

## Research Article

# Frequency and Reasons for Newborn Readmission after Discharge from the Maternity Ward

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## Abstract

**Aim:** The aim of this paper was to determine the frequency and the reasons for newborn readmissions at the Clinic for Pediatric Diseases at the University Clinical Hospital Mostar.

**Methods:** The retrospective study included 71 newborns readmitted at the Clinic of Pediatric diseases over the course of one year. The surveyed group consisted for children who met the criterion of hospital readmissions which included newborns who were released from the maternity ward, but returned to the hospital within the first 30 days of life, due to the development of some pathological condition.

**Results:** The readmission rate expressed as readmitted infants within 30 days compared to 1,000 live births was 38.89 %. By analyzing the working diagnoses of readmitted newborns, we found significantly more children with a diagnosis of newborn jaundice than other possible diagnoses ( $p < 0.001$ ). Statistically significant differences were found in the distribution of mothers according to all variables: number of births, delivery mode and complications during pregnancy ( $p < 0.001$ ).

**Conclusion:** The most common reasons for hospital readmission were newborn jaundice and respiratory infections. Rehospitalization has a significant impact on the family and it can be reduced by providing adequate health care and by treating the most common pathological conditions at the maternity ward.

**Keywords:** Hospital Readmission; Newborn; Respiratory Infections

## Introduction

Neonatal morbidity was defined as any medical condition resulting in postdelivery inpatient hospital readmission, observational stay, or mortality in the first 28 days of life [1]. A readmission was defined as the admission of a newborn to any hospital after discharge from the maternity ward. A newborn infant transferred directly from another institution was not counted as a readmission [2]. While more refined measures of health outcomes are desirable, newborn readmission is used because it reflects morbidity and it is costly. In addition, newborn readmission is correlated with health problems that critics of early discharge believe may be caused by

short postpartum stays [3]. High readmission rates are viewed as a negative indicator of the quality of care during hospitalization and, particularly, of the discharge assessment and process [4]. A newborn who is ill is more likely to be readmitted than a newborn who is healthy and of importance is the fact that some pathological conditions are more frequent than others [3]. The most frequently reported causes of infant readmission are: dehydration, diarrhea, feeding problems, fever, infections, gastrointestinal problems, jaundice, sepsis and viral/respiratory issues [5]. Recently, rehospitalization of healthy term newborns has received scientific and media attention [6]. Neonatal readmissions have a significant impact on new families and may be decreased by appropriate hospital care and follow-up [7]. According to generally accepted standards of maternity care, the health care needs of the newborn and mother

in the immediate postnatal/postpartum period should be met at the delivery site. These needs includemonitoring and support to ensure the infant's stabilization during the initial physiologictransition from intrauterine to extrauterine environments, performance of recommended immunizations, mandatory screening for genetic disorders, and initiation of feeding and assessment of major medical risk factors [8]. Detection of significant jaundice, ductal-dependant cardiac lesions, gastrointestinal obstruction, and other problemsmay require a longer period of observation by skilled and experienced health care professionals [9]. Longer length of stay before discharge is protective againstreadmission but it is not reasonable to prolong the hospitalization of newbornsafter birth who meet criteria for discharge [10]. Preventable hospital readmissions are a topic of national focus as potential indicators of clinical failure and unnecessary expenditures [11].

## Aim

The aim of this paper was to determine the frequency and the reasons for newborn's readmission at the Clinic for Pediatric Diseases at the University Clinical Hospital Mostar.

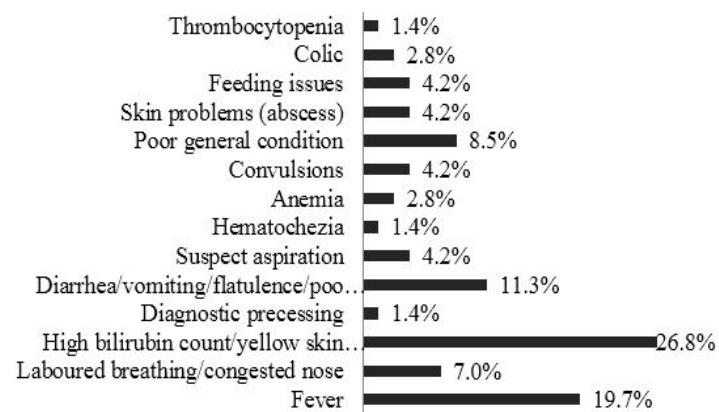
## Subjects and Methods

This retrospective study included 71 newborns readmitted at the Clinic of Pediatric diseases at the University Clinical Hospital Mostar in the period from January 2016 to January 2017. The surveyed group consisted of children who met the criterion of hospital readmissions after being released from the maternity ward, up to 30 days of age, due to the development of some pathological condition. The study excluded all newborns that were immediately transferred to the Department of Neonatology and Intensive care of newborns from the maternity clinics. The following variables were observed in newborns: age, gestational age, sex, gender, feeding mode, vaccine status, diagnosis, department, duration and type of treatment. The variables observed in pregnant women were: number of pregnancies and childborths, birth mode and com-

plications during pregnancy. The data was collected using medical documentation from the basis of the Clinic for Pediatric diseases. Data were analyzed in SPSS for Windows (version 17.0., SPSS Inc. Chicago, Illinois, USA) and Microsoft Excel (version Office 2007, Microsoft Corporation, Redmond, WA, USA). Results were expressed as number and relative frequencies (%). The Chi-square ( $\chi^2$ ) test was used for testing the statistical significance. The level of significance was  $p=0.05$ . P values that could not be expressed to three decimal places are shown as  $p<0.001$ .

## Results

The number of live-born children at the Department of Gynecology at the University Clinical Hospital Mostar during 2016 was 1821 children. The readmission rate expressed as readmitted infants within 30 days compared to 1,000 live births was 38.89 %.



**Graph 1:** Working diagnoses during hospital readmission.

By analyzing the working diagnoses of readmitted newborns, we found significantly more children with a diagnosis of newborn jaundice than other possible diagnoses ( $\chi^2=72.746$ ;  $df=13$ ;  $p<0.001$ ).

Variables		Number of newborns	%	$\chi^2$ test	p
Gestational age	<38	5	7	79.211	<0.001
	38-40	59	83.1		
	>40	7	9.9		
Gender	m	34	47.9	0.127	0.722
	ž	37	52.1		
Birth weight (g)	2 000-2 499	3	4.2	32.592	<0.001
	2 500-2 999	10	14.1		
	3 000-3 499	28	39.4		
	3 500-3 999	23	32.4		
	4 000-4 499	7	9.9		

Feeding mode	breastfeeding	54	76.1	19.282	<0.001
	breastfeeding and milk formula	17	23.9		
Vaccine status	no	9	12.7	35.268	<0.001
	yes	47	66.2		
	unknown data	15	21.2		

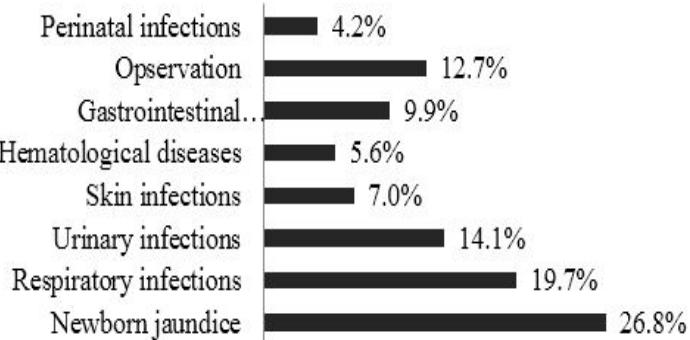
**Table 1:** Distribution of newborns according to gestational age, gender, birth weight, feeding mode and vaccination status.

Statistically significant differences were found in the distribution of newborns according to gestational age, gender, birth weight, feeding mode and vaccine status.

Variables		Number of mothers	%	$\chi^2$ test	p
Number of births	1	27	38	4.07	0.044
	2+	44	62		
Delivery mode	vaginal	60	85	33.817	<0.001
	C-section	11	16		
Complications during pregnancy	no	46	65	6.211	0.013
	yes	25	35		

**Table 2:** Distribution of mothers according to the number of births, delivery mode and the occurrence of complications during pregnancy.

Statistically significant differences were found in the distribution of mothers according to all variables: number of births, delivery mode and complications during pregnancy.



**Graph 2:** Release diagnoses during hospital readmission.

The research has shown a statistically significant difference in the presence of individual release diagnoses ( $\chi^2=23.310$ ;  $df=7$ ;  $p=0.002$ ). The most common cause for rehospitalization was newborn jaundice.

## Discussion

This study determined that the frequency for newborn's readmission at the Clinic for Pediatric Diseases at the University Clinical Hospital Mostar in 2016 was 38.98 %, while the most common reasons for hospital readmission were newborn jaundice and respiratory infections. The research from Canada showed that the incidence of newborn's readmission has increased over the past few decades, while the average length of stay decreased from 4 to

2 days [2]. According to our study, children born vaginally had a greater incidence of readmission than children born by C-section, which could mean that longer length of stay in the maternity ward for infants born by C-section reduces the risk of rehospitalization. These conclusions are confirmed by the American study [12]. According to another study, the first week of life is the most critical period for newborns [8], while our research found a higher number of readmissions in the 4th week of life. By analyzing working diagnoses, we found that the leading causes of the hospital readmissions were increased bilirubin count and fever, while the study done in the US in 2013 showed that infections were the most common cause of hospitalization [13]. A study from Austria showed that male newborns were hospitalized more often than females, especially for respiratory diseases [14], and, while this was a statistically significant finding, such a result was not found in our research. Some studies indicate that lower gestational age and lower birth weight do not have an impact on newborn readmission rates [15]. Newborn jaundice and respiratory infections, according to our research, occurred most frequently in newborns between 38 and 40 weeks gestation, while gender had no major influence on the occurrence of certain diagnoses. These results match with the analysis from 2013 [4]. We also found that uncomplicated and multiparity pregnancies and vaginal delivery were the most common [16]. It is explained by the fact that babies born vaginally are discharged prior to infants born by C-section, so certain pathological conditions develop as the infant enters the home environment [5].

Therefore, an increase in a newborn's readmission rate means an increase in healthcare costs and therefore, certain measures should be taken to prevent hospitalization and reduce the overall rates. We believe that increasing the length of stay and improving

health care is not a major investment, and can bring a great benefit not only to the system, children and families, but to the entire society as well.

## Conclusion

This study determined that the frequency for newborn readmission at the Clinic for Pediatric Disease in 2016 was 38.98 %, while the most common reasons for hospital readmission were newborn jaundice and respiratory infections. Rehospitalization has a significant impact on the family and it can be reduced by providing adequate health care and by treating the most common pathological conditions at the maternity ward.

## Conflict of Interest

The manuscript has not been published or submitted for publishing elsewhere, the manuscript has been read and approved by all the authors, and there is no any financial or other conflict of interest.

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