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Introduction
Female sexual dysfunction (FSD) is defined as the occurrence of changes in any one of the four phases of the female sexual response including desire, arousal, orgasm, resolution, or the presence of persistent or recurrent pain. The DSM-V defines FSD to include 1) sexual interest/arousal disorder, 2) orgasmic disorder, 3) genito-pelvic pain/penetration disorder. FSD is multifactorial and involves physical, social, and psychological dimensions. Pregnancy may be a risk factor for FSD with possible causes including hormonal changes, altered self-image, and changes in PFM function, but data in the literature is limited and sometimes contradictory.

Aims of the Study
1) Compare sexual function and PFM strength in primigravid and non-pregnant nulliparous women
2) Categorize the participants into groups based on their sexual dysfunction status and compare PFM strength in women with and without FSD
3) Evaluate the correlation between the FSFI scores and the results of PFM strength evaluations

Study Design/Methods
Cross-sectional observational study

Inclusion criteria:
- Primigravid group (PG)- pregnant for first time, singleton of at least 14 wks of gestational age, reporting sexual intercourse at least 1x in past 4 wks
- Non-pregnant nulliparous group (NG)- never been pregnant, reporting sexual intercourse at least 1x in past 4 wks

Exclusion criteria for both groups:
- Inability to contract the PFM, prior Urogyn surgery, presence of cognitive impairment, neuro conditions, or degenerative disease, presence of UTI at time of assessment

Clinical evaluation: same investigator (a PT) performed all evaluations using standardized verbal commands, intra-tester reliability tested using 11 women tested on 2 different days (Kappa for vaginal palpation 0.91; ICC for vaginal squeeze 0.94 demonstrating high intra-tester reproducibility
- PFM assessment in supine hookling, with empty bladder
    - Bidigital (index and middle fingers) at 4 cm into the vagina (at midline?) to assess ability to contract and relax and to test strength of the PFM without overflow of other mm groups and without breath holding
  - The original Laycock Modified Oxford used the index finger only and testing was performed at 4 and 8 o’clock
Participants did 3 “inward and upward” PFM contractions with maximal effort x 5 secs each interrupted by a 1 minute rest

- Vaginal squeeze pressure in supine hooklying
  - Peritron pressure manometer measuring cmH₂O with probe 4 cm into vagina (rationale given that the PFM anatomically are ~3.5 cm from the introitus and that this area represents the high pressure zone per Frawley 2006, ref. #16)
- Participants did 3 “inward and upward” PFM contractions with maximal effort x 5 secs each interrupted by a 1 minute rest
- Investigators used the average of the 3-peak pressure

- FSFI questionnaire (validated in Portuguese and in Brazilian pregnant women) used to assess sexual function during the last 4 weeks, completed in a private place
  - Domains include desire, arousal, lubrication, orgasm, satisfaction, pain
  - 19 items
  - Total score is obtained by adding domain scores (possible scores range from 2-36)
  - Higher score = better sexual function
  - Cut-off score of 26.5 for differentiating those with (scores below 26.5) and without (scores above 26.5) sexual dysfunction (Wiegel 2005)

**Statistical analysis performed using Statistical Package for Social Sciences (SPSS V21)**

**Results**

- Study participants: 105 pregnant, 90 non-pregnant assessed for eligibility; 41 did not meet inclusion criteria (Figure 3)
- Table 1 showed that women were similar in age in both groups, PG > BMI and were less active

<table>
<thead>
<tr>
<th>Table 2</th>
<th>PG (N = 76)</th>
<th>NG (N = 78)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSFI desire</td>
<td>better</td>
<td></td>
</tr>
<tr>
<td>FSFI arousal</td>
<td>better</td>
<td></td>
</tr>
<tr>
<td>FSFI lubrication</td>
<td>better</td>
<td></td>
</tr>
<tr>
<td>FSFI orgasm</td>
<td>better</td>
<td></td>
</tr>
<tr>
<td>PFM Oxford score</td>
<td>greater</td>
<td></td>
</tr>
<tr>
<td>PFM Peritron</td>
<td>greater</td>
<td></td>
</tr>
<tr>
<td>FSD (FSFI scores &lt; 26.5) (74 of 154)</td>
<td>62%</td>
<td>28%</td>
</tr>
<tr>
<td>All of these women had lower PFM Oxford scores (Table 3)</td>
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</tbody>
</table>

- Correlation of FSFI total score compared to PFM palpation/Oxford and squeeze pressure/Peritron in entire sample (N = 154) (Table 3)
  - Women with lower PFM values had lower FSFI scores (N=74) regardless of pregnancy status
  - Women with higher PFM values had higher FSFI scores (N=80) regardless of pregnancy status

**Discussion**

- Main finding of this study: women with FSD had lower PFM values regardless of pregnancy status (Table 3)
  - Although the majority of those with FSD were in the PG (62%)
There was a strong positive correlation between sexual function (FSFI) and PFM strength. The NG had better PFM variables and FSFI scores (desire, arousal, lubrication, orgasm) than PG:
- PG were in their 1st pregnancy (no deliveries yet that could be relevant to PFM function)
- Groups were homogenous with respect to age to exclude the influence of age on PFM function
- Differences in physical activity (PA) were deemed non-influential (PG did “mild” PA)
  - It is unclear from the article how they measured this

Observational studies cannot establish causality, but the authors believe that reduced PFM strength is associated with FSD due to:
- Weak involuntary rhythmic contractions of PFM during orgasm, change in vaginal distension with penile penetration, hypotonia (not defined) leading to vaginal hypoesthesia, anorgasmia, and UI during orgasm

Other studies in support:
- Franco 2016 postmenopausal women
- Franceschet 2009 pregnant women in their 2nd and 3rd trimester
- Martinez 2014 non-pregnant women

Multiple pregnancy variables affecting both PFM and sexual function (therefore it is not possible to attribute FSD during pregnancy to decreased PFM strength alone):
- Hormonal changes (ligamentous laxity, changes in the vaginal lumen and epithelial cells, N/V, breast changes, fatigue, reduced lubrication leading to possible dyspareunia)
- Physical changes (distension of abdomen, weight of fetus on PF, biomechanical changes on joints)
- Emotional/psychological changes (body image, positioning during sex, fear of harming the fetus and fear of premature delivery)

**Study Strengths:** one investigator, intratester reliability tested, between-group comparison, PG no deliveries, homogeneous re age, sample size, use of validated FSFI plus PE

**Study Weaknesses:** cross-sectional observational study

**Clinical Application**
- Study suggests it is important to pay attention to the role PFM in sexual function during pregnancy and provide guidance re s/s of FSD
  - Good sexual health is important to QOL and general well-being
  - s/s of FSD may continue into the postpartum period regardless of delivery type and may be due to changes in the PFM

**Questions to consider:**
- Do you regularly discuss sexual function with your patients regardless of pregnancy status?
- Do your patients generally want to discuss sexual function? Is there a discrepancy in comfortability regarding this discuss in different age groups or pregnancy status?
- Have you seen an improvement in sexual function with PFMT?

**Related Articles**
