Original Research Article
Journal of Kathmandu Medical College, Vol. 13, No. 3, Issue 49, Jul.-Sep., 2024

Timing of passage of first stool and urine by newborn delivered at a tertiary level hospital

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ABSTRACT

Introduction: Passage of first stool and urine is considered as one of the reassuring indicators to exclude some important congenital anomalies of gastrointestinal and genitourinary tract. Also, it is a sign that the newborn is healthy. Different studies from different geographical reasons have shown varying results in the timing of first passage of it. Hence this study aims to assess timing of passage of first stool and urine by newborn in our setting.

Objectives: To assess the timing of passage of first stool and urine by newborn

Methodology: A descriptive observational study was carried out among 210 newborns born at Kathmandu Medical College Teaching Hospital, for the period of six months using convenient sampling technique. Data were analyzed by using frequency percentage and Mann-Whitney U test to see the associations.

Results: Study showed that 92.9% of newborns passed their first stool within eight hours of life and remaining 7.1% within 16 hours. Most of them i.e., 66.7% of newborns passed urine within 8 hours of life where as 6.7% of newborn passed their first urine beyond 24 hours. There was significant association between type of delivery and timing of passage of first stool ($p = <0.05$) and urine ($p = <0.05$). Timing of passage of first stool was significantly associated with type of oral feeding ($p = <0.05$).

Conclusion: Most of the newborn pass their first urine and stool within 24 hours of birth but few of them can go beyond 24 hours for urine without subsequent abnormality.

Keywords: Meconium; Newborn; stool; Urine.

Access this article online

Website: www.jkmc.com.np

DOI: https://doi.org/10.3126/jkmc.v13i3.82875

HOW TO CITE
Poudel S, Basnet R, Lamichhane M. Timing of passage of first stool and urine by newborn at a tertiary level hospital. J Kathmandu Med Coll. 2024;13(3):150-4.

Submitted: Mar 10, 2025
Accepted: Jul 15, 2025
Published: Aug 5, 2025

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ISSN: 2019-1785 (Print), 2091-1793 (Online)

INTRODUCTION

The first stool after birth is called meconium, which is quite different from ordinary stool in its nature. It is a dark, viscous material that is normally passed within the first 48 hours of life. With the beginning of feeding, it is replaced by green-brown transition stools and after 4-5 days, by yellow brown milk stool. The timing of passage of it is a vital aspect of a neonatal well-being.[1] Timely passage of first stool and urine excludes anatomical abnormality in gastro-intestinal as well as genito-urinary tract and also signifies its functional maturity. Majority of new-borns pass their first urine within 24 hours of life[2]. Production of urine begins soon after birth leading to first void to occur typically within the first 24 hours of birth.[3] A study from Turkey showed that 99.2%[1] of the new-borns passed their first stool within 24 hours of birth. A study from Nigeria showed that 88% of the full-term neonates passed meconium at 15.4 ± 3.6 hrs of life while only 12.0% of them passed meconium after 24 hrs of life and all by 48 hrs of life. The mean time of passage of stools by preterm, low birth weight babies was 45.2 ±2.4 hrs[4]

However, there are substantial variations in these parameters. Many factors have been suggested to influence it like gestational age at birth, birth weight, method of delivery, timing of commencement of breastfeeding, and timing of first feeds other than breast milk.[5]

Also, in our practice we frequently encounter with the situations where we have to deal with the questions related to normal duration for first stool and void by new-borns. So, this study was conducted to assess the timing of passage of first stool and urine by newborn and its associated factors in our context.

METHODOLOGY

A descriptive Observational study was conducted at Kathmandu Medical College, Teaching Hospital (KMCTH) among 210 newborns delivered at KMCTH from January to June 2022 by using convenient sampling technique. Ethical clearance was obtained from Institutional Review Committee KMCTH (Ref no. 130120209). Sample size was calculated on the basis of 88% prevalence of passage of stool within 24 hours of birth[2] with 5% allowable error. Hence the calculated sample size with the formula $n = z^2pq/d^2$, P = 0.88, q = 0.12, d = 5% of p = 0.04 is 210. the Data was collected by researchers themselves and on duty nurses. Babies were checked every 2 hours during day time and 4 hours during night time by inspecting their diapers/nappies. For perinatal factors, babies' hospital records were used and for demographic information interview was taken with parents using the designed proforma after obtaining informed consent from them. New-borns with identified congenital gastrointestinal disorders, genitourinary disorders, critically ill and unable to feed orally and who had intrauterine passage of meconium were excluded from the study. Data analysis was done using IBM SPSS Statistics for Windows, version 25 (IBM Corp., Armonk, N.Y., USA. Descriptive (mean, frequency, percentage median (IQR), etc) as well as inferential statistics, Mann Whitney - U test and Kruskal Wallis - H test was used to see the association.

RESULTS

The study showed that more than half of the newborns were male and majority of them were full term normal birth weight neonates, 187 (89%). The mean± SD for maternal age was 27.9 ± 3.9 and 124 (59%) of them were primipara mothers. Majority i.e., 163 (77.6%) of the newborns were born via Caesarian section and 167 (79.5) neonates were fed with formula due to insufficient milk production of mother during immediate post-operative period. Some of the mothers had comorbidities like gestational diabetes 27 (12.8%), hypothyroidism 26 (12.3%) and hypertensive disorders 14 (6.7%, Table 1). Most of the i.e., 195 (92.9%) of newborns passed their first stool within eight hours of life and remaining 15 (7.1%) within 16 hours. The mean duration of passage of stool was 4.1±2.9 hours. More than two/third of them, 140 (66.7%) passed urine within eight hours of life where as 14 (6.7%) of them passed their first urine beyond 24 hours of their life and required bladder stimulation for the same. Those cases were followed up for next 24 hours, However, they didn't show any difficulty with consequent passage of urine thereafter (Table 2). There was significant association between type of delivery and timing of passage of first stool (p-value <0.05) and urine (p -value <0.05). Timing of passage of first stool was significantly associated with type of oral feeding (p -value <0.05, Table 3).

Table 1: Birth characteristics of newborns.

Characteristics	n (%)
Sex	
Male	118 (56.2)
Female	92 (43.8)
Gestational age in weeks	
34-37	23 (11)
≥ 37	187 (89)
Birth weight in Kg	
< 2.5	23 (11)
≥ 2.5	187 (89)
Neonatal resuscitation	
Not required	204 (97.1)
Stimulation with oxygen	6 (2.9)
Type of feeding	
Breastmilk	21 (10)
Formula	167 (79.5)
Mixed	22 (10.5)
Maternal age in years	
Mean ± SD: 27.9±3.9 (20-38)	
Parity	
Primipara	124 (59)
Multipara	80 (38.1)
Grand multipara	6 (2.9)
Type of delivery	
SVD	44 (21)
Caesarian Section	163 (77.6)
Instrumental	3 (1.4)
Antenatal risk factors*	
None	137 (64.3)
Hypertensive disorders	14 (6.7)

Gestational Diabetes	27 (12.8)
Hypothyroidism	26 (12.3)
Oligohydramnios	8 (3.8)
Decrease fetal movement/ brady or tachycardia	25(11.9)
Others†	4(1.9)

*Multiple response; † Obstetric cholelithiasis, Genital wart

Table 2: Timing of passage of urine and stool by newborn

Variables	n (%)
Timing of Passage of first stool	
≤ 8 hours after birth	195 (92.9)
8-16 hours after birth	15 (7.1)
Mean ±SD: 4.1±2.9	
Timing of passage of first urine	
≤ 8 hours after birth	140 (66.7)
8-16 hours after birth	39 (18.6)
16-24 hours after birth	17 (8.1)
>24 hours after birth	14 (6.7)
Mean ±SD: 8.1±6.7	

DISCUSSION

This study give insight into time of first elimination by newborn and its variation depending upon type of feeding, mode of delivery etc. All the new-borns in this study passed stool within 24 hours of birth. The mean age of the neonates at first passage of stool was 4.1± 2.9 hours and 92.9 % newborns passed their first stool within 8 hours of life. Similar findings have been reported by a study from western Nepal where 88.3% babies passed their first stool within 12 hours of life.[6] This is also consistent with the findings of another study conducted in Baghdad city Hospital where 98.7% of term neonates passed their first stool within 24 hours of life.[7] Similar finding is reported from a Nigerian study[8]. A study from India showed the median duration of passage of meconium as 4 hours[9] similar to our study result but the mean duration of passage of stool by Nigerian new-born was 16± 10.5 which is quite longer than findings of our study. [10] In this study 89% of the newborn were full term and all the newborns passed meconium within 16 hours of life similar to the result of another study where 88% of the full-term neonates passed meconium at 15.4 +/- 3.6 hrs.[4]

Table 3: Association of timing of Passage of first stool and urine with birth characteristics.

Characteristics	Median (IQR)	Timing of passage of first stool		Median (IQR)	Timing of passage of first urine	
		Mean rank	p-value		Mean rank	p-value
Sex						
Male	3.3(2,5)	106.23	0.8	6(4,6)	105.06	
Female	3.3(2,6)	104.56		7(3,11)	106.07	0.9
Gestational Age						
< 37 weeks	3(1.5,6)	93.04	0.2	6(2,8)	93.76	0.3
≥37 weeks	3.4.(2,5)	107.03		6.3(4,11)	106.94	
Birth weight						
Low birth weight	3(2,8)	99.93	0.6	6(2,8)	94.37	0.3
Normal birth weight	3.4.(2,5)	106.18		6.2(4,11)	106.87	
#Type of delivery						
SVD	4(3,7)	127.8		8.5(4,13.5)	121.48	
CS	3.1(2,5)	99.25	0.02‡	6(3,8.5)	100.07	0.02‡
Instrumental delivery	6(1,6.2)	118.17		25 (6,25)	166.17	
Type of oral feeding						
Breast milk	4(2,8)	47.39		7 (3,10)	57.42	
Formula	3(2,5)	75.52	0.02‡	6(4,10)	70.2	0.2
Mixed feeding	4 (2,6)	75.64		9(94,19)	60	

p-value significant <0.05 = ‡Kruskal-Wallis H test.

In this study 66.7% of newborn passed first urine within 8 hours of life and 93.3% within 24 hours with mean duration of 8.1±6.7 hours. A small percentage i.e., 6.7% of newborn went beyond 24 hours and as per our hospital protocol, they were given gentle tapping as bladder stimulation to initiate urination. Similar results have been reported by a study in India where 69.7% neonates passed their first urine within 6 hours of life with median duration of 4 hours.[9] Another study from western Nepal showed that 99.8% of neonates passed urine within 12 hours of life.[6]

In this study timing of passage of meconium was significantly influenced by type of delivery and type of oral feeding given to newborn. In contrast to this result of a study from USA showed no significant difference in timing of meconium between breast fed and formula fed neonates.[11] The difference might be attributed to geographic differences and hospital protocol of feeding newborn delivered via caesarian section with formula feeding and formula has higher osmolality leading to increased peristalsis in newborn . Different studies showed that study timing of meconium passage was significantly affected by gestational age at delivery, mode of delivery, birth weight, timing of commencement of breastfeeding and formula feeding before breast feeding. [5,12–14]

Type of delivery was also significantly associated with timing of passage of urine but result from other studies didn't reveal similar findings.[9,11]

In this study caesarean section delivery was relatively higher 77.6% than the WHO recommendation i.e., 15-20%.[15] One of the reasons for it might be being a tertiary level hospital, our hospital gets high risk and complicated cases and it is a referral center as well.

It is a single canter study so the findings may not be generalizable to other settings.

CONCLUSION

The average duration for passage of first stool was around four hours and urine was around eight hours. Most of the newborn pass their first urine and stool within 24 hours of birth but few of them can go beyond 24 hours for urine without any subsequent problem. We can use these findings as evidence to counsel parents regarding the same.

Source of support: None
Conflict of Interest: None

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