**Additional file 3- Main methodological characteristics of included studies**

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| Year, Author | Country | Therapy method  (patients) | Randomized (Y/N) | Inclusion criteria | Exclusion criteria | BPD  definition |
| 2020, Chen J et al11 | China | HFNC: FiO2: 30%-40%, flow:4-6 /min, at 37°C.  CPAP: flow 4-8 L/min, PEEP 5-7 cmH2O, FiO2:40%, | Y | GA <32 and weight:<1,000 g; with SDR; invasive ventilation and within seven days after birth; prepared for tracheal extubation and a change to non-invasive ventilation. | Congenital airway mal formations, congenital diaphragmatic hernia, congenital lung dysplasia, tracheo esophageal fistula; life-threatening congenital mal formations. | NR |
| 2020, Leibel S et al17 | Canadá | HFNC: 5-8 L/min.  CPAP:5-10 cm/H2O | Y | GA ≤28; IGCo=34/7; tolerating full enteral feeds and were not orally feeding | GA >28 weeks’ , extubated less than a week  prior to randomization, on biphasic CPAP or NIPPV, or had significant  congenital or neurological anormalities | NICHD |
| 2019, Demirel G et al18 | Turquia | HFNC:flow: 6L/min(max.8). FiO2 was adjusted to maintain SpO2 between 90 and 95%..  CPAP: 6 cm/H2O (max. 7) | Y | GA ≤32 with a AIG and had spontaneous respiration. | Intubation after birth, congenital anomalies, intrauterine  growth restriction, and perinatal asphyxia. | NR |
| 2019, Shokouhi M et al19 | Iran | HFNC: 2-8 L/min  Oxygen flow (L/min) = 0.92 + (0.68 + weight [kg]); FiO2: 0.21-1.0  CPAP: 4 cm /H2O; FiO2:0.4. | Y | GA: 28 - 36 RDS affliction, NICU admission length of < 24 h,  oxygen requirement with the  FiO2 of more than 40 mmHg, and 5-min Apgar  Score: > 5. | Congenital heart defects or other  major congenital anomalies. | NR |
| 2018, Murki S et al20 | Índia | 1-7 L/min.  CPAP: pressures to SpO2:90%-95%. | Y | PT≥28 weeks GA; birth weight ≥1,000 g;  SDR first 6 h of birth | Infants with major mal formations and those intubated in the DR. | 36 weeks PMA |
| 2018, Farhat A A et al21 | Iran | CPAP:  6 8cm/H2O  HFNC:  2 - 5 L/min | N | PT:28-34 weeks and 800-2500 g; | Severe asphyxia, major anomalies, < 800g or > 2500 g, GA <28 or> 34 weeks, congenital pneumonia, primary blood culture, parental dissatisfaction. | Supplemental oxygen more than 28 days |
| 2017, Soonsawad S et al22 | Thailand | HFNC: 4 L/min  CPAP: pressure was set similar to the pressure of PEEP of ventilator | **Y** | Intubated, (GA) <32 weeks  and <1500 g | < 700 g, major congenital heart diseases, airway  anomalies, lung hypoplasia, and neuromuscular disorders | NR |
| 2017, Shin J et al10 | Korea | HFNC: 3-7 L/min  CPAP: 4-7 cm/H2O | **Y** | Not meet the invasive respiratory support | GA <30 weeks or< 1,250 g; congenital anomalies of the upper airway tract, major congenital or chromosomal abnormalities, air leak or cardiovascular instability | NICHD |
| 2016, Lavizzari A.et al23 | Italy | HNFC: 4 to 6 L/min  CPAP: 4 to 6 cm/H2O | Y | GA: 29- 36 weeks 6 days; mild to moderate SDR and parental consent obtained | Severe RD; major congenital anomalies respiratory; or severe IVH | NR |
| 2016, Kadivar M et al24 | Irã | HFNC: 4 L/min  CPAP:5-8 cmH2O | Y | SDR, surfactant replacement therapy, extubated within one hour after  INSURE method | Asphyxia, respiratory  disease, major congenital  anomalies, and had not needed surfactant  replacement therapy  or had long intubation for more hours | NR |
| 2014, Kugelman A et al25 | Israel | HFNC: 1-5 L/min.  NIPPV: at a synchronized mode | Y | GA<35 week >1,000 g,  SDR and written  informed consent. | Cardiac  disease,  congenital malformation, cardiovascular or  respiratory instability or the unavailability  of suitable ventilator/device | 36 weeks PMA |
| 2014, Ciuffini F et al26 | Itália | CPAP: 4-6 cmH 2O;  HFNC: 4-6 L/min. | Y | GA 29 and 36 weeks;  mild to moderate RD  Informed parental consent;  FiO2 > 0.35-0.40 to maintain  an SpO2 between 85-93% and / or dyspnea  intubated and treated with  INSURE | Congenital mal formations and IVH  severe, not possible to obtain consent from the parents. | NR |
| 2013, Yoder B A et al27 | EUA and China | HFNC: infant weight.  CPAP: 5-6 cm H2O. | Y | >1000 g and GA 28 weeks. | Air leak syndrome; abnormalities of upper and lower airways; serious abdominal, cardiac, or respiratory malformations | Oxygen reduction test. |
| 2013, Collins C L et al28 | Australia | HNFC: 4 L/min  CPAP: 8 cm/ H 2O | Y | GA< 32 weeks, endotracheal intubation and  positive pressure ventilation | Upper airway  obstruction, congenital airway malformations, or major cardiopulmonar malformations | 36 weeks PMA |
| 2013, Manley B J et al29 | Australia | HFNC: 5-6 L/min  CPAP: 7 CM/ H2O | Y | <32 weeks, MV through an endotracheal  tube, and were scheduled to undergo extubation  for the first time to noninvasive respiratory support. | GA>36 weeks at the time of extubation,  major congenital anomaly | 36 weeks PMA |

**BPD:** Bronchopulmonary dysplasia **RCT:** Randomized Clinical Trials **HFNC:** High flow nasal cannula **CPAP:** Continuous Positive Airway Pressure **NICHD:** National Institute of Child Health and Human Development **PMA:** Postmenstrual age **NIPPV:** Intermittent positive pressure ventilation **PT:** preterm **GA:** gestacionalage **SDR:** syndrome distress respiratory **DR:** delivery room **PMA:** Post menstrual age **MV:** mechanical ventilation **IVH:** intraventricular hemorrhage