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The effect of spinal cord level on sexual function in the spina bifida population

N.G. Lee [c], E. Andrews [a], I. Rosoklija [a], T. Logvinenko [a,d], E.K. Johnson [a], R.D. Oates [b], C.R. Estrada Jr [a]

[a]Department of Urology, Boston Children's Hospital, 300 Longwood Ave, Boston, MA 02115, USA

[b]Boston University Medical Center, 725 Harrison Ave, Suite 3B, Boston, MA 02118, USA

[c]Children's National Medical Center, 111 Michigan Ave. NW, Washington, DC 20010, USA

[d]The Clinical Research Center, Boston Children's Hospital, 300 Longwood Ave, Boston, MA 02115, USA

Correspondence to: N.G. Lee, Children's National Medical Center, 111 Michigan Ave. NW, Washington, DC 20010, USA, Tel.: +1 202 476 3262; fax: +1 202 476 4739

noraglee@gmail.com (N.G. Lee)
elizabeth.andrews@childrens.harvard.edu (E. Andrews)
ilina.rosoklija@childrens.harvard.edu (I. Rosoklija)
tanya.logvinenko@childrens.harvard.edu (T. Logvinenko)
ekjohns@gmail.com (E.K. Johnson)
robert.oates@bmc.org (R.D. Oates)
carlos.estrada@childrens.harvard.edu (C.R. Estrada)

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Summary

Introduction
Sexual dysfunction and infertility are prevalent in the spina bifida (SB) population; however, the mechanism of how they affect a person with spina bifida is poorly understood. Additionally, the management of children with spina bifida becomes more difficult as they exit from pediatric institutes.

Objective
The present study sought to evaluate sexual health (using validated questionnaires) and fertility in adults with spina bifida and to correlate spinal cord level and ambulatory status with degree of sexual function.

Study design
After institutional board review approval, 199 adult patients with SB, aged 18 and older and who were followed in one pediatric institution, were identified. Patients who were non-English speaking, cognitively and/or developmentally delayed, or unable to be contacted were excluded. Surveys regarding demographics, sexual health and infertility were mailed to the patients and administered in the clinic with the option to opt-out of the survey. Survey questions regarding sexual health were constructed using validated questionnaires: Female Sexual Function Index (FSFI) for females, and International Index of Erectile Function (IIEF) and Sexual Health Inventory for Men (SHIM) for males. Sexual dysfunction scores were correlated to the patients' spinal level and ambulatory status.

Results
Of the 121 eligible patients, 45 replied, with a response rate of 39%. For females, using a cut-off value of 26.5 for FSFI scoring, 25 out of 28 (89%) had sexual dysfunction. No association was seen between spinal level or ambulatory status and overall FSFI, satisfaction, or desire scores. For males, 10 out of 17 (59%) had severe erectile dysfunction (ED), and one out of 17 (6%) had no ED. No association was seen between ambulatory status and sexual function scores for the males. However, SHIM, satisfaction, and ED scores were higher in males with lower spinal lesions. People with spina bifida of both genders tended to have moresevere dysfunction compared to those with sexual dysfunction of other etiologies, except with similar sexual desire scores. Regarding questions on fertility, no participant attempted to have children; thus, there was no infertility reported.

Discussion
Few studies have been conducted on sexual health and fertility in adults with SB. Three studies have utilized validated questionnaires and found varying degrees of sexual dysfunction in this subset of patients; however, only one study found sexual activity to be more likely in patients with more caudal levels of neurologic impairment. The present study also showed that SHIM, satisfaction, and ED scores were higher in males with lower spinal lesions. Limitations to this study primarily included the small sample size and low survey response rate.

Conclusion
Limited information is known about adults with SB, and sexual function and fertility. While expressing sexual desire, adults with SB appear to experience high rates of sexual dysfunction. Fertility rates were inadequately assessed; this was possibly due to the high rate of sexual dysfunction. Sexual health in the SB population is an important component of the myriad of urologic care issues for these people. Due to the disparity in their care after reaching adulthood, it is prudent to follow these patients and understand their pathophysiology as they continue to mature through life.

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Table Female FSFI and male IIEF survey results.

Female Sexual Function Index for women: variable (score range) $n = 28$	Median (interquartile range)	*P*-value for spinal level, ambulatory level
Female Sexual Function Index: full scale score (range 2–26)	5.0 (2.7–17.2)	0.40, 0.57
Sexual desire (range 2–10)	4.0 (2.0–6.0)	0.77, 0.48
Arousal (range 0–20)	0.0 (0.0–6.3)	–
Lubrication (range 0–20)	0.0 (0.0–7.0)	–
Orgasm (range 0–15)	0.0 (0.0–3.5)	–
Satisfaction (range 0–15)	4.0 (1.5–9.5)	0.72, 0.71
Pain (range 0–15)	0.0 (0.0–12.3)	–
International Index of Erectile Function for men: variable (score range) $n = 17$	**Median (interquartile range)**	***P*-value for spinal level, ambulatory level**
Sexual Health Inventory for Men: score (range 1–25)	5.0 (1.0–12.0)	0.02, 0.15
Erectile function (range 1–30)	5.0 (1.0–13.0)	0.02, 0.26
Orgasmic function (range 1–10)	1.0 (0.0–5.0)	–
Sexual desire (range 2–10)	5.0 (2.0–8.0)	0.36, 0.83
Intercourse satisfaction (range 0–15)	0.0 (0.0–0.0)	–
Overall satisfaction (range 2–10)	3.0 (2.0–4.0)	0.046, 0.33

Introduction

Pediatric patients with spina bifida (SB) face many challenges, including those that result from transitioning care into adulthood [1]. Bladder and bowel management are heavily emphasized and often time-consuming, whereas sexual dysfunction and infertility may be less well addressed. Additionally, the pathophysiology of these disease processes for SB patients are poorly understood and infrequently studied.

Several previous studies have assessed sexual function in adults with SB [2–9]; however, only three have reported validated questionnaires, and only one evaluated both genders [2–4]. Given this limitation, the present study sought to further evaluate sexual dysfunction in adult women and men with SB using validated questionnaires. It additionally aimed to analyze the extent of sexual dysfunction according to spinal level and ambulatory status, hypothesizing that lower spinal levels and greater ambulatory state would be associated with lower degrees of sexual dysfunction. Given the ill-defined nature of infertility in adults with SB, it also sought to evaluate fertility as a secondary outcome.

Materials and methods

Patient cohort

Following institutional review board approval, 199 adults with SB, aged 18 to 39 and who were followed in the multidisciplinary SB clinic at one pediatric institution, were identified. Patients were excluded if they were non-English speaking, had cognitive or developmental impairment, or were unable to be contacted due to various reasons. Cognitive function was determined through medical records. Surveys were also excluded if the answers were markedly incongruent, as these patients were considered to be cognitively delayed.

Survey instrument

Surveys regarding general demographics, comorbidities, sexual health and fertility were mailed to the patients, with the option to opt-out of the survey. Surveys were also administered in the SB clinic. Questions regarding sexual health were obtained from validated questionnaires, including the Female Sexual Function Index (FSFI) for women, and the International Index of Erectile Function (IIEF) for men [10,11]. Analysis of the full 15-question IIEF survey was used, along with the five-question subset called the Sexual Health Inventory for Men (SHIM). Each survey group's questions were based on domains within sexual dysfunction, including: sexual desire, arousal or erectile function, orgasmic function and satisfaction. For female and male questionnaires, the lower the score, the more substantial the degree of dysfunction. For the 19-question FSFI survey, the full-scale overall score is derived from a computational formula, as described by Rosen et al. [10]. A value below 26.5 is indicative of female sexual dysfunction. For the male survey, the SHIM score gives an assessment of overall degree of sexual dysfunction, while the IIEF survey allows individual domains to be scored and categorized [11].

Data analysis

Descriptive statistics were used to characterize the demographics, comorbidities and sexual health survey responses of the present population of adult patients with SB. Age and scores were reported as medians (interquartile