

Table 20b. Pregnancy, Labour, and Breastfeeding Behaviours After SCI

Author, Year; Country Score Research Design Total Sample Size	Methods	Results
<p>Khalili et al. 2022 Sweden Case control Level 3 N=109</p>	<p>Objective: The aim of this study was to describe the rate of pregnancy in spinal cord injured women in Sweden as well as pregnancy, delivery, and neonatal outcomes Population: N=109, 82% Paraplegia, 18% Tetraplegia, Methodology: Data from the Swedish Medical Birth Register and the National Patient Register. The general population was used as reference and included all non-spinal cord injured patients who gave birth during the same period of time. Outcome Measures: Pregnancy Rate, Pregnancy, Delivery, and Neonatal Outcomes</p>	<ol style="list-style-type: none"> 1. Caesarean delivery (34%) was most common across women with SCI compared to the general population (18%) 2. Pregnant women with paraplegic SCI had greater incidence of recurrent UTI 3. In the SCI group, 15% of infants were preterm, most were born term 4. A slightly higher percentage of SCI women sought medical care for infertility lasting more than 2 years
<p>Crane et al. 2019 USA Case-control Level 3 N=529 N with SCI=161</p>	<p>Objective: To assess pregnancy outcomes among women with spinal cord injury, paralysis, or spina bifida using population-based data. Population: N=529 SCI: N=161 Methodology: Diagnosis codes were screened to identify cases and a 10:1 random sample of comparison women. Relative risks (RR) and 95% confidence intervals (CI) were calculated overall and separately for each condition using multivariable regression. Outcome Measures: Pregnancy Outcomes (Weight gain, gestational diabetes, preeclampsia, etc.), Delivery/ labour characteristics, and Longer-term Outcomes</p>	<ol style="list-style-type: none"> 1. Pregnant women with SCI had a RR of 14.90 for UTI 2. Caesarean delivery (RR 1.98) and obstructed labor (RR 2.73) were higher in SCI population 3. Women with SCI were hospitalized for more than 4 days after vaginal birth (RR 8.25) 4. Hospitalization related to postpartum depression was RR 7.36 higher than general population 5. In the SCI group, gestational age <37 weeks had a RR 1.27 6. Infant had a RR 1.52 of hospitalization days more than 4 7. The greatest increased risks of rehospitalization occurred in the first year after delivery for all groups, although the increased risks for women with SCI were not statistically significant.

<p>Morton et al. 2013 USA Case-control Level 3 N=34</p>	<p>Population: 48 pregnancies in 34 women with various physical disabilities (22 of the pregnancies were by women with SCI). Median maternal age of 27 years (range 21-40 years). 17 women had injuries at or above T6 and 5 had a SCI below T6. Treatment: None Outcome Measures: Pregnancy complications and evaluation of breastfeeding 6 weeks postpartum</p>	<ol style="list-style-type: none"> 1. Women with physical disabilities were less likely to breastfeed (53%) their children than women without SCI (77%; P = 0.02). 2. Medications used by patients with chronic SCI may affect breastfeeding rates. 3. Autonomic Dysreflexia (AD) occurred in 10 out of 17 women with SCI T6 and above.
<p>Robertson et al. 2020 UK Case series Level 4 N=68</p>	<p>Objective: To assess pregnancy outcomes in women with spinal cord injury. Population: N=68, 44 Traumatic Methodology: Reviewing maternity records of all pregnant women with SCI attending the National Spinal Injury Centre at Buckinghamshire NHS Trust between 1991 and 2016 Outcome Measures: Antenatal complications, method of anaesthetic, intrapartum data (gestation at delivery, onset of labour, mode of delivery, indication for obstetric intervention) and neonatal outcomes (low birth weight, stillbirth, neonatal death)</p>	<ol style="list-style-type: none"> 1. 57 births were cephalic and 8 were breech 2. 25 women presented with worsening spasms during pregnancy and 16 had UTIs 3. 77% of pregnancies were vaginal deliveries while 23% were caesarean deliveries 4. Most pregnancies were carried to term
<p>Andretta et al. 2019 Italy Case series Level 4 N=52</p>	<p>Objective: To further describe changes to bladder management that occur during pregnancy in women with SCI Population: N=52, Mean age: 43, Mean age at injury: 18, 39 TSCI, 5 NTSCI, ASIA: 22A/ 12B/ 6C/ 4D Methodology: Data were collected by retrospective analysis of medical records and via cross-sectional survey of 52 women with SCI, representing 67 pregnancies, at ten Italian neurological clinics. Outcome Measures: Pregnancy, Delivery, Urodynamics, Bladder</p>	<ol style="list-style-type: none"> 1. Bladder voiding changed mostly in the first trimester during first (45%) and second (55%) pregnancy to intermittent or indwelling catheters 2. Urinary incontinence worsened or developed during pregnancy (46.2%) 3. 48.1% had UTIS and 21.2% had recurrent UTIS (>3 events) 4. 52% of the first and 50% of the second pregnancy were delivered at term
<p>Skrowronski & Hartman 2008 Australia</p>	<p>Population: All tetraplegic women presenting to the obstetric service of a university teaching hospital, which also provides a regional</p>	<ol style="list-style-type: none"> 1. Of the seven pregnancies, 2 were babies who were exclusively breastfed, 2 were fed with breast milk and supplements, 1 was bottle

<p>Case Series Level 4 N=5</p>	<p>spinal injury service, between 1981 and 2006. This case series describes seven pregnancies in five tetraplegic women. Mean age at the time of injury was 22 years, and, at the time of pregnancy, 33 years. All participants had spinal cord injuries in the region of C6.</p> <p>Treatment: None</p> <p>Outcome Measures: Course, complications, management and outcomes of pregnancy in tetraplegic women.</p>	<p>fed, 1 was express fed + supplements, and 1 was fed for two days nasogastric feeding, then by bottle.</p> <ol style="list-style-type: none"> All 5 women experienced some difficulties with breastfeeding, including autonomic dysreflexia, inhibition of the milk ejection reflex, and problems of infant handling. Paradoxically, one participant with complete cord lesion at C6 had minimal difficulties with breastfeeding.
<p>Mazzia & Berndt 2023 International Cross-sectional Level 5 N=780; N=14 SCI</p>	<p>Objective: The objectives of this study were to determine the obstetric and neonatal outcomes of people who acquired spinal cord injuries (SCI) during pregnancy.</p> <p>Population: N=780 SCI Group: N=14, Mean age: 38.9, 3 Cervical, 8 Thoracic, 3 Lumbar</p> <p>Methodology: Observational questionnaire examining pregnancy outcomes of people with SCI</p> <p>Outcome Measures: Prenatal and Postnatal Complications and Neonatal Outcomes</p>	<ol style="list-style-type: none"> Most women with SCI had vaginal births (54.5%) Unaware contractions (20%) and bladder infections (30%) were the most common pregnancy complication 54.5% were preterm births and 36.4% were admitted into the NICU Most common postpartum outcomes were depression (30%)
<p>Lee et al. 2018 Sweden and Canada Cross-sectional Level 5 N=102</p>	<p>Population: Women with SCI (C1-L4). Mean age 41.31±9.77 years. AD was reported by 46.7% of women with cervical SCI (n=14). 25% of women with upper thoracic (T1-T6) SCI (n=3) and 13.1% of women with low-level SCI below or at T7 (n=8). 76.7% (n=23) of women with cervical SCI indicated insufficient milk production as a major breastfeeding complication compared to 58.3% (n=7) of upper thoracic and 36.1% (n=22) of low-level SCI.</p> <p>Treatment: None</p> <p>Outcome measures: Participants' injury, pregnancy, childbirth, lactation/breastfeeding difficulties, breastfeeding education and psychological wellbeing (using validated scales for quality of life</p>	<ol style="list-style-type: none"> Breastfeeding cessation in women with cervical and upper thoracic SCI was mainly due to lack of time for both breastfeeding and personal care (bladder care, showering, activities of daily living). The low-level SCI group reported sleep deprivation. 63% (n=56) of women who sought information self-researched or received no education on breastfeeding with SCI.

	<p>after SCI, postpartum depression, anxiety, maternal self-efficacy).</p>	
<p>Bertschy et al. 2016 Switzerland Cross-sectional Level 5 N=17</p>	<p>Population: 17 women who are mothers with SCIs who gave birth over to 23 children over the last 15 years (age range= 18-54 years), mean age of SCI= 21yo, mean age of giving birth= 33yo, 13 paraplegic and 4 tetraplegics</p> <p>Treatment: None. Descriptive study of the most frequent secondary medical problems during the pregnancies of women with SCI.</p> <p>Outcome Measures: The questionnaire specifically asked about skin problems, bowel function, UTI frequency, mode of delivery, decubital ulcers, hospital admissions, medication changes, respiratory tract problems, and changes in neurogenic lower urinary tract dysfunction symptoms. In addition, patients were asked whether they took prophylactic measures against UTIs, decubitis, and deep vein thrombosis.</p>	<ol style="list-style-type: none"> 1. All participants practiced independent bladder management. 3 women changed their bladder management techniques during pregnancy. 5 women reported an increased bladder evacuation frequency during pregnancy, and 6 women reported a new onset or increase in incontinence. 2. 10/17 women performed prophylactic measures against deep vein thrombosis where 9/10 of them used compressive stockings. No incidences of deep vein thrombosis were diagnosed during pregnancy. 3. 10 women were hospitalized during the course of their pregnancies. Aside from urinary tract infections/ pyelonephritis, women were hospitalized for falls, hypertension, pneumonia, preeclampsia, pre-term labour or tachycardia. 4. Although medical complications are not infrequent during pregnancy in women with SCIs, pregnancy and delivery in this group of women are possible without posing intolerable risks to the mothers or the children. 5. Women had vaginal births (1 required general anesthesia) while 11 women underwent caesarean sections (8 general and 3 epidural anesthesia).

<p>Mitra et al. 2015 USA Cross-sectional Level 5 N=13,361 N=1,015 women with disabilities</p>	<p>Population: Women with disability (n=1,015) and women without disability (n=12,346). Ages categorized as <20, 20-29, 30-39 and 40 years. Treatment: None Outcome Measures: reported breastfeeding, maternal attitudes and experiences</p>	<ol style="list-style-type: none"> 70% of women with disabilities reported ever breastfeeding or pumping compared to 75% of women without disabilities (p<0.01). 45% of women with disabilities were currently breastfeeding versus 53% of women without disabilities (p<0.01). Type of disability is not specified: participants self-identified by answering "Are you limited in any way in any activities because of physical, mental, or emotional problems?"
<p>Iezzoni et al. 2015a USA Cross-sectional Level 5 N=1907</p>	<p>Population: 1907 women with traumatic SCI (age range=18-49 years). Treatment: None Outcome Measures: Data included SCI clinical details, functional impairments, participation measures, depressive symptoms, life satisfaction, and hospitalizations in the last year relating to pregnancy or its complications.</p>	<ol style="list-style-type: none"> 2% of participants were hospitalized during the past 12 months for a reason related to pregnancy, which differed significantly by the years elapsed since injury. The highest rate occurred 15 years post injury (3.7%). Younger age at injury was associated with current pregnancy (p<0.0001). Those reporting pregnancy were more likely to be married or partnered, have sport-related SCI, have higher motor scores, and have more positive psychosocial status scores.
<p>Iezzoni et al. 2015b USA Cross-sectional Level 5 N=22 N=8 with SCI</p>	<p>Population: 22 women (34.8±5.3years); most were white, well-educated, and higher income; 8 had SCI, 4 had cerebral palsy, 10 had other conditions; 18 used wheeled mobility aids. Treatment: None Outcome Measures: maternal experience in women with SCI.</p>	<ol style="list-style-type: none"> Some women's obstetricians had height adjustable examination tables, which facilitated transfers for physical examinations. Other women had difficulty transferring onto fixed height examination tables and were examined while sitting in their wheelchairs. Family members and/or clinical staff sometimes assisted with transfers; some women reported concerns about transfer safety. No women reported being routinely weighed on an accessible weight scale by their prenatal care clinicians. A few were never weighed during their pregnancies.
<p>Iezzoni et al. 2015b USA Observational Study</p>	<p>Population: 22 women (34.8±5.3years); most were white, well-educated, and higher income; 8 had SCI, 4 had cerebral palsy, 10 had other conditions; 18 used wheeled mobility aids.</p>	<ol style="list-style-type: none"> 14 had caesarean deliveries (8 elective). Impairment-related complications during pregnancy included: falls; urinary tract and bladder problems; wheelchair fit and stability problems

<p>Level 5 N=22 N=8 with SCI</p>	<p>Treatment: None Outcome Measures: Functional impairment-related complications during pregnancy.</p>	<p>that reduced mobility and compromised safety; significant shortness of breath, sometimes requiring respiratory support; increased spasticity; bowel management difficulties; and skin integrity problems (this was rare, but many women greatly increased skin monitoring during pregnancy to prevent pressure ulcers).</p> <ol style="list-style-type: none"> Women with mobility disabilities appear to experience problems relating to their functional impairments. Pre-conception planning and in-depth discussions during early pregnancy could potentially assist women with mobility disabilities to anticipate and address these difficulties.
<p>Jackson & Wadley 1999 USA Cross-sectional Level 5 N=472</p>	<p>Population: Women who gave birth pre-injury (n=242) and postinjury (n=66). Mean age at the interview was 40 years. Cervical, thoracic and lumbar with AIS A, B, C, D. Lesion levels and breakdown not provided for women who answered pregnancy questions. Treatment: None Outcome measures: self-reported reproductive health issues</p>	<ol style="list-style-type: none"> Of women who gave birth pre-SCI, 28% breastfed their children pre-injury; only 11% breastfed post-injury (P < 0.05). Breastfeeding duration was longer post-SCI than pre-SCI at 6.1 months vs 4.2 months.
<p>Khazaeipour et al. 2018 USA Qualitative Study N=8</p>	<p>Objective: This study investigated the experience of pregnancy and childbirth in women with spinal cord injury (SCI). Population: N=8 women, Mean age= 34.5, Mean time since injury= 14 years, 6 Thoracic, 2 Lumbar, 8 complete Methodology: The data were collected using telecommunication and face-to-face semi-structured interviews with eight women with SCI. The study employed the interpretative phenomenological approach and thematic analysis Outcome Measures: Childbearing experience of women with SCI</p>	<ol style="list-style-type: none"> Five main themes have emerged from data analysis: (1) revivification, (2) fear and concern of motherhood with SCI, (3) flawed health care system, (4) maternal experience under a supportive umbrella, and (5) strengthening spirituality and religious belief

<p>Cross et al. 1991 USA Interview study Qualitative N=16</p>	<p>Population: 16 women with SCI, with a total of 22 live births. Average maternal age (at delivery) was 25.6 years. 9 injured at or above T6 (12 live births), 7 injured below T6 (10 live births). Treatment: None Outcome measures: pregnancy outcomes and complications.</p>	<ol style="list-style-type: none"> 1. All women who chose to breastfeed were able to do so (number of women or SCI level is not stated for those women). 2. One woman reported an increase in spasticity while breastfeeding her child.
<p>Hocaloski et al. 2017 Canada Workshop Report N=29</p>	<p>Population: Of 29 women in attendance, there were 7 physicians, 7 registered nurses (RNs), 5 people with SCI, 2 physical therapists (PTs), 2 occupational therapists (OTs), 1 mental health professional, 1 social worker, 1 researcher, 1 knowledge translation (KT) specialist, 1 PhD student. Treatment: None Outcome measures: n/a (workshop for consensus on care in Canada)</p>	<ol style="list-style-type: none"> 1. A pre-meeting online survey of stakeholders elucidated 3 themes: lack of knowledge for both consumers and care providers, gaps in access to services and information, and a need for collaboration throughout the perinatal journey. 2. The workshop addressed issues of care providers' lack of knowledge of non-medical issues during the perinatal period, physical and attitudinal barriers to access to care for women with SCI, and the need for better collaboration and communication between care providers, the latter potentially initiated by providing information to care providers through the women with SCI themselves. 3. Content experts attending the workshop collectively made recommendations for knowledge generation and research priorities, clinical application priorities, and the need for policy and guideline development in this field. Two information sources for women have since been developed and are available online