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Continuous nuchal translucency-based risk assessment for trisomy 21 in the first trimester: development and validation in an Indian population

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Objectives To develop and validate a continuous, gestational age-adjusted nuchal translucency (NT)-based risk model for trisomy 21 during first-trimester screening in an Indian population.

Method: This retrospective observational cohort study included 8,605 singleton pregnancies undergoing first-trimester screening between CRL 60- 84 mm. NT measurements were obtained using a standardized protocol. Gestational age-specific NT centiles were derived using polynomial regression. Trisomy 21 risk was estimated by interpolating NT values across gestation using polynomial and spline-based modelling.

Results Trisomy 21 was confirmed in 68 pregnancies (0.79%). NT demonstrated a graded, continuous association with trisomy 21 risk. Approximately 6% of pregnancies had NT values above the 95th centile. The interpolated NT-based model demonstrated good discrimination and enabled continuous risk estimation rather than reliance on fixed NT cut-offs. Polynomial equations for Nuchal translucency in an Indian population.

Conclusion: gestational age-adjusted NT-based risk modelling provides a clinically intuitive approach to trisomy 21 screening and may improve individualized counselling.

NT (mm)	Interpolated LR for T21	NT (mm)	Interpolated LR for T21	NT (mm)	Interpolated LR for T21
1	0.3	3.1	4.2	5	30
1.1	0.36	3.2	4.9	5.1	30
1.2	0.42	3.3	5.6	5.2	30
1.3	0.48	3.4	6.3	5.3	30
1.4	0.54	3.5	7	5.4	30
1.5	0.6	3.6	8	5.5	30
1.6	0.68	3.7	9	5.6	30
1.7	0.76	3.8	10	5.7	30
1.8	0.84	3.9	11	5.8	30
1.9	0.92	4	12	5.9	30
2	1	4.1	13.8	6	30
2.1	1.12	4.2	15.6		
2.2	1.24	4.3	17.4		
2.3	1.36	4.4	19.2		
2.4	1.48	4.5	21		
2.5	1.6	4.6	22.8		
2.6	1.98	4.7	24.6		
2.7	2.36	4.8	26.4		
2.8	2.74	4.9	28.2		
2.9	3.12				
3	3.5				

