

## INTISARI

Vitamin D telah lama diketahui berperan dalam metabolisme kalsium dan homeostasis tulang. Selain itu vitamin D berperan dalam perkembangan sel mesenkimial dan sel epitel alveolar yang mempengaruhi proses pematangan paru janin. Sel alveolar tipe II mengekspresikan reseptor vitamin D, terlibat dalam sintesis dan sekresi surfaktan sebagai respon terhadap vitamin D. Arteri umbilikalis pada janin meluas ke tali pusat membawa darah yang berasal dari pembuluh darah sistemik janin menuju plasenta. Darah yang berasal dari pembuluh darah sistemik janin memiliki jumlah oksigen dan nutrisi yang sama dengan darah yang didistribusikan ke jaringan tubuh janin selama periode intrauteri. Bayi prematur dan bayi berat lahir sangat rendah berisiko memiliki simpanan vitamin D dalam tubuh yang rendah akibat kurangnya transfer vitamin D transplasenta dari ibu ke janin. Penelitian ini bertujuan untuk menganalisis kadar vitamin D arteri tali pusat sebagai faktor risiko sindrom distres respirasi pada bayi berat lahir sangat rendah.

Kami melakukan penelitian kohort prospektif pada bayi berat lahir sangat rendah di ruang NICU yang lahir di RSUP Dr. Sardjito pada bulan Oktober 2023 sampai dengan Februari 2024. Bayi berat lahir <1500 gram dan usia gestasi >26 minggu diinklusi dalam penelitian, sedangkan bayi yang mengalami kelainan kongenital mayor, kelainan kongenital hati dan ginjal serta bayi asfiksia berat yang meninggal saat resusitasi bayi baru lahir dieksklusi dari penelitian. Pemeriksaan kadar vitamin D arteri tali pusat dilakukan segera setelah lahir di laboratorium Patologi Klinik RSUP Dr. Sardjito. Luaran primer adalah sindrom distres respirasi.

Didapatkan 57 bayi berat lahir sangat rendah yang lahir selama periode penelitian, 6 bayi dieksklusi. Terdapat 43 bayi (84,3%) mengalami defisiensi vitamin D. Kejadian SDR sebesar 70,6% (SDR derajat I 33,3%; SDR derajat II 31,4%; SDR derajat III 5,9% dan SDR derajat IV 0%). Defisiensi vitamin D arteri tali pusat mempengaruhi kejadian SDR (OR 11,33; IK 95% 1,95-65,93; p=0,007). Riwayat maternal tanpa suplementasi vitamin D juga merupakan faktor yang mempengaruhi SDR (OR 9,14; IK 95% 2,14-39,07; p=0,003). Jenis kelamin, berat lahir, riwayat maternal dengan ketuban pecah dini >18 jam tidak berpengaruh signifikan terhadap kejadian SDR pada bayi berat lahir sangat rendah. Kesimpulan pada penelitian kami, kadar vitamin D arteri tali pusat yang defisien dan riwayat maternal tanpa suplementasi vitamin D meningkatkan risiko kejadian SDR pada BBLSR.

**Kata kunci:** vitamin D, arteri tali pusat, sindrom distres respirasi, berat lahir sangat rendah

## ABSTRACT

Vitamin D has been known to play a role in calcium metabolism and bone homeostasis. Apart from that, vitamin D plays a role in the development of mesenchymal cells and alveolar epithelial cells which influence the process of fetal lung maturation. Type II alveolar cells express the vitamin D receptor, involved in the synthesis and secretion of surfactant in responses to vitamin D. The umbilical artery in the fetus extends to the umbilical cord carrying blood originating from the fetal systemic vasculature to the placenta. Blood originating from the fetal systemic blood vessels has the same amount of oxygen and nutrients as the blood distributed to the fetal body tissues during the intrauterine period. Premature and very low birth weight infants are the risk of having low vitamin D stores in the body due to a lack of transplacental transfer of vitamin D from mother to fetus. This study aims to analyze umbilical cord arterial vitamin D levels as a risk factor for respiratory distress syndrome in very low birth weight infants.

We conducted a prospective cohort study on very low birth weight infants in the NICU ward who were born at RSUP Dr. Sardjito in October 2023 to February 2024. Infants with birth weight <1500 grams and gestational age >26 weeks were included in the study, while infants with major congenital abnormalities, congenital liver and kidney abnormalities and severe asphyxia infants who died during newborn resuscitation excluded from the study. Examination of umbilical cord arterial vitamin D levels was carried out immediately after birth in the Clinical Pathology laboratory at RSUP Dr. Sardjito. The primary outcome was respiratory distress syndrome.

There were 57 very low birth weight infants born during the study period, 6 infants were excluded. There were 43 infants (84.3%) who had vitamin D deficiency. The incidence of RDS was 70.6% (RDS stage I 33.3%, RDS stage II 31.4%, RDS stage III 5.9% and RDS stage IV 0%). Umbilical cord arterial vitamin D deficiency influenced the incidence of RDS (OR 11.33; 95% CI 1.95-65.93; p=0.007). Maternal history without vitamin D supplementation is also a factor influencing RDS (OR 9.14; 95% CI 2.14-39.07; p=0.003). Gender, birth weight, maternal history of premature rupture of membranes >18 hours have no significant effect on incidence of RDS in very low birth weight infants. Conclusion in our study, vitamin D deficiency in umbilical cord artery and maternal history without vitamin D supplementation increase the risk of RDS in very low birth weight infants.

**Key words:** vitamin D, umbilical cord artery, respiratory distress syndrome, very low birth weight