

2014

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## Recommended Citation

Walton, Lori Maria; Ummul Ambia, S. J. M.; and Schbley, Bassima Hussein, "Incidence and Impact of Urinary Incontinence, Pain, and Other Comorbidities on Health Related Quality of Life (HRQOL) For Postpartum Bangladeshi Women" (2014). *Faculty Publications*. 8.

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# Incidence and Impact of Urinary Incontinence, Pain, and Other Comorbidities on Health Related Quality of Life (HRQOL) For Postpartum Bangladeshi Women

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**Abstract** - To investigate the incidence and impact of urinary incontinence (UI) and pain on health related quality of life (HRQOL) for postpartum Bangladeshi women. Methods: Prospective, cross sectional, correlational design (n=94) of postpartum Bangladeshi women, ages 18-44, with history of one or more obstetrical deliveries within the last three years. Subjects completed the Bengali version of the SF-36 and IIQ-7. Results: UI incidence was reported at 45% (n=39/86) total, 44% CS (n=18/41), and 47% (n=21/45) for NVD. IIQ-7 scores and UI presence showed strong correlations in both CS ( $\rho=.729, 84, p<.001$ ) and NVD ( $\rho=.874, 84, p<.001$ ). The highest impact of UI was reported in the CS group. One sample t-test reported significant differences for the sample when compared with the age equivalent norms for the SF-36 domain and component scores ( $p=.05-.001$ ). Significant differences in HRQOL were reported for women with "pelvic/abdominal pain" and "UI" compared to those without "pain" or without "UI" and strong inverse correlations ( $\rho=.597-.853$ ) were reported for subjects with "pain" on the SF-36 domains ( $p=.001$ ). The Mixed Birth Mode (MBM) group (n=8) reported UI incidence at 74% (n= 6/8), and pelvic/abdominal pain at 63% (n=5/8). Conclusion: No significant difference was found in UI and HRQOL measures by birth mode. However, pelvic, abdominal pain, and UI impact were found to be significant and inversely correlated to HRQOL. A significant decrease in HRQOL was reported compared to age related norm scores. Future research should address pelvic and abdominal pain and "mixed birth mode" impact on QOL and UI.

**Keywords** - Postpartum, Maternal Health, Health Related Quality of Life, Urinary Incontinence, Pelvic Pain, Community Based Programs

## 1. Introduction & Background

Bangladesh is a country with over one third of the population living in and another one third living just above poverty level (World Bank Report, 2008; Hossain, Kramer, Khandoker, Kramer, & Islam, 2011). The World Health Organization (WHO) (2010) indicates that Bangladesh has poor prenatal and postpartum care, nutritional deficiencies, high incidence of non-skilled birth attendant utilization, and the second highest maternal mortality and morbidity rates next to sub-Saharan Africa (Lumbiganon, Laopaiboon, Gulmezoglu, Souza, Taneepanichskul, & Ruyan, 2010; Menken, Duffy & Kuhn, 2003). These events make women living in Bangladesh more vulnerable to complications during pregnancy and continuing into the postpartum period that may reduce their health related quality of life (HRQOL) and increase the risk of urinary incontinence (UI) (Press, Klein, Kaczorowski, Liston,

& Von Dadelszen, 2007; Brugha & Pritze-Aliassime, 2003). It is important to also understand the needs, local practices, and perceptions of pregnancy, birth, and the postpartum period because of the Bangladeshi social and religious culture to determine the specific needs of this community.

Quality of life is defined as "the extent to which one's usual or expected physical, emotional, and social well being is affected by a medical condition or treatment" (Khanna & Tsevat, 2007). Amongst all women living in Bangladesh, over 80% reported at least one morbidity during one to three years following birth delivery either by C-section (CS), normal vaginal delivery (NVD), or assisted vaginal delivery (AVD) (Sibley, Blum, Kalim, & Hruschka, 2007; Chakraborty, Islam, Chowdhury, Bari, & Akhter, 2003). The most common morbidities during the pregnancy and related to postpartum morbidities included edema (23.33%), anemia (19.94%), urinary problems (16.76%), eclampsia (1.99%) and hemorrhage (3.51%) (Parkhurst & Rahman, 2007; Rahman, Parkhurst, & Normund, 2003). Other problems related to childbirth com-

plications include fistulae, uterine prolapse, urinary incontinence and pelvic pain (Rahman, Parkhurst, & Normund, 2003).

Bangladesh continues to have one of the highest maternal mortality and morbidity rates for developing countries. In 2010, the WHO reported that maternal mortality rates are 380/100,000. Although there are significantly fewer maternal deaths compare to previously reported rates of 450/100,000 in 2005 and 724/100,000 in 1990, the WHO has set a Millennial Development Goal 5 (MDG5) by 2015. The MDG5 aims to improve maternal health across developing countries, where maternal mortality rates continue to soar (Hogan et al., 2008; Filippi, Ronsmans, Campbell, Graham, Mills, Borghi, Koblinsky, & Osrin, 2006). Several studies have suggested a relationship between maternal morbidity and mortality (Islam et al., 2004; Fortney et al., 1999; Jejeebhoy, 1997). Others have demonstrated an increased incidence in mortality for women in Bangladesh who experience one or more morbidities in the postpartum period (Islam, Chowhury, Chakraborty, Bari, & Akhter, 2004; Fortney & Smith, 2005; Afsana & Rashid, 2000). Forty to 75% of women living in Bangladesh have reported one or more postpartum morbidities (Fronczak, Antelman, Moran, Caulfield, & Baqui, 2005; Akhter, Chodhury, & Sen, 2006).

Two common postpartum morbidities are urinary incontinence (UI) and decrease in quality of life (HRQOL). HRQOL may be directly impacted by other co-morbidities associated with the postpartum period (Islam, 2007). Therefore, this study investigates the relationship of common postpartum incontinence and its impact on the overall HRQOL for postpartum women living in Bangladesh. This information will be useful to health care professionals as they often design postpartum programs for women with UI and its associated HRQOL impairment.

The WHO Millennium Development Goal 5 (MDG5) is directed towards improving maternal health and HRQOL by decreasing maternal mortality and morbidities and by improving prenatal and postpartum programs for women living in developing countries such as Bangladesh. However, caesarean section (C-section) rates have risen above the WHO's 10% recommended safe rates (Dosa, 2001). The effect of birth mode on impairments and functional limitations during the postpartum period have not been explored. Part of this strategic goal includes improving access to prenatal and postpartum programs that will effectively reduce the morbidities associated with postpartum maternal health. However, there is currently no information on the specific morbidities experienced by women according to mode of birth delivery. Without this critical evidence, any attempt to comprehensively develop these prenatal and postpartum programs will lack focus.

Religious and gender-role expectations in a patriarchal society limit women's autonomous decision making when it comes to prenatal and postpartum care, nutrition, and daily activities and may also place Bangladeshi women at high risk for problems during childbirth or in the postpartum period.

Cost of care is another prohibitive factor for Bangladeshi women, especially in the rural areas where transportation to a healthcare facility may take several hours or the cost of care at the hospital may exceed the family's yearly income (\$590, UNICEF, GNI 2010). For these women, real solutions that create a standard of care that will be cost effective, culturally accepted, practical, efficient, and effective need to be explored. Women living in Bangladesh are vulnerable to complications during pregnancy and continuing into the postpartum period that may reduce their HRQOL and increase the risk of urinary incontinence. There are no studies comparing HRQOL and the incidence of urinary incontinence amongst Bangladeshi women who have had CS and those with NVD or AVD. The purpose of this study is to investigate the relationship of a common postpartum symptom, urinary incontinence, and the impact of UI on overall HRQOL of postpartum women living in Bangladesh.

## 2. Research Hypotheses & Research Questions

The incidence of UI and HRQOL in women living in Bangladesh are inversely related and directly correlated to mode of birth. Comorbidities, including pelvic and abdominal pain, UI, and decreased HRQOL measures, differ across age groups and mode of birth experienced. Related research questions for this study include: (1) What is the incidence of UI in women living in rural Bangladesh? (2) Does UI incidence have a correlation with mode of birth or health related HRQOL? (3) What is the health related HRQOL for postpartum women living in rural Bangladesh? (4) Is there a difference in health related HRQOL between those who undergo c-section and normal vaginal delivery (NVD)? (5) Is there a correlation between any of the variables (age, pain, complications, postpartum period, last reported UI) relating to Mode of Delivery (MOD), HRQOL or UI?

## 3. Methods

This was a prospective, correlational design study of 94 postpartum Bangladeshi women, age 18-44, with obstetrical deliveries within the last three years. This study compared the HRQOL and incidence of UI in women post CS and vaginal delivery. The exclusion criteria included failure to sign written consent, delivery time beyond three years, and a history of any of the following diagnosis: diabetes, pre-eclampsia, gestational diabetes, cardiopulmonary problems, abdominal surgeries, postpartum depression, neurologic disease affecting bowel and bladder function, and prior history of physical therapy addressing UI.

The study was implemented at the Center for Rehabilitation of the Paralyzed (CRP), a non-governmental organization (NGO) in Savaar, Bangladesh. The CRP operates a spinal cord injury hospital and a rehabilitation facility for patients with neurologic and orthopedic diagnosis, both on the same

campus in Savar. They provide medical services to underserved patients from 13 districts across Bangladesh, most of which are in rural regions. The Center for Rehabilitation of the Paralyzed is an ideal institution to conduct this research, as it primarily serves the local rural population of Savar.

Female subjects from the Center of Rehabilitation for the Paralyzed in Dhaka, Bangladesh, were contacted and those who met the inclusion criteria and who provided written consent were interviewed and completed both the SF-36 and the IIQ-7. The Bengali translation of the SF-36, a 36 question standardized survey tool that measures HRQOL, and the Bengali translated IIQ-7, which measures the impact of UI on functional activities were given to all participants who met the inclusion criteria. One hundred subjects were recruited using a purposive sampling method for a total of fifty in each group, according to birth mode. Six subjects were excluded from the study because of mixed birth mode status.

### 3.1. Validity and Reliability of SF-36 and IIQ-7

The Bengali translated Incontinence Impact Questionnaire-7 (IIQ-7) Bengali language version, interview questionnaire, and the Bengali translated SF-36 (Version 2) are both valid and reliable instruments for use with this population with excellent test-retest reliability (ICC= .94-1.0) and internal consistency (Cronbach's alpha= .94-.99) (Walton, Brown-Cross, Parvin, & Rahman, 2012; Khader, Hourani, & Al-Akour, 2011; Cam, Sakalli, Ay, Cam & Karateke, 2007). Convergent, construct, and concurrent validity were also good (Walton et al., 2012). The SF-36 was utilized to measure the HRQOL, the interview questionnaire to indicate presence of pain (presence/absence and location) and incidence of UI, and the IIQ-7 to measure the impact of UI on function of everyday living. The SF-36 is copyright owned by Quality Metrics. Permission from Quality Metrics was obtained prior to beginning this study. The IIQ-7 copyright permission was obtained from Wake Forest School of Medicine prior to initiation of this research study.

### 3.2. Data Collection

Prior to initiation of data collection, permission was obtained from the Ethics Committee on Research at the Center for

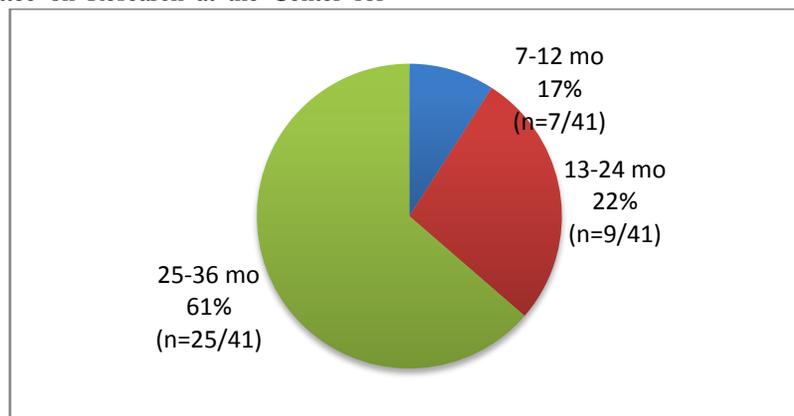
Rehabilitation of the Paralyzed with IRB approval from Nova Southeastern University. The co-researchers were trained by the primary researcher on the correct way to administer the instruments as detailed below.

All data were collected during a single meeting with each participant. Data collection was completed July 8-August 20, 2012, within two months of IRB approval. A self-generated interview questionnaire was created by the primary investigator. Data from the initial interview (See Appendix 1 Interview Questionnaire) included information regarding age, mode of birth, delivery and post-partum complications, past medical history, episiotomy, date of last child birth delivery, UI, medications, skilled birth attendant, and birth location (hospital or home). All study forms, including the interview questionnaire, the Bengali version of the SF-36 and IIQ-7, and the Bengali version of the informed consent, were provided to the co-researchers prior to the start of the study by the primary investigator. Data were kept confidential (in compliance with IRB and US HIPAA laws) with personal identifiers removed by the co-investigators and replaced by matched numbering of each survey (IIQ-7 and SF-36) and all data collection forms.

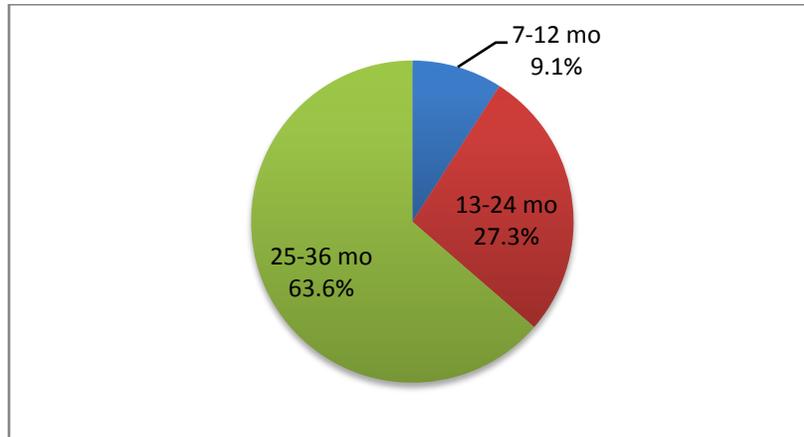
## 4. Results

### 4.1. Demographics

Ninety-four percent (n=81/86) of the subjects reported their religion as "Islam", 5% (n=4/86) as Christian and 1% (n=1/86) as Hindu. The age groups were evenly represented for the 18-24 age group (n=38) and 25-34 age group (n= 42), however, the age group representing 35-44 years was low by comparison (n=6). Sixty-one percent (61%; n=25/41) of participants in the CS group were 25-36 months postpartum, 17% (n=7/41) reported giving birth in the past 13-24 months, and 22% (n=9/41) reported giving birth in the prior 7-12 months. (Figure 1a) Sixty-four percent (64%; n=28/44) of participants reported having vaginal deliveries within the last 25-36 months, 27% (n=12/44) delivered vaginally within the last 13-24 month period, and 9% (n=4/44) within the 7-12 months. (Figure 1b)



**Figure 1a.** Percentage of C-sections by Postpartum Period



**Figure 1b.** Percentage of Vaginal Deliveries by Postpartum Period

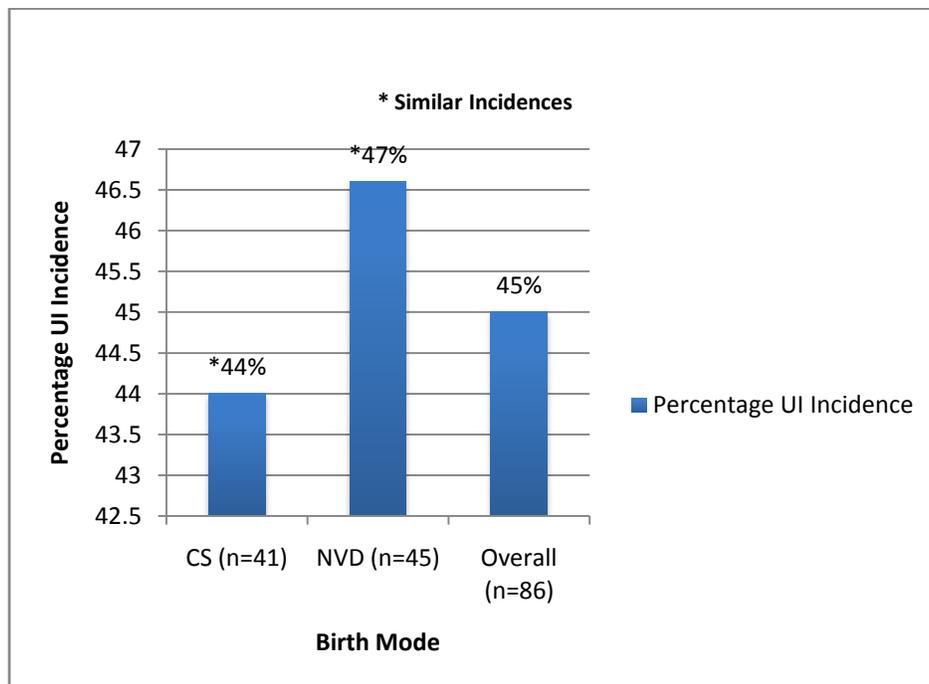
**4.2. Overall incidence of urinary incontinence**

Forty-five percent (45%; n=39/86) of the total cohort reported having one or more incidences of urinary incontinence during the postpartum period. Forty-four percent (44%; n=18/41) of those in the CS group reported having current episodes of UI compared with 47% (n=21/44) in the vaginal delivery group. (Figure 2a)

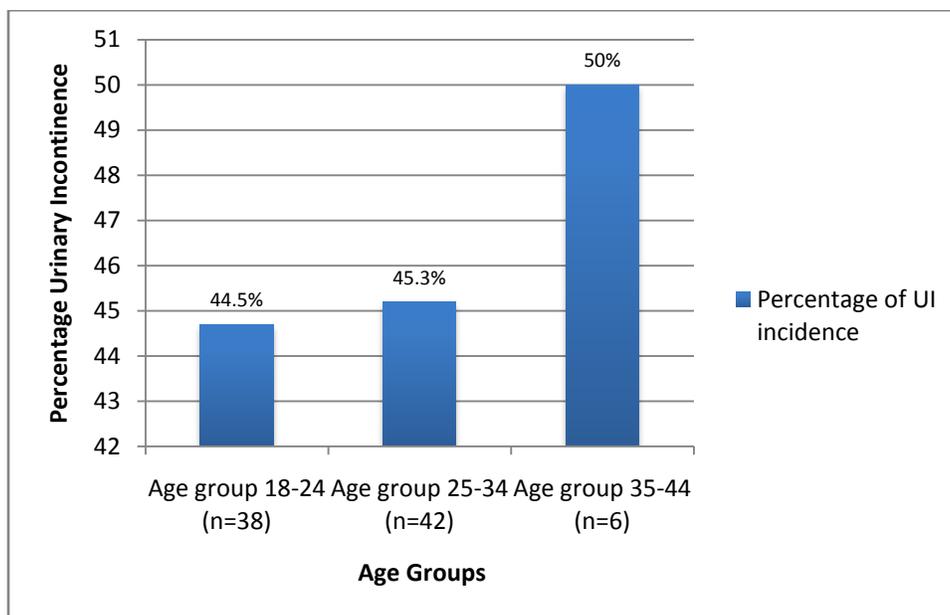
Of the 39 women who reported urinary incontinence, 80% (n=31/39) reported a urinary incontinence episode within the

last six weeks. Twenty percent (21%; n= 8/39) of the women reported having an episode of UI within the last six weeks to six months. (Figure 2b)

Forty-five percent (45%; n=17/38) of the 18-24 year old women reported having an episode of urinary incontinence during the postpartum period. Forty-five percent (45%; n= 19/42) of the 25-34 year olds and 50% (n=3/6) of the 35 and older group reported urinary incontinence within the postpartum period. (Figure 2b)



**Figure 2a.** Incidence of UI by Birth Mode

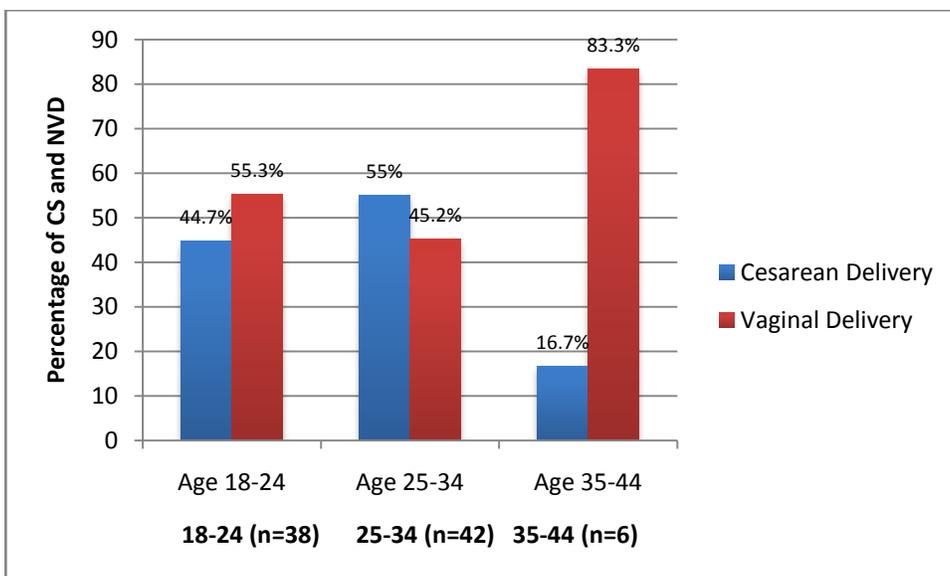


**Figure 2b.** Percentage of UI Incidence by Age Group

**4.3. Birth Mode according to age groups**

Forty-five percent (45%; n=17/38) of those 18-24 reported having CS births, while 55% (n=23/42) of those 25-34 suggested CS deliveries, and 17% (n=1/6) of 35-44

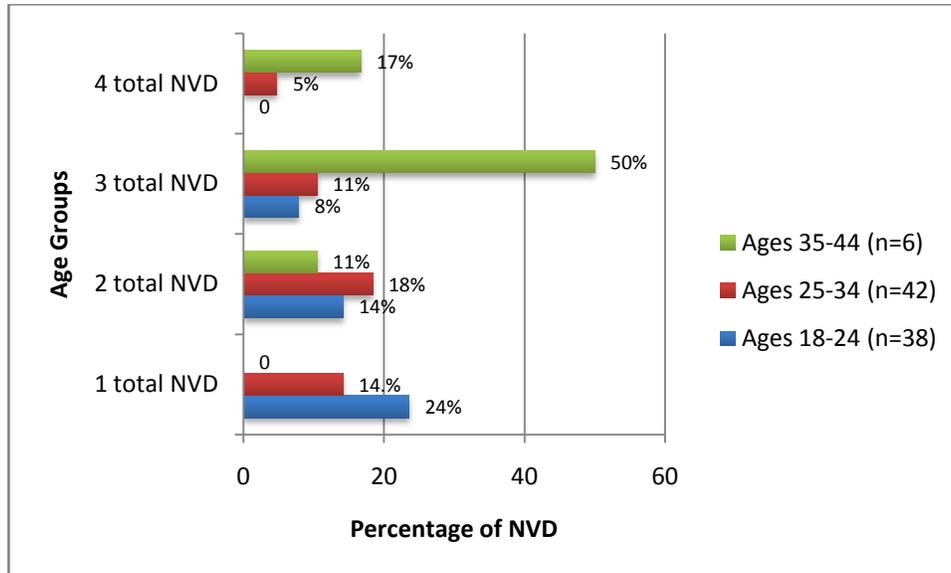
year old women reported having CS as their birth mode. Vaginal deliveries were reported by 55% (n=21/38) of the women aged 18-24, by 45% (n=19/42) of those in the 25-34 age range, and by 83% (n=4/5) of women above the age of 35. (Figure 3a)



**Figure 3a.** Birth Mode According to Age

Forty-five percent of women 18-24 years of age reported no vaginal deliveries, while 24% experienced 1 vaginal birth, 23% with 2 vaginal births and 8% reporting 3 vaginal birth deliveries. Sixty-seven (67%; n=30/45) of those in the vaginal delivery group reported having more than one vaginal delivery. Of the women in the 25-34 year old group, 14% reported

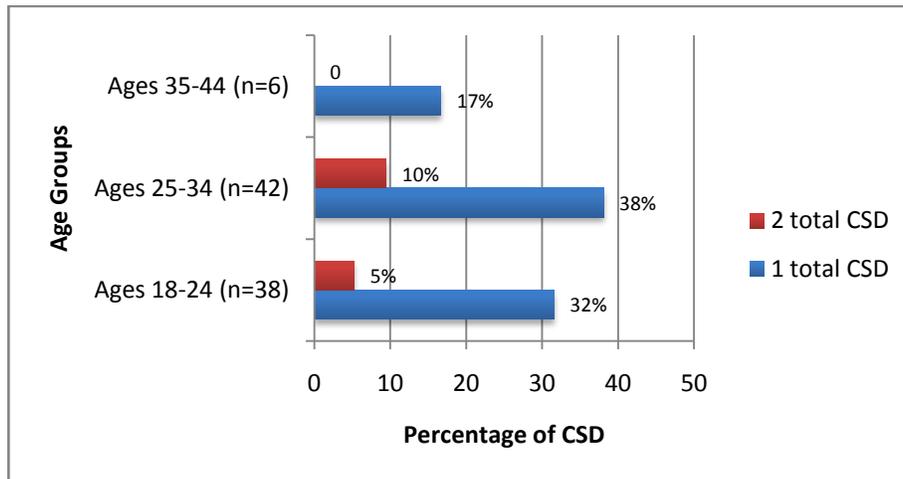
“1” vaginal delivery, 18% reported “2”, 11% reported “3”, and 5% reported “4” or more vaginal deliveries. In the 35-44 year old age group, 17% (n=1/6) reported “2”, 50% reported “3” (n=3/6), and 17% (n=1/6) reported “4” total vaginal deliveries. (Figure 3b)



**Figure 3b.** Percentage of Total Normal Vaginal Deliveries (NVD) by Age

Thirty-two percent (32%; n=12/38) of the women, 18-24 years of age, reported a total of “1” CS delivery compared to 38% (n=16/42) in the 25-34 year age group and 17% (n=1/6) in the 35-44 year age group. Fifteen percent (15%; n=6/41) of those subjects in the CS group reported having more than one

CS. Five percent (5%; n=2/38) in the 18-24 age group reported “2” lifetime CS deliveries compared with 10% (n=4/42) in the 25-34 years age group and “0” for the 35-44 years age group. (Figure 3c)



**Figure 3c.** Percentage of Total C-Section Deliveries (CSD) by Age Group

**4.4. Urinary incontinence incidence and correlation with birth mode and HRQOL on the SF-36 and IIQ-7**

Overall, there were 41 subjects in the CS group and 45 subjects in the vaginal delivery group. The CS group showed a weak but significant inverse correlation between HRQOL as measured on the SF-36 physical component scores (PCS) (rho= -.312, p =.022) when utilizing the Spearman’s rho. Similar results were found for the vaginal delivery group with PCS (rho=-.340, p=.022). However, the MCS scores in the CS

group (rho=-.087, p=.588) were not significantly correlated to UI incidence, while the NVD group showed a weak, but significant inverse correlation (rho=-.314, p<.05) for the MCS. In the CS group, none of the individual domain scores showed a significant correlation to UI report. However, in the vaginal delivery group, PF, BP, GH, SF, RE, and MH all showed weak, but significant correlations. (Table 1a) IIQ-7 scores and report of UI, however, showed a good correlation in the CS group (rho=.729, p < .001) and a strong correlation in the NVD group (rho=.874, p<.001) (Table 1b).

**Table 1a.** Spearman rho correlation between UI incidence and HRQOL on SF-36

Domain	PF	RP	BP	GH	VT	SF	RE	MH
CS rho	-.205	-.240	-.217	-.204	-.158	-.094	-.296	-.023
CS <i>p</i>	=.198	.130	.172	.201	.323	.561	.060	.887
NVD rho	-.395*	-.189	-.422*	-.365*	-.251	-.325*	-.397*	-.310*
NVD <i>p</i>	<.05	.213	<.05	<.05	.097	<.05	<.05	<.05

\* = significant findings at the .05 level

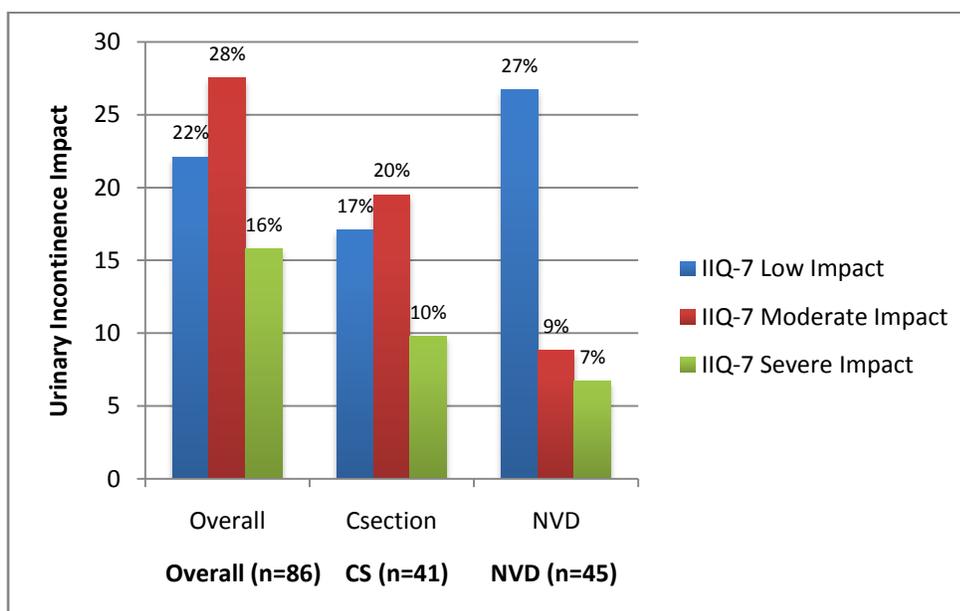
**Table 1b.** IIQ-7 correlation (UI incidence & Impact)

Statistical Test	Statistical Value
IIQ-7 CS rho correlation	.729*
<i>p</i> value	<.001
IIQ-7 NVD rho correlation	.874*
<i>p</i> value	<.001

\* significant at < .001 level

For subjects in both groups, 44% (n=38/86) reported some impact of urinary incontinence on function. Thirty-six percent reported a minimum impact (33.33 IIQ-7 score) or higher and 8.1% of women reported a moderate impact (66.6 IIQ score) on activities of daily living. Fifty percent (n=18/38) of those who reported some distress were in the low impact scoring group. Thirty-two percent (32%) reported moderate impact and 18% reported severe impact. Of those in the CS group (n=41), 54% reported “no impact”, 17% reported “low im-

act”, 20% reported “moderate impact”, and 10% reported “severe impact”. In the NVD group (n=45), 58% reported “no impact”, 27% reported “low impact”, 9% reported “moderate impact”, and 7% reported severe impact of urinary incontinence per the IIQ-7 scale. (Figure 4) A significant difference was not found between birth mode groups (CS and NVD) in the SF-36 scores for all eight domains, component scores, and the IIQ-7 when utilizing the Mann Whitney-U test statistic.

**Figure 4.** Impact of Urinary Incontinence (UI) Scores on Incontinence Impact Questionnaire (IIQ-7) Overall and by Birth Mode

The SF-36 national mean norms for females by age group were compared to individual scores for the eight domains and mental and physical component scores. All of the eight domain scores in each age group, with the exception of VT, showed a significant difference at <.05 or <.001 for each of the age groups (Table 2a, 2b, 2c). When all three age groups

were compared utilizing the Kruskal-Wallis test, a significant difference was found only between the age groups in respect to MH (H=6.307, 2, p=.043) and VT (H=6.66, 2, p=.036). A Mann Whitney U was calculated to determine if there was a significant difference by birth mode for scores on the SF-36 and IIQ-7. No significant difference was found between the

CS and NVD group with respect to SF-36 component and individual domain scores or total IIQ-7 scores. SF-36 domain scores were analyzed looking at age group, utilizing a Kruskal-Wallis nonparametric one-way ANOVA and found a significant difference between age groups for Vitality (VT) ( $H=6.61, (2,85), p=.036$ ) and Mental Health (MH) ( $H=6.31, (2,85), p=.043$ ). A Mann Whitney-U confirmed the difference in VT scores between the youngest age (18-24 years) group and oldest age (35-44 years) group, ( $U= -2.25, 39, p=.024$ ) and between the middle and oldest age group (35-44), ( $U= -2.16, 39, p=.031$ ), but no significant difference

between the youngest and middle age groups. The mean for the middle age group (25-34 years) ( $VT=49.62 \pm 11.11$  SD) presented much higher compared to the oldest age group (35-44) mean ( $VT=39.60 \pm 8.38$  SD) and the youngest age group ( $VT=47.16 \pm 7.49$  SD) exhibited higher VT score means, but lower MH scores than the middle group. Similar findings were reported in the means for MH for the youngest age group ( $MH=37.63 \pm 9.78$  SD), middle age group ( $MH=41.19 \pm 11.52$  SD) and the oldest age group ( $MH=31.23 \pm 7.89$  SD).

**Table 2a.** One Sample T-test Comparing SF-36 Scores for Age Group 18-24 to Age Appropriate National Norm Means for females (18-24)

Domain, df	t-statistic	norm/mean	Sig-2tailed	CI lower	CI upper
PF, 37	-4.148*	53.04/44.18	<.001	-13.183	-4.531
RP, 37	-4.036*	51.66/44.61	<.001	-10.592	-3.511
BP, 37	-3.959*	51.89/44.32	<.001	-11.439	-3.694
GH, 37	-4.489*	48.14/40.54	<.001	-11.031	-4.169
VT, 37	1.243	45.65/47.16	.222	-.9527	3.975
SF, 37	-4.056*	48.26/41.92	<.001	-9.503	-3.171
RE, 37	-3.898*	48.26/39.82	<.001	-12.828	-4.053
MH, 37	-4.854*	45.34/37.63	<.001	-10.925	-4.490
PCS, 37	-4.038*	53.26/46.14	<.001	-10.689	-3.546
MCS, 37	-3.277**	44.43/39.43	<.05	-8.080	-1.906

\*significant at the <.001 level; \*\* = significant at the <.05 level \*\*CI= 95%, alpha =.05

**Table 2b.** One Sample T-test Comparing SF-36 Scores for Age Group 25-34 to Age Appropriate National Norm Means for females (25-34)

Domain,df	t-statistic	Norm/mean	p value	CI lower	CI upper
PF, 41	-6.084*	52.96/43.383	<.001	-12.756	-6.398
RP, 41	-5.918*	51.73/41.809	<.001	-13.307	-6.535
BP, 41	-3.238**	51.44/45.425	<.05	-9.6038	-2.226
GH, 41	-4.650*	50.86/43.741	<.001	-10.212	-4.027
VT, 41	.894	48.08/49.613	.377	-1.9296	4.9953
SF, 41	-4.049*	49.43/42.695	<.001	-10.094	-3.376
RE, 41	-6.306*	49.71/38.851	<.001	-14.336	-7.382
MH, 41	-3.706*	47.78/41.192	<.001	-10.179	-2.997
PCS, 41	-5.263*	53.03/45.464	<.001	-10.469	-4.663
MCS, 41	-3.004**	47.14/41.891	<.05	-8.777	-1.721

\*significant at the <.001 level; \*\* = significant at the <.05 level

**Table 2c.** One Sample T-test Comparing SF-36 Scores for Age Group 35-44 to Age Appropriate National Norm Means for females (35-44)

Domain,df	t-statistic	Norm/mean	p value	CI lower	CI upper
PF, 5	-3.142*	51.45/36.337	<.001	-27.479	-2.7480
RP, 5	-5.691**	51.35/35.221	<.05	-23.823	-8.4337
BP, 5	-2.423**	49.95/35.212	<.05	-24.562	-4.9145
GH, 5	-3.659*	50.15/31.880	<.001	-31.104	-5.436
VT, 5	-2.561	48.36/39.602	.051	-17.548	.0313
SF, 5	-5.798**	49.30/39.578	<.05	-14.032	-5.412
RE, 5	-5.821**	49.91/29.317	<.05	-29.697	-11.499
MH, 5	-5.119**	47.74/31.235	<.05	-24.7927	-8.2173
PCS, 5	-3.561**	51.56/37.692	<.05	-23.8808	-3.8559
MCS, 41	-4.811**	47.80/33.347	<.05	-22.1755	-6.7312

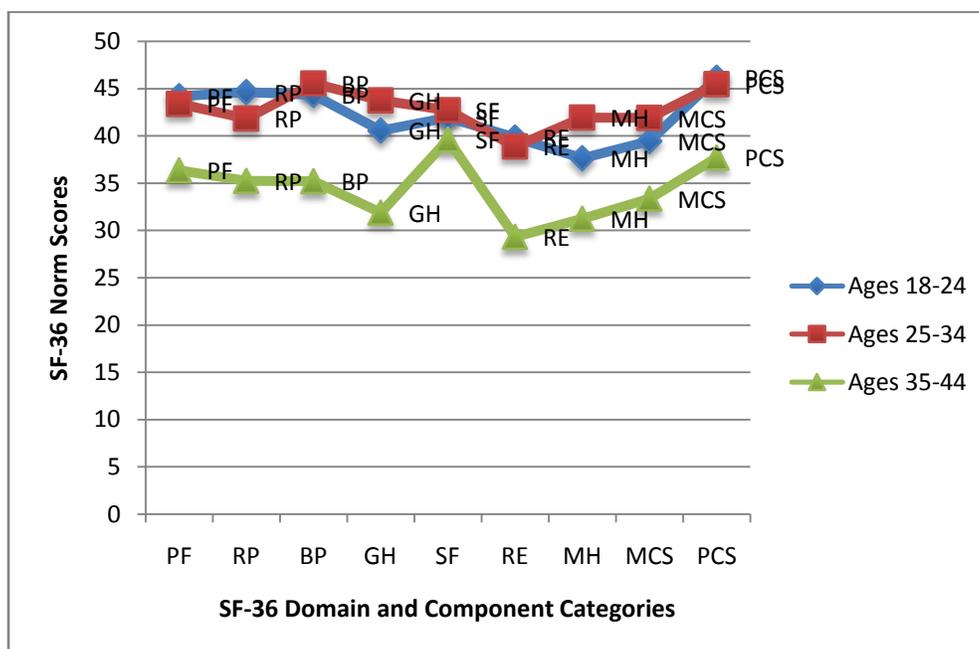
\*significant at the .001 level; \*\* significant at .05 level.

The one sample t-test comparing scores for the 25-34 age group showed significant differences for Physical Function (PF) (t=-6.084, 41, p<.001), Role of Pain (RP) (t=-5.918, 41, p<.001), Bodily Pain (BP) (t=-3.238, 41, p<.05), General Health (GH) (t=-4.650, 41, p<.001), Social Function (SF) (t=-4.049, 85, p<.001), Role Emotion (RE) (t=6.306, 41, p<.001), Mental Health (MH) (t=-3.706, 41, p<.001), and component scores Physical Component Score (PCS) (t=-5.263, 41, p<.001), and Mental Component Score (MCS) (t=-3.004, 41, p<.05). However, the Vitality (VT) domain did not show a significant difference between the age related norm and sample (t=.894, 41, p=.377).

Age group 35-44 reported significant differences in PF

(t=-3.142, 5, p<.001), RP (t=-5.691, 5, p<.05), BP (t=-2.423, 5, p<.05), GH (t=-3.659, 5, p<.001), SF (t=-5.798, 5, p<.05), RE (t=-5.821, 5, p<.05), MH (t=-5.119, 5, p<.05), and component scores PCS (t=-3.561, 5, p<.05), and MCS (t=-4.811, 5, p<.05).

Post hoc tests revealed a significant difference, with the mean scores significantly higher for VT and MH only between the 18-24 year age group and 35-44 years age group for VT (U=46.50, 43, p=.019). The 25-34 year age group (VT=U=57, 47, p=.031; U=54.5, 47, p=.025) when compared to the 35-44 year age group showed significant differences in both VT and MH. (Figure 5)

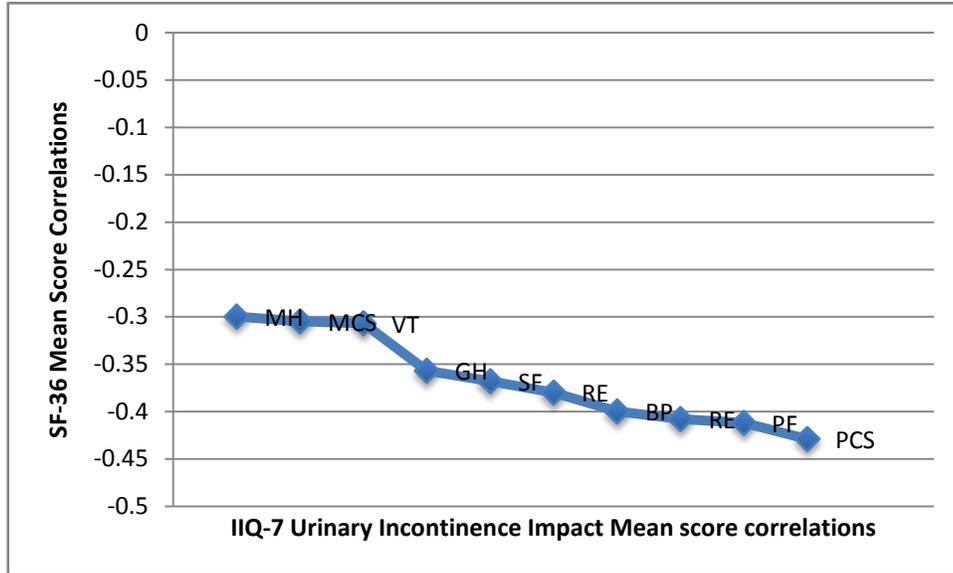


**Figure 5.** Comparison of Mean Scores on SF-36 by Age Group

**4.5. Correlations between UI, IIQ-7, Pain, Complications and HRQOL Measures (SF-36)**

A significant but weak inverse correlation between IIQ-7 scores and SF-36 scores, utilizing Spearman’s rho correlation, was found in each of the SF-36 domains as well as the composite physical and mental scores. Overall, scores in the PF

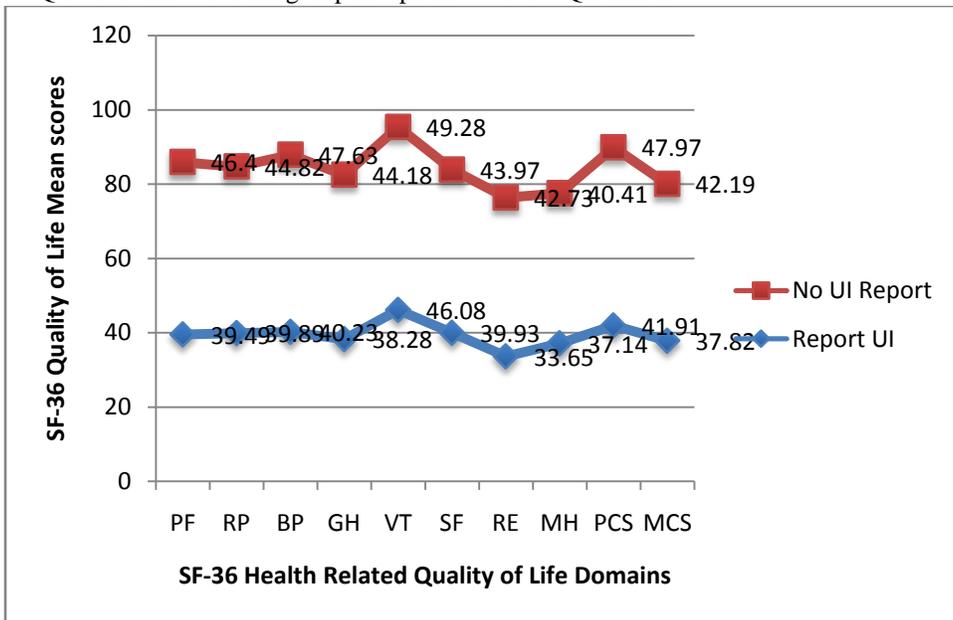
(rho=-.412, 85, p<.001), RE (rho=-.408, 85, p<.001), BP (rho=-.400, 85, p<.001), and PCS (rho=-.429, 85, p<.001) domains were more strongly inversely correlated with the IIQ-7 scores than those in the RP, VT, SF, and MH domains. However, all domains of the SF-36 showed significant inverse relationships with the IIQ-7 scores (p<.001). (Figure 6a)



**Figure 6a.** SF-36 (HRQOL) Inverse Correlation to IIQ-7 (UI Impact)

A significant difference was found between the women who reported postpartum UI compared with those who did not on SF-36 scores utilizing the Mann Whitney-U test (PCS: U=570, 85, p=.003; PF: U=599, p=.005; RP: U=681, p=.037; BP: U=589, p=.004, GH: U=611, p=.008, RE: U=560, p=.001). (Figure 6b) There was no significant difference between scores on the IIQ-7 for those in the CS group compared

to the vaginal delivery group (U=841, 85, p=.434). However, when birth mode was considered according to parity (total CS in a lifetime), there was a significant but weak direct relationship with respect to IIQ-7 scores on the Spearman rho (rho = -.295, p<.05), suggesting multiple CSs may have some effect on the impact of urinary incontinence as it pertains to the IIQ-7 scale.

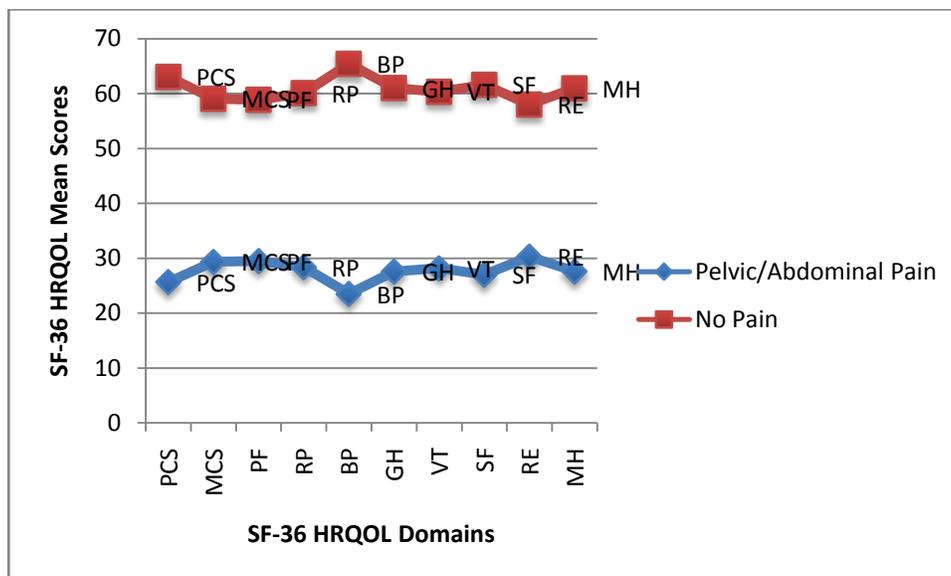


**Figure 6b.** UI Report and QOL Differences

Quality of life scores on the SF-36 individual domains were also compared for women who reported pelvic and/or

abdominal pain compared to those who reported no pelvic and/or abdominal pain across the birth modes using a Mann Whitney-U to compare the two groups. A significant difference ( $p < .001$ ) was found between the groups with respect to

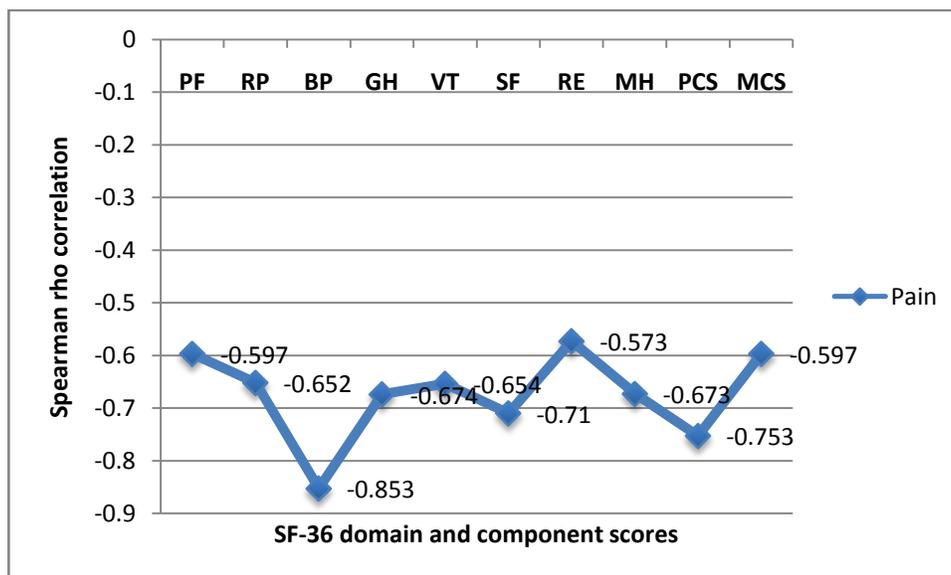
pain in each of the SF-36 domain and component scores. The “no pain” group reported mean scores that were significantly higher on the SF-36 than the “pelvic/abdominal pain” group. (Figure 7)



**Figure 7.** Comparison of HRQOL Means by Presence vs Absence of Pain

Correlations between presence/absence of pain and HRQOL scores as indicated with Spearman’s rho correlation were significant for all categories at  $< .001$ . Strong correlation was found between pelvic/abdominal pain report and HRQOL scores as measured on the SF-36 for PF ( $\rho = -.597$ , 85,

$p < .001$ ), RP ( $\rho = -.652$ , 85,  $p < .001$ ), BP ( $\rho = -.853$ , 85,  $p < .001$ ), GH ( $\rho = -.674$ , 85,  $p < .001$ ), VT ( $\rho = -.654$ , 85,  $p < .001$ ), SF ( $\rho = -.710$ , 85,  $p < .001$ ), RE ( $\rho = -.573$ , 85,  $p < .001$ ), MH ( $\rho = -.673$ , 85,  $p < .001$ ), PCS ( $\rho = -.753$ , 85,  $p < .001$ ), MCS ( $\rho = -.597$ , 85,  $p < .001$ ). (Figure 8)



**Figure 8.** Inverse Correlation between Pelvic/Abdominal Pain & HRQOL

**4.6. Correlation of pain, UI presence, and skilled birth attendant with mode of birth**

Frequencies, percentages chi-square and fisher’s exact test were utilized to analyze presence/absence of pain, UI pres-

ence, and skilled birth attendant. Fifty three percent (54%;  $n=22/41$ ) of those in the CS group reported pelvic and/or abdominal pain compared with 51% ( $n=23/45$ ) of those in the vaginal delivery group. Forty four percent (44%;  $n=18/41$ ) of those in the CS group complained of a complication during

postpartum period related to the birth mode compared to 38% (n=17/45) of those in the NVD group. No significant difference was found between the two birth modes with respect to pain presence/absence or complications in the postpartum period.

Sixty-one percent (62%, n=53/86) of the subjects reported being in the 25-36 month postpartum period, 23% (n=20/86) reported being in the 13-24 month period postpartum and 15.3% (n=13/86) reported being in the 6-12 month postpartum period. Thirty-six percent (36%, n=31/86) of the total sample reported a recent incidence of UI within the last six weeks and 48% (n=41/86) reported UI incidence within the last six months. Of those in the longest postpartum phase (25-36 months), 42% (n=22/53) reported an acute episode of UI within the last six weeks and 9% (5/53) reported a subacute episode of UI within the last six months. Of those in the 13-24 month postpartum period, 32% (n=6/19) reported an acute episode of UI within the last 6 weeks and 16% (n=3/19) reported a subacute episode of UI within the last 6 months. Of those in the 6-12 month postpartum period 23% (n=3/13) reported an acute episode within the last six weeks and 15% (n=2/13) reported a subacute episode of UI within the last six months.

#### 4.7. Characteristics of subjects who reported “mixed birth mode”

Subjects who had a previous CS after vaginal delivery (n=5) or vaginal delivery after CS (VBAC) (n=3) were included in the analysis for this section. Thirty-eight percent (38%; n=3/8) reported one or more complications during the postpartum period related to delivery. Sixty-three percent (63%; n=5/8) reported pelvic and/or abdominal pain lasting 36 months after delivery. Eighty-seven percent of those in the “mixed birth mode group” (MBM) reported utilizing a skilled birth attendant on their last delivery. Seventy-four percent (74%; n=6/8) in the MBM reported incidence of UI during the extended postpartum period. No significant difference was found between those who had recent CS compared to those with recent NVD in respect to pain, UI report, or complications. A significant difference was not found between birth modes in the MBM group with respect to SF-36 individual and component scores and total IIQ-7 when utilizing a Mann-Whitney U to compare the two groups.

Comparison between the CS only group with the MBM group showed a slight increased report in complications (43%, n=18/41) compared to the MBM group (38%; n=3/8). Similar findings were reported by the NVD group (38%; n=17/45) compared to the MBM (38%; n=3/8) group. Fifty-four percent (54%; n=22/41) of the CS only group reported pain compared to 63% (n=26/41) in the MBM group while 51% (n=23/45) of the NVD group reported pain compared to 63% (n=5/8) in the MBM group. Forty-four percent (44%; n=18/41) of the CS only group reported incidence of UI in the longest postpartum period compared to 74% (n=6/8) in the MBM group. Forty-seven percent (47%; n=21/45) compared to 74% (n=6/8) reported UI incidence in the extended postpartum period. A

significant difference was not found between the birth modes for any of the variables with chi-square analysis. However, a significant difference was found between the CS and NVD group for presence of a skilled birth attendant (chi-square=42.55, 85, p<.001), with 90% (n=37/41) of the CS group reporting a skilled birth attendant present during delivery compared to 20% (n=9/45) of the NVD group. No significant differences were found between CS only groups and MBM or NVD only groups compared to MBM group utilizing the Kruskal-Wallis test.

#### 4.8. Specific morbidities by birth

Those in both the CS and vaginal delivery groups reported a high incidence of urinary incontinence (CS: 44%, n=18/41; NVD: 47%; n=21/45), abdominal and/or pelvic pain (CS: 54%, n=22/41; NVD: 51%, n=23/45), and total complications related to the birth delivery (CS: 44%, n=18/41; NVD: 38%, n=17/45). In the 18-24 year age group, 35% (n=6/17) reported UI after CS compared to 52% (n=11/21) in the vaginal delivery group. In the 25-34 years age group, 52% (n=12/23) reported UI in the CS compared to 37% (n=7/19) with NVD in the 25-34 years age group. One of the 35-44 years age group subjects reported no UI and five (60%) reported having UI incidence in the last six weeks.

Twenty-two percent (n= 9/41) of those reporting a complication in the CS group reported a complication, but did not specify the nature of the problem. In the CS group, 12% (n=5/41) reported prolonged labor, 5% (n=2/41) reported headache, 2% (n=1/41) reported excessive abdominal pain, 5% (n=2/41) reported loss amniotic fluid, and 5% reported low back pain. In the NVD group, 24% (n=11/45) reported a non-specific complication, 4% reported low blood pressure, 4% (n= 2/45) reported vomiting, 2% (n=1/45) reported headache, 4% (n=2/45) reported prolonged labor, 4% (n=2/45) reported premature labor, 2% (n=1/45) reported placenta abrupta, 2% (n=1/45) reported breech presentation, and 4% (n=2/45) reported loss amniotic fluid. Pain was present in 54% (n=22/41) of the CS group and 51% (n=23/45) of the vaginal delivery group. The presence of pain was reported at 52% (n=45/86) for the entire sample. Total complications reported by the CS group were 44% (n=18/41) and 38% (n=17/45) for the NVD group.

## 5. Discussion

This study did not find a significant difference in respect to, unlike other research studies which reported high complications, incidence of UI, and pain in the NVD group compared to CS (Chin, Chen, Liu, & Wang, 2006; Goldberg, Abramov, Botros, Miller, Gandhi, Nickolov, & Sand, 2005; McKinnie et al., 2005). However, our research found a significant inverse relationship between UI report and HRQOL, but failed to find any relationship between birth mode and UI incidence or impact. The overall HRQOL for women who reported no pain and no UI was not different than the age related norms from

the SF-36. However, all women who reported either pain or UI or both pain and UI, a decrease in HRQOL scores was reported compared to their age related norms all (18-24, 25-34, and 35-44 years). A strong significant inverse relationship was also reported for women who reported having either abdominal and/or pelvic pain. More advanced age (35-44 years), having one or more complications related to pregnancy and birth, parity and pain were all inversely correlated with HRQOL. Advanced age (35-44 years), parity and pain were also related directly to report of UI. Women who were in the postpartum period of one to three years also reported greater incidence of UI.

### 5.1. Postpartum UI & HRQOL

Postpartum UI studies have been limited to the acute postpartum period, a time period of six weeks to six months after delivery for most, although problems exist beyond the postpartum period into the second and third years following delivery (Spellacy, 2001). This study did not find a significant difference in report of postpartum UI by birth mode for the overall group. However, 45% (n=86) of women reported at least one episode of urinary incontinence during the postpartum period. Eighty percent (n=31/39) of the postpartum women reported an episode of UI within the last six weeks and 21% (n=8/39) reported an incidence within the last seven weeks to six months, almost double the amount (26%) reported for the general female population and 6-29% in the first six months after birth delivery (Temml, Haidinger, Schmidbauer, Schatzl, & Madersbacher, 2000; Mason, Glenn, Walton, & Appleton, 1999). Fronczak et al. (2005) and Akhter et al. (2006) reported that 40-75% of women living in Bangladesh reported one or more postpartum morbidities. In this study, Bangladeshi women in the period (up to three years after delivery), continued to report morbidities associated with the delivery of a child (Herrmann, Scarpa, Rodrigues, Palma, & Ricetto, 2009). This may suggest a pattern of comorbidity for women in the chronic postpartum period that needs to be considered in evaluation, education, and intervention planning for physical therapy and other health related services. This finding is in conflict with earlier findings in the literature, which state that urinary incontinence is more of a "transient observation" and resolves within the first postpartum year (Mason, Glenn, Walton, & Appleton, 1999). Forty four percent (n=41) of the women in the CS group and 46% (n=21/45) of the vaginal delivery group reported having urinary incontinence episodes. No significant relationship between the two groups (CS and vaginal delivery) was identified when utilizing phi coefficient test and Fisher's Exact Test ( $\phi=.038$ ,  $p=.793$ ; Fisher's Exact Test = .831, 85,  $p=.484$ ).

Fifty-two percent (n=45/86) reported having pelvic and/or abdominal pain related to delivery on the interview questionnaire (See Appendix). Forty-one percent (n=35/86) of women surveyed reported one or more complications during delivery. The literature referring to the acute postpartum period indicates that pelvic pain and urinary incontinence were among the common complaints by Bangladeshi women

during the immediate postpartum period (Kalim, 2009) whereas this study found that these concerns may continue into the second and third year postpartum. Had these women been given the opportunity to receive intervention for UI, this occurrence may have been minimized.

Chakraborty et al. (2003) reported 80% of women with one or more comorbidities, which is different than the findings of this study, with 65% (n=56/86) report of comorbidities. This difference may be due to the fact that our study excluded some of the more serious comorbidities that were reported in Chakraborty's study, such as diabetes, eclampsia, perineal tears, neurological deficits, and other surgical traumas. However, the purpose of this research effort was to create an awareness of specific morbidities related to common physical therapy diagnosis, including UI and pain for postpartum Bangladeshi women. The intent of this study was to provide research direction useful in clinical application for future consideration by governmental and non-governmental organizations, physicians, physical therapists, and other health care practitioners.

### 5.2. Birth Mode and Age, UI, Pain, SF-36, and IIQ-7

In this study, considering the total CS deliveries over a lifetime, there were higher percentages of CSs for the 25-34 year old group (48%) followed by the youngest age group (37%), and the oldest age group (17%). Overall, 97% (n=40/41) of total reported CSs over a lifetime, were in women less than 35 years of age. The frequency of CSs in the younger group was not explained and warrants further research. However, it may be a reflection the World Health Organization report regarding CS increases over the last five years (WHO, 2010).

The majority of the literature suggests birth mode to be a significant predictor and correlation with UI and quality of life, with vaginal delivery far surpassing CS in prediction of postpartum UI (Leijonhufvud et al., 2011; MacArthur et al., 2006). However, in this study, a correlation was not found between birth mode, UI, and HRQOL scores as indicated on the SF-36 and IIQ-7 scores suggesting, no difference between the CS and NVD group with respect to quality of life scores, UI, and impact of UI on everyday activities and function. The findings of our study is similar to one study by McKinnie, Swift, Wang, Woodman et al. (2005), which concluded that CS did not decrease risk of UI in postpartum women.

In the literature, NVD is reported to have less problems with scar tissue, adhesions, UI, pelvic pain and complications compared to CS (Wang, 2010). However, in this study, no significant difference was found by birth modes for presence/absence of pain, HRQOL, or urinary incontinence episodes.

### 5.3. Overall HRQOL for Postpartum women living in Bangladesh as measured by the SF-36

This study compared Bengali women to age related norms for those in developed countries, as this was the only information available. Total Physical Component Summary (PCS) and Mental Component Summary (MCS) were significantly lower

than the norm, suggesting a significant decrease in quality of life for both physical and mental domains in the overall sample. When individual domains were compared to the age related norm scores, mental (MH) and emotional domains (RE) reported the largest movement away from the norm based score. General Health (GH), Social Functioning (SF), Role Physical (RP), and Physical Functioning (PF) also showed significant deviation from the norm based scores. This suggests an overall decrease in both mental and physical quality of life for these postpartum women up to thirty six months following delivery.

A significant but mild inverse correlation was found between the IIQ-7 and PCS, MCS, PF, BP, RP, GH, MH, SF, and RE scores. This validates the high impact of urinary incontinence on women in both mental and physical HRQOL as measured by IIQ-7 and was reflective of lower quality of life physical component scores on the SF-36. This was similar to the findings of another preliminary study on the validity and reliability of the IIQ-7 when translated into Bengali as compared to the SF-36 gold standard (Walton, Brown-Cross, Parvin, & Rahman, 2011). Women that reported high incidence of urinary incontinence on the IIQ-7 also reported lower scores on both physical and mental health components of the SF-36, indicating a relationship between urinary incontinence and quality of life for postpartum women up through 36 months after delivery. This finding is in conflict with Kocaoz et al. (2010), who found no correlation between HRQOL and UI in their study of women during the acute postpartum period. However, another study by Hermansen et al. (2010) reported a 23% decrease in physical and sexual function following CS delivery and AVD compared to NVD. Declercq et al. (2008) reported greater incidence of UI in the NVD group (47%) compared with the CS group (15%).

#### 5.4. Limitations and Future Recommendations

Limitations of our study include a limited sample size for the oldest age group and limitation in the measurement of pelvic pain and detailed information on associated comorbidities. Future research may focus on obtaining more detailed information regarding pelvic, abdominal, and low back pain as comorbidities and the association with mode of birth mode and HRQOL. Age related factors, particularly the 35-44 years age group, should be considered for future studies as a part of exploration of the high risk pregnancy and will allow for more detailed analysis of the role age plays in incidence and impact of UI and HRQOL for women. Furthermore, research may be useful for determining specific physical therapy related intervention programs during different stages of the postpartum period.

## 6. Conclusion

This study found no significant differences between birth modes in relationship to UI and HRQOL in Bangladeshi women in the postpartum period. However, an overall inci-

dence of UI in the extended postpartum period of up to 3 years was considered high compared to age related norms of nulliparous women and is similar to other studies that focus on the acute postpartum period up through one year (Ege et al., 2010; Borghi et al., 2006). This high report of UI incidence through the third year postpartum indicates the incidence of UI does not automatically resolve itself and needs further intervention. HRQOL for women in the chronic postpartum period living in Bangladesh is significantly lower than norm scores for each of the SF-36 age groups, with the lowest quality of life seen in the 35-44 year old age group. However, women who reported UI scored significantly lower on SF-36 physical, pain, general health, and emotional domains than women who did not report UI. Presence of pain was highly inversely correlated with SF-36 HRQOL scores in each category with the exception of VT, which may indicate a need for future research focusing more on the role pain may play on HRQOL in the postpartum period.

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