-hospital deliveries.

Ramiz Yazıcı[1]

Murat Genç[2]

[1]*Department of Emergency Medicine, University of Health Sciences, Kanuni Sultan Suleyman Training and Research Hospital, İstanbul, Türkiye*
[2]*Department of Emergency Medicine, Ankara Training and Research Hospital, Ankara, Türkiye*

Corresponding author:
Ramiz Yazıcı
✉ dr.ramiz.yazici@gmail.com

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METHODS

Our study is a retrospective registration study. Between October 1, 2022, and June 1, 2024, out-of-hospital delivery calls made to the Ankara 112 Emergency Health Services Emergency Health Automation System (ASOS) were analyzed, along with delivery cases brought to the Ankara Etlik City Hospital Gynecology Clinic. Permission was obtained from the relevant institution for our study.

Ethics committee approval for our study was obtained from the Ankara Bilkent City Hospital Medical Research Scientific and Ethical Evaluation Board No. 2 with the number TABED-2-24-332 on 26.06.2024. The study included 49 cases of out-of-hospital deliveries that occurred on the specified dates. Cases with missing transfer forms or missing parameters were not included.

Data analysis was performed using IBM SPSS 27.0 (Armonk, NY: IBM Corp.) statistical package program. Descriptive statistical methods (frequency, percentage, mean, standard deviation, median, quartile separation), as well as the Chi-Square (χ^2) test, were used to compare qualitative data. The conformity of the data to normal distribution was evaluated by the Shapiro-Wilk test, skewness and kurtosis, and graphical methods (histogram, Q-Q Plot, Stem and Leaf, Boxplot). The Mann-Whitney U test was used to compare quantitative data that did not show normal distribution between groups. The statistical significance level was accepted as $p<0.05$.

RESULTS

The mean age of the patients included in the study was 27.4±5.7 years. The mean hemoglobin (hb) values were 11.2±1.5. One case occurred in 2022, 34 cases in 2023, and 14 cases in 2024. In terms of season, it was observed that the most cases occurred in spring (n=17) and the fewest in fall (n=6). The most cases occurred on Mondays (n=10) and the least on Tuesdays (n=2). There were 14 cases during working hours and 35 cases during non-working hours. While 23 of the patients were nationals of the Republic of Türkiye, 26 were of other nationalities. Six of the cases were stillbirths. It was noted that 41 of the calls made were for medical reasons, seven were for transportation requests, and one was due

Table 1. Characteristics of the participants

		n=49	%
		Mean±SD	Median (IQR)
Age (year)*		27.4±5.7	26.0 (23.0–32.5)
Hb*		11.2±1.5	11.4 (10.4–11.9)
	*<11***	*18*	*36.7*
	*≥11***	*31*	*63.3*
Command reaction times (s)*		309.2±418.1	173.0 (131.5–320.5)
Station reaction times (s)*		37.4±20.5	36.0 (22.5–57.0)
Reach time (Scene arrival - Call)*		639.5±538.7	510.0 (387.0–707.0)
Year**	2022	1	2
	2023	34	69.4
	2024	14	28.6
Season**	Spring	17	34.7
	Summer	12	24.5
	Fall	6	12.2
	Winter	14	28.6
Day of the week	Monday	10	20.4
	Tuesday	2	4.1
	Wednesday	7	14.3
	Thursday	7	14.3
	Friday	6	12.2
	Saturday	8	16.3
	Sunday	9	18.4
Hours**	Working	14	28.6
	Non-working	35	71.4
Nationality	Republic of Türkiye	23	46.9
	Others	26	53.1
Stillbirth	No	43	87.8
	Yes	6	12.2
Reason of call**	Medical	41	83.7
	Transportation	7	14.3
	Traffic accident	1	2
Result**	Transport to hospital	42	85.7
	Transport inter-hospitals	7	14.3

*: Mean ± SD / Median (IQR), **: n / %
Hb: Hemoglobin; s: second; SD: Standard Deviation; IQR: Inter Quantile Range.

Table 2. Comparison of hemoglobin values with nationalities

	Nationality		P*
	Republic of Türkiye (n=23)	Others (n:26)	
Hb	11.4 (8.6–14.2)	11.0 (7.6–11.9)	**0.037**

*: Mann-Whitney U Test (Median (Q1-Q3))
Hb: Hemoglobin.

to a traffic accident. While 42 of the calls resulted in transfer to the hospital, seven were transfer requests between hospitals. It was observed that all of the inter-hospital transfers were made due to the need for specialist physicians (Table 1).

The median command reaction time was 173 seconds, the median station reaction time was 36 seconds, and the median time between the call and arrival at the scene was 510 seconds (Table 1).

Hb values of the cases were analyzed. In comparisons made between nationalities, it was found that there was a statistically significant difference between nationalities in terms of hb values (p=0.037), with those of the Republic of Türkiye having higher hb values (Table 2). Hemoglobin values were compared with other characteristics, and no significant difference was found.

Command reaction times, station reaction times, and transportation times to the scene were compared between working hours and non-working hours cases, and no significant difference was found.

DISCUSSION

In our study, we aimed to examine unplanned out-of-hospital births in Ankara province over a period of approximately two years and to shed light on what needs to be done to improve the quality of healthcare services provided by emphasizing the possible deficiencies in such cases. The findings highlighted that most of the cases occurred outside of working hours.

We believe that the biggest limitations of our study are the small number of cases and the fact that the conditions of the cases after they reached the hospital were not included. In their study, UNICEF stated that while emergency health services can transport all pregnant women regardless of high risk or actual complications, the success of such a system should be measured by the rate at which all pregnant women with complications are transported to an appropriate referral level (6). Our study was also conducted to increase the success of the system by emphasizing both short transportation times and complication follow-up.

We believe that more comprehensive studies can be conducted by adding a control group in future studies and examining the complications experienced in out-of-hospital deliveries. Snowden et al. found that perinatal mortality rates of unplanned out-of-hospital deliveries were higher than those of in-hospital planned deliveries (7). Similarly, Rodie et al. found that babies needed more hospitalization in the neonatal unit after unplanned out-of-hospital deliveries (8).

In our study, the median time for ambulances to arrive at the scene after the call was 510 seconds. This is below the 10 minutes recommended by the Ministry of Health quality standards for urban cases. In cases requiring rapid intervention such as childbirth, rapid access to the scene is a factor affecting patient mortality and morbidity. Örtqvist et al. found that mortality and morbidity rates increased as the transportation time to out-of-hospital delivery cases increased (9). On the other hand, we believe that the quality of antenatal care decreases in out-of-hospital deliveries compared to in-hospital deliveries. McClelland et al. found that clinical observations were mostly incomplete in out-of-hospital deliveries (10). Jena et al. estimated that increasing the in-hospital delivery rate and potentially saving lives contributed to a 15% reduction in maternal mortality (11). However, this analysis was a rough estimate without taking into account the proportion of obstetric emergencies carried and other social, economic, and health system factors. In 2013, another study in Punjab province highlighted a sudden increase in in-hospital deliveries immediately after the introduction of the ambulance service (12,13).

When the reasons for transfer were analyzed, it was observed that all transfer cases were due to the need for specialized physicians. To reduce the number of transfers of obstetric cases, which are a special case group, the distribution of hospitals' specializations should be improved. In a study by Bertazzoni et al., in parallel with our study, it was found that the main reason for inter-hospital referral was the need for specialized care (14).

When the hb levels of the cases were compared with their nationalities, it was observed that the hb values of the foreign national group were significantly lower than those of the Republic of Türkiye group. This may be a finding that sheds light on possible disruptions in access to health services by foreign nationals. Hansen et al. examined migrant workers in their study. In the study, their sociodemographic and medical conditions were examined, and they found differences in health indicators with control groups (15).

No significant difference was found when the ambulance transportation times during and outside of working hours were compared. It may be considered that factors such as ambulance demand and traffic density during and outside of working hours may affect transportation times to the case. In a study by Sarıyer et al., it was found that ambulance demands were higher during weekend evening hours compared to weekdays (16). However, the lack of a significant difference in our study can be concluded that such factors are taken into consideration in the planning of emergency health services.

Suryoputro et al. emphasized that the emergency call application developed for pregnant women may have the potential to reduce the referral problem of pregnant women through features such as personal information, pregnancy danger signs information, risky pregnancy estimator, emergency button, chat feature, and examination history (17). We believe that our study will be useful in the development of emergency health services by shedding light on the literature.

CONCLUSION

As a result, although the time to reach the case in prehospital health services is below the quality standards, further shortening these times will have a positive effect on patient outcomes. Expanding such studies will increase the quality of prehospital emergency healthcare services.

Ethics Committee Approval: The study was approved by Ankara Bilkent City Hospital Medical Research Scientific and Ethical Evaluation Board (decision no: 332, date: 26.06.2024).

Informed Consent: Written informed consent was obtained from the patients who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

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