An evaluation of the risk factors for developing PFD in a group of women with and without diagnosed PFD in a Dutch university hospital using the modified Dutch version of the UR-Choice and to determine which risk factors were independently related to PFD: a cross-sectional and feasibility study

Master thesis

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SAMENVATTING

Doelstelling

Deze studie heeft als primaire doelstelling (a) de evaluatie van de risicofactoren van
bekkenbodemproblemen (BB) in een groep vrouwen met en zonder de diagnose BB
problemen in een Nederlands universiteitsziekenhuis door middel van de aangepaste
Nederlandse versie van de UR-Choice en (b) het vaststellen van de risicofactoren die een
onafhankelijke relatie hebben met BB problemen. De secundaire doelstelling is het evalueren
van de haalbaarheid van de aangepaste vragenlijst.

Methode

Deze cross-sectionele studie betreft vrouwen tussen 35 en 80 jaar uit een universitair
ziekenhuis met de diagnose wel of geen BB problemen. Deelnemende vrouwen vulden de
aangepaste Nederlandse versie van de UR-Choice in. Univariate logistische regressie is
gebruikt om de risico factoren met betrekking tot BB problemen te identificeren. Multivariate
logistische regressie is gebruikt om vast te stellen welke risicofactoren een onafhankelijke
relatie hadden met BB problemen.

Resultaten

 Honderdveertien vrouwen van wie 62 met en 62 zonder de diagnose BB problemen vulden
de vragenlijst in. Beide groepen verschillen significant in leeftijd. De factoren "Kaukasisch

ras", "lengte minder dan 1.60 m", "BMI voor de zwangerschap hoger dan 25 kg/m2", "moeder en/of zuster met BB problemen", "meer dan twee kinderen" en "het gewicht van het eerste kind meer dan 4000 gram" hadden een positieve samenhang met BB problemen ($P>0,05$). De factoren "urineverlies voor de zwangerschap" en "leeftijd hoger dan 35 jaar" bij de eerste bevalling" hadden een negatieve samenhang met BB problemen ($P>0,05$). De factor "meer dan twee kinderen" is gevonden als onafhankelijke factor voor BB problemen ($P=0,03$).

Conclusie

Zes factoren van de aangepaste Nederlandse versie van de UR-Choice hebben een positieve samenhang met BB problemen. De factor "meer dan twee kinderen" heeft een onafhankelijke relatie met BB problemen.

Klinische relevantie

Een voorspellende vragenlijst is van belang om vrouwen met een hoog risico op het ontwikkelen van BB problemen vroegtijdig te identificeren.

ABSTRACT

Aims

The principal aim is (a) evaluating the risk factors for pelvic floor dysfunction (PDF) in a group of women with and without diagnosed PFD in a Dutch University hospital using the modified Dutch version of the UR-Choice and (b) determining which risk factors are independently related to PFD.The secondary aim is to evaluate the feasibility of the modified Dutch version of the UR-Choice.

Methods

This cross-sectional study including women aged between 35 and 80 years in a university hospital with or without diagnosed PFD. Women filled out the modified Dutch version of the UR-Choice. Univariate logistic regression is used to identify the risk factors for PFD. Multivariate logistic regression with backward selection procedure is used to determine which risk factors are independently related to PFD.

Results

One hundred fourteen women of which 62 with and 52 without the PFD filled out the questionnaire. Both groups significantly differ in age. The factors "Caucasian race", "height more than 160 m.", "BMI before pregnancy more than 25 kg/m2", "mother and or sister presence of PFD", "more than 2 children" and a "weight of the first child more than 4000 gram" had a positive correlation with PFD (*P*<0,05). The factors "urinary incontinence (UI) before pregnancy" and "age more than 35 year at first delivery" had a negative correlation with PFD (*P*<0,05). In the multivariate logistic regression only "more than 2 children" is found to be independently related to PFD.

Conclusion

This study shows that six factors of the modified Dutch version of the UR-Choice have a positive correlation with PFD. Only the factor "more than two children" is independently related to PFD.

Clinical Relevance

A predictive questionnaire is relevant for early identification of women at high risk for developing PFD.

Keywords: ***pelvic floor dysfunction, prevention, risk factor***

I. INTRODUCTION

1.1 Introduction to the subject

Symptoms of pelvic floor dysfunction (PFD) such as urinary incontinence (UI), pelvic organ prolapse (POP) and faecal incontinence (FI) are common in many women. Epidemiological data show an increase in the last 10 years (1). According to the International Continence Society (ICS) and the International Urogynecological Association (IUGA) UI and POP are the most prominent in PFD (2). Prevalence data in the Netherlands show that approximately one in five women will have surgical treatment for POP and UI during her lifetime and 13.000 surgical interventions per year are POP related in the Netherlands (3,4).

Specific risk factors for PFD are mentioned in various studies. Some risk factors have a non-obstetric background and seem to be not or partly modifiable, others are part of the pregnancy or obstetric process but are modifiable so that PFD might be prevented or limited (5-12). Among these risk factors, the first delivery seems to be the most crucial (13). As a

result of strong labor forces the genital tract can be seriously damaged and lacerations may occur (14). The supporting structures, including the pelvic floor muscles (PFM) and the pudendal nerve often show adverse effects after vaginal delivery (15). However, the specific strength of these various risk factors is difficult to determine; they often coexist and influence each other making it difficult to weigh the individual factors (16).

Focusing on early identification of women at high risk for PDF should be one of the key points in the obstetric field. Some studies have indeed found evidence in the prevention of childbirth related PFD (17-23). Though prevention has not been given a great deal of attention yet, possibly because PFD often occur only several decades after the deliveries of a woman (24). In this context it should be noted that the appearance of PFD in further life might be connected with other factors such as Chronic Obstructive Pulmonary Diseases (COPD), a decrease in the pelvic floor function as a result of lower estrogen status in menopausal women or constipation (25-27). A predictive questionnaire could therefore be relevant for early identification of women at high risk for developing PFD. Such a need is recognized by some studies that suggest a scoring system for prediction of PFD or mentioned risk factors of PFD (5,28). Other researchers made an attempt to develop prediction models for postpartum urinary and fecal incontinence. (28,29).

Recently a new and promising risk score has been introduced: the UR-Choice, which uses eight items to predict the risk of future PFD (30). The UR-Choice is particularly promising since it combines all of the relevant and evidence based risk factors. Moreover, it is easy to handle for both (para) medical staff and patients. In case of early recognition of risk factors for PFD, specialized pelvic floor physical therapy (PFPT) could be started which is found to be

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an effective, cheap and safe intervention for PFD (31,32).

Nonetheless, the UR-Choice is still under development and presently validation studies are being undertaken in the UK and New Zealand. For this reason, no psychometric properties and no formal English, and consequently no Dutch, version is yet available.

Still, to make a start with a useful tool for professionals for detecting PFD in women at high risk, we decided to translate and modify the original UR-Choice. Feasibility was evaluated by adding two supplementary questions about the time spent to fill out the questionnaire and about clarity of the questions (33). For the objective of this study, the modified Dutch version was used retrospectively in two groups of women with and without diagnosed PFD. Special attention was given to factors that might predict pelvic floor dysfunction.

2. AIMS

The principal aim is (a) evaluating the risk factors for pelvic floor dysfunction (PDF) in a group of women with and without diagnosed PFD in a Dutch university hospital using the modified Dutch version of the UR-Choice and (b) determining which risk factors are independently related to PFD.

The secondary aim is to evaluate the feasibility by determining the time burden and clarity of the modified Dutch version of the UR-Choice.

3. METHOD

3.1 - Design
This cross-sectional study was performed to evaluate the risk factors in a group of women with and without diagnosed PFD.

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3.2 - Population and domain

Between January and April 2015, the outpatient files in the Department of Gynecology in the Radboud University Medical Centre (UMC), in Nijmegen, The Netherlands, were screened. The population consisted of women who consulted a gynaecologist in 2013 and 2014 and with whom either PFD or no PFD was diagnosed at the time of the consultation. Two groups were selected, one group with and another without a PFD diagnose. PDF was defined as a diagnose for either UI, POP or FI (34). In the study group, patients with PFD were referred to the University Medical Centre Nijmegen for either UI, FI or POP. Eligible participants had to be between 35 and 80 years old and should have had one or more pregnancies in history. Participants with a history of cancer, an inflammatory bowel disease or a neurological disease (such as MS, Parkinson, CVA) where excluded from the study. In the group without diagnosed PFD, women with a history of surgery for POP and/or UI and/or FI were excluded too.

3.3 - Data collection

All participants were fully informed about the purpose of the study and the procedures by an information letter that was sent to their home address. After consultation of the Research Ethics Committee Arnhem-Nijmegen (METC) of the Radboud University Medical Centre, no informed consent was deemed necessary for this study. It was clearly mentioned in the letter that participation was not obligatory. Data were collected by using the modified Dutch version of the UR-Choice retrospectively in a group of women with diagnosed PFD and a group without a diagnose of PFD. The questionnaire, together with a return and stamped envelope, was sent by mail to all women selected. Participants having not responded after four weeks were sent a reminder. After eight weeks, non-responders were sent a second reminder.

3.4 - Measurement

The modified Dutch version of the UR-Choice was based on the original UR-Choice items and consists of eight questions all concerning estimated risk factors for PFD (30). In addition, two questions about the time spent on answering and the clarity of the questions were added in order to determine the feasibility of the Dutch version. Since the original UR-Choice has not been validated yet, its translation in Dutch and modifying the questions was performed by the researchers of the study. To ensure a correct understanding of the translated questions by the selected patients, the researchers submitted the modified Dutch version of the UR-Choice to a small sample of obstetric patients and found that no problems were reported. The study was approved by the Medical Ethics Committee of Arnhem-Nijmegen, The Netherlands.

3.5 - Data analysis

All relevant scores of demographic characteristics were represented for the total group and supplementary for both groups in number, percentage (%), median (range) and mean (standard deviation (S.D.)). To prepare data for statistical analysis, scores of the modified Dutch version of the UR-Choice were dichotomized with cut-off points according to literature (3,5,7-12,19,30,35-38). Scores are represented for the total group and for both groups in number, percentage (%) and median (range). Differences in scores and significance (*P*-value) with 95% CI between both groups were tested by an Independent Samples T Test for continuous variables and a Chi-square test for dichotomous variables.

The feasibility of the modified Dutch version of the UR-Choice was not only considered on the basis of the time spent for answering the questions (time spent was represented in increments of whole minutes) but also by measuring the clarity of the questions (patients

could choose between "yes" or "no" with regard to clarity). Differences in scores on time

spent in both groups were calculated by an Independent Samples T-Test. Univariate logistic

regression was used to identify the risk factors for PFD. Multivariate logistic regression with

backward selection procedure was used to determine which risk factors were independently

related to PFD.

To check for selection bias, data about age were compared with the non-responder group.

A *P*-value <0,05 was considered significant. Data were analyzed using SPSS v. 20 (SPSS, inc.,

Chicago, Ill., U.S.A).

4. RESULTS

The response rate was 62% (62/100) in the group with PFD and 53% (52/98) in the group

without PFD. In table 1, demographic characteristics of the total group of 114 participants are

represented. It is shown that there is significant difference between both groups for mean

age (11,6 years (*P*<0,00)). Table 2 shows the demographic characteristics split up for the

group with PFD and without PDF. Two participants in the group without PFD had UI or POP.

These complaints were secondary to the main diagnosis and of less intensity so no

consultation was needed. It is found that the mean age in the group with PFD is 59,9 years

(S.D. 12,2) with a median of 61,5 (range 37;79) and the mean age of the group without PFD is

48,3 (S.D. 8,1) with a median of 47, (range 35;69). Table 3 shows the modified Dutch version

of the UR-Choice with cut-off points for the total group. In table 4, scores of both groups are

separately presented and it is shown that there is no significant difference between both

groups for all items of the modified Dutch version of the UR-Choice. In table 5, the univariate

and multivariate logistic regression are represented. In the univariate logistic regression, a

positive correlation with PFD is found for "Caucasian race" (OR 2,6; *P*=0,13) "height < 160 m." (OR 2,0; *P*=0,22), "BMI before pregnancy > 25 kg/m2" (OR1,2; *P*=0,77) , "mother and or sister presence of PFD" (OR2,0; *P*=0,08), "> 2 children" (OR1,9; *P*=0,12) and a "weight of the first child > 4000 gram" (OR1,2; *P*=0,77). A negative correlation was found for "UI before pregnancy" (OR 0,6; *P*=0,53) and "age > 35 year at first delivery" (OR 0,2; *P*=0,09). No significance was shown for all correlations. In the multivariate logistic regression only "more than 2 children" is found to be significantly independent related to PFD (OR 2,7; *P*=0,03). Regarding the time spent for filling in the modified Dutch version of the UR-Choice, the mean time for the group with PFD was 5,5 minutes and for the group without PFD 3,5 minutes (*P=0,05)*. A positive answer for clarity of the modified Dutch questionnaire was high in both groups, 83,9% for the group with PFD and 82,7% for the group without PFD.

Comparison of the median age of the responder group with PFD to the non-responder group with PFD showed a difference of 18 years (62 years respectively 44 years, range 37;79 respectively 36;77), comparison of the median age of the responder group without PFD to the non-responder group without PFD showed only a difference of years 3 years (47 years respectively 44 years, range 35;69 respectively 35;62 years.

5. DISCUSSION

5.1 Findings

The present study on the modified Dutch version of the UR-Choice was used retrospectively in two groups of women with and without diagnosed PFD in a Dutch university hospital to evaluate the risk factors for developing PFD and to determine with risk factors were independently related to PFD. It was found that all risk factors, except "UI before pregnancy"

and "age older than 35 year at first delivery" have a positive correlation with PFD. However, these correlations are rather weak (highest OR = 2,6), and should have been stronger. A possible explanation might be the long period for many women between filling out the questionnaire and the pregnancy period. On the other hand, it seems that questions of the modified Dutch version of the UR-Choice are clearly formulated and easy to understand. It might therefore be possible that other risk factors are of influence for prediction of PFD. The factor "more than 2 children" is the only one to be found to be significantly independent related to PFD. In addition, we expected that more factors of the modified Dutch version of the UR-Choice should have an independent relation with PFD. According to the patients' characteristics, there is a significant difference shown between both groups for mean age (11,6 years). A cause for this difference might be the fact that PFD symptoms and bother often occur only several decades after a delivery of a woman (24). This is in line with the recent findings of Rodriquez who found that POP occurs in older women and that average ages of patients with prolapse are 62 years (39). This is also in accordance with the study of Murad who found that a higher age (older than 50 years) influences the prevalence of POP (40). Supplementary other factors such as COPD, a decrease in PF function as a result of low estrogen status in menopausal women or constipation as result of a decrease in activities in elderly women might have an influence on PFD as well (25-27).

5.2 - Risk factors

The findings in this study are in accordance with other studies in which obstetric risk factors for PDF were discussed. Jangö (2014) found several risk factors of obstetric PFD such as primiparity and excessive birthweight in primiparous women (21). Uustal Forneel (2004) found that risk factors for PFD were associated with vaginal delivery, multiparity, age,

inheritance and overweight (41). In a systematic review of Dudding, several risk factors for anal sphincter injury and PFD were found including birth weight higher than 4 kg. and first vaginal delivery (42). In a study of Lince (2012), it was found that there is a relationship between family members with POP and the presence of POP (9). In a systematic review of the published data on the prevalence, incidence and risk factors of female UI and obstetric treatment of UI in Europe of Cerruto (2013) was found that the prevalence of UI ranged from 14,1 to 68,8% and increased with increasing age. Maternal age over 35 years and a family history of UI were significant risk factors for UI in pregnancy. In this review, 4 out of 7 studies concerned primiparous women. (38). In a study of Kepenekci (2011), it was shown that vaginal delivery and higher parity increased the risk of urinary and defecatory symptoms of PFD (43).

Other findings in this study were in not in line with former studies. In the univariate logistic regression in this study, it was found that UI before the first pregnancy has a negative correlation with PFD. Viktrup (2002) found that UI present in the first pregnancy and puerperium predicts an increased risk of having the symptoms five years later (10). In a study of Brown, it was found that the strongest predictor of incidental UI in pregnancy was occasional leakage before pregnancy (aOR 3,6; 95% CI 2,6-4,7) (35).

In the multivariate logistic regression, there was only one risk factor "more than 2 children" significantly independent related to PFD (P=0,03). This is in contradiction with a study of Kamisan Atan (2015), in which was found that the first delivery had the most impact on the pelvic floor. However, they found that very few studies focussed on the impact of subsequent births (37).

Yet it is important to consider that the pathogenesis of PFD is complex and negative risk factors might be at variance in different women and sometimes difficult to study (44). Several factors and behavioural tendencies influence the function of the PF and play a role in a decrease of function. Some researchers have also made an attempt in developing prediction models for PFD using risk factors. Still, it should be considered that such a prevention model does not contribute automatically to the prevention of PFD (28,29). In case of recognition of risk factors, an adequate intervention might reduce PFD in following years (38,39,45).

5.3 - Clinical relevance

As mentioned by Wilson (2014) and some other studies, a predictive questionnaire is relevant for early identification of women at high risk for developing PFD.

5.4 - Strengths and limitations

This study has some strengths and limitations. Analysis of the proposed risk factors of the original UR-Choice was not yet performed in any other study. The UR-Choice is particularly promising since it combines all of the relevant and evidence based risk factors. Moreover, it is easily to handle for both (para) medical staff and patients. Besides, there is no practical tool such as a questionnaire in The Netherlands that offers professionals in the gynaecological and obstetric field an opportunity to find out the risk their patient to have PFD in the future. This questionnaire might be a first step in risk prediction of PFD for all postpartum women.

A limitation of the study is the relative small sample size. At the time of the study, normal values, standard deviations and means of the original UR-Choice were unknown so sample size calculation could not be performed. Furthermore, the study was performed in a relative short period and the number of non-responders is significant. However, the number of non-

responders in the group without PFD can easily be explained because these participants had

no PFD and therefore might not be motivated to fill in the questionnaire. Another limitation

was the recall bias of the question "did you have UI before pregnancy ?". The absence of

correction of age in the logistic analysis can also to be considered as a limitation of this

study.

5.5 - Recommendations

For practical use for health care professionals in the obstetric field, a pragmatic approach in

using a risk measurement tool should prevail. Therefore, the modified Dutch version of the

UR-Choice should be validated and accuracy should be determined. Larger prospective

studies should be undertaken based on existing global population databases in combination

with illness statistics taking into account all risk factors and allowing to calculate a sum score.

6. CONCLUSION

According to this study, the following conclusions can be made. The sample size of the study

was small. A positive correlation with PFD is found for the following items of the modified

Dutch version of the UR-Choice: "Caucasian race", "height < than 160 m.", "BMI before

pregnancy > than 25 kg/m2", "mother and or sister presence of PFD", "> 2 children" and a

"weight of the first child was m> 4000 gram" (OR>1; *P*<0,05). A negative correlation with

PDF was found for "UI before pregnancy" and" age > 35 years at first delivery" (OR<1,

P<0,05). No significance was shown for all correlations. The factor "more than 2 children" is

found to be independently related to PFD (OR=2,7; *P*=0,03). With regard to feasibility, it was

found that the modified Dutch version of the UR-Choice was easy to use in both groups and

mean time spent per woman answering the questionnaire was less than 5 minutes.

Table 1 Patients characteristics (total group)

Total group N=114		
Present age (years)		53 (35;79)
Parity ≤ 2		2 (1;2)
1	19 (24,4%)	
2	59 (75,6%)	
Parity >2		3 (3;7)
3	21 (58,3%)	
4	9 (25,0%)	
5	2 (5,6%)	
6	3 (8,3%)	
7	1 (2,8%)	
Present Body Mass Index (kg/m2)[1]		
<20	5 (4,4%)	19 (19;20)
20-25	38 (33,3%)	23 (21;25)
25-30	27 (23,7%)	27 (25;30)
30-35	12 (10,5%)	33 (30;34)
35-40	3 (2,6%)	39 (36;39)
Unknown	29 (25,4%)	
Caesarean section		
Yes	12 (10,5%)	
No	102 (89,5%)	
Gynecological surgery		
Yes	36 (31,6%)	
No	78 (68,4%)	
Previous Pelvic Floor Physical Therapy		
Yes	35 (30,7%)	
No	79 (69,3%)	
Type of pelvic floor dysfunction[2]		
UI	19 (16,7%)	
FI	4 (3,5%)	
POP	41 (36,0%)	
No UI, FI, POP	50 (43,8%)	

Data are presented as number of women, percentage (%) and median (range)
[1]Note that data on 29 women are missing
[2]UI= urinary incontinence, FI=faecal incontinence, POP=pelvic organ prolapse

Table 2 Patients characteristics of the two groups of women, that is with the diagnose PFD and without the PFD

	Group with PFD N=62		Group without PFD N=52		*p-value*
Present age (years)		61,5 (37;79)		47,0 (35;69)	0,00
Present age (mean)		59,9 (12,2)		48,3(8,1)	
Parity ≤ 2					0,24
1	7 (18,4%)		12 (30,0,0%)		
2	31 (81,6%)		28 (70%)		
Parity >2					0,92
3	15 (62,5%)		6 (50%)		
4	4 (16,7%)		5 (41,7%)		
5	2 (8,3%)		0		
6	3 (12,5%)		0		
7	0		1 (8,3%)		
Present Body Mass Index (kg/m2)[3]					
<20	1 (1,6%)	19 (19;19)	4 (7,7%)	19 (19;19)	0,63
20-25	22 (35,5%)	23 (21;24)	16 (30,8%)	23 (21;24)	0,35
25-30	19 (30,7%)	27 (25;29)	8 (15,4%)	27 (25;29)	0,90
30-35	8 (12,9%)	33 (30;35)	4 (7,7%)	32 (30;33)	0,49
35-40	2 (3,2%)	38 (36;39)	1 (1,9%)	39 (39;39)	0,69
Unknown	10 (16,1%)		19 (36,5%)		
Caesarean Section					0,00
Yes	2 (3,2%)		10 (19,2%)		
No	60 (96,8%)		42 (80,8%)		
Gynecological surgery					0,00
Yes	36 (58,1%)		0		
No	26 (41,9%)		52 (100%)		
Previous Pelvic Floor Physical Therapy					0,00
Yes	33 (53,2%)		2 (3,85%)		
No	29 (46,8%)		50 (96,2%)		
Type of pelvic floor dysfunction					0,79
UI	18 (29,0%)		1 (1,92%)		
FI	4 (6,5%)		0		
POP	40 (64,5%)		1 (1,92%)		
no UI, FI, POP	0		50 (96,2%)		

Data are presented as number of women, percentage (%) and/or median (range), and/or mean (S.D.) Significance was measured with Independent Samples T-test for continuous variables and Chi-square test for dichotomous variables
[3]Note that data of 29 women are missing, 10 in the group with PFD and data of 19 women in the group without PFD

Table 3 Dutch modified version of the UR-Choice with cut-off points (total group)

Total group N=114	
Are you of Caucasian origin?	
Yes	102 (89,5%)
No	12 (10,5%)
What is your height? [4]	
< 1,60	16 (14,0%)
≥ 1,60	98 (86,0%)
Did you have UI before pregnancy?	
Yes	7 (6,1%)
No	107 (93,9%)
At what age did you get your first baby?[5]	
>35	6 (5,3%)
≤ 35	108 (94,7%)
What was your weight just before your first pregnancy? [6/8]	
>25	19 (16,7%)
≤25	94 (82,5%)
Does or did your mother or (one of your sisters suffer from PFD(UI and/or FI, and/or POP)?[9]	
Yes	46 (40,4%)
No	59 (51,8%)
How many children did you have (including caesarean sections)?	
>2	37 (32,5%)
≤2	77 (67,5%)
What was the weight of your first child?[7]	
>4000	12 (10,5%)
≤4000	102 (89,5%)

Data are presented as number of women, percentage (%)
[4]Height in meters
[5]Age in years
[6]For data analysis data of Body Mass Index (kg/m2) were used.
[7]Weight of the child in grams
[8]Note that data on 1 woman is missing
[9]Note that data on 9 women are missing

Table 4 Dutch modified version of the UR-Choice with cut off points split in group with PFD and without PFD

	Group with PFD N=62	Group without PFD N=52	*p-value*
Are you of Caucasian origin?			*0,12*
yes	58 (93,5%)	44 (84,6%)	
no	4 (6,5%)	8 (15,4%)	
What is your height?[4]			*0,21*
< 1,60	11 (17,7%)	5 (9,6%)	
≥ 1,60	51 (82,3%)	47 (90,4%)	
Did you have UI before pregnancy?			*0,53*
yes	3 (4,8%)	4 (7,7%)	
no	59 (95,2%)	48 (92,3%)	
At what age did you get your first baby?[5]			*0,08*
>35	1 (1,6%)	5 (9,6%)	
≤ 35	61 (98,4%)	47 (90,4%)	
What was your weight just before your first pregnancy?[6/8]			*0,77*
>25	11 (17,7%)	8 (15,4%)	
≤25	51 (82,3%)	43 (8,7%)	
Does or did your mother or (one of your sisters suffer from PFD (UI and/or FI, and/or POP)?[9]			*0,16*
yes	29 (46,8%)	17 (32,7%)	
no	27 (43,5%)	32 (61,5%)	
How many children did you have (including caesarean sections)?			*0,12*
>2	24 (38,7%)	13 (25%)	
≤2	38 (61,3%)	39 (75%)	
What was the weight of your first child?[7]			*0,77*
>4000	7 (11,3%)	5 (9,6%)	
≤4000	55(88,7%)	47 (90,4%)	

Data are presented as number of women, percentage (%) and/or median (range). Significance was measured with Independent Samples T-test for continuous variables and Chi-square test for dichotomous variables

[4]Height in meters
[5]Age in years
[6]For data analysis, data of Body Mass Index (kg/m2) were used
[7]Weight of the child in grams
[8]Note that data on 1 woman is missing
[9]Note that data on 9 women are missing, 6 in the group with PFD and 3 in the group without PFD

Table 5 Risk factors of the univariate logistic and multivariate logistic regression analysis on pelvic floor dysfunction

|	Univariate		Multivariate	
	OR (95% CI)	*p-value*	OR (95%)	*p-value*
mUR-Choice Caucasian race		*0,13*		
Yes	2,6 (0,8;9,3)[a]			
No	Ref.			
mUR-Choice height (meters)		*0,22*		
< 1,60	2,0 (0,7;6,3)[a]			
≥ 1,60	Ref.			
mUR-Choice UI before 1st pregnancy		*0,53*		
Yes	0,6 (0,1;2,9)			
No	Ref.			
mUR-Choice age before delivery (years)		*0,09*		
>35	0,3 (0,0;1,4)[a]			
≤35	Ref.			
mUR-Choice BMI before 1st pregnancy (kg/m2)[8]		*0,77*		
>25	1,2 (0,4;3,1)			
≤25	Ref.			
mUR-Choice mother/sister PFD [9]		*0,08*		
Yes	2,0 (0,9;4,5)[a]			
No	Ref.			
mUR-Choice amount children		*0,12*	2,7 (1,1;6,5)	*0,03*
>2	1,9 (0,8;4,3)[a]			
≤2	Ref.			
mUR-Choice 1st child (grams)		*0,77*		
>4000	1,2 (0,4;4,0)			
≤4000	Ref.			
Variance explained by the model	6,6%[10]			

[a] *P* <0.3; the factors with *P*< 0.3 were included in the multivariate logistic regression
[8] Note that data on 1 woman is missing
[9] Note that data on 9 women are missing, 6 in the group with PFD and 3 in the group without PFD
[10] Nagelkerke R^2

Figure 1 Flow diagram
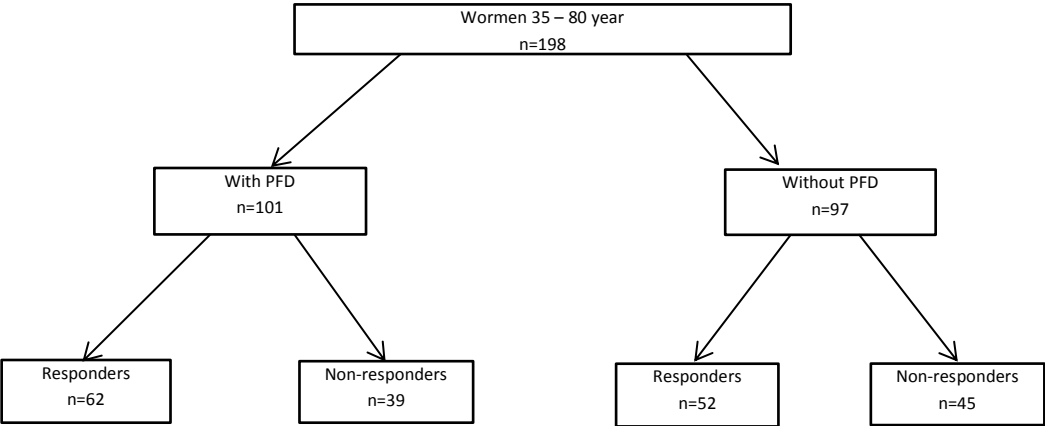
Appendix 1

Modified Dutch version of the UR-Choice

Are you of Caucasian origin?   yes / no

Bent u van het Kaukasische (blanke) ras?   *ja / nee*

What is your height?   ... cm

Wat is uw lengte?   *... cm*

Did you have UI before pregnancy?   yes / no

Heeft u urineverlies gehad voor of tijdens uw 1ste

zwangerschap?   *ja / nee*

At what age did you got your first baby?   ...

Wat was uw leeftijd bij de eerste bevalling?   *...*

What was your weight just before your first pregnancy?   ...

Wat was uw gewicht vlak voor uw 1ste zwangerschap?   *...*

Does or did your mother or (one of your sisters suffer from PFD

(UI and/or FI, and/or POP)?   yes / no

Heeft of had uw moeder of (één van uw) zus(ters)

bekkenbodemproblematiek (urineverlies/verzakking

ontlastingsverlies)?   *ja / nee*

How many children did you have (including caesarean sections)? ...

Hoeveel kinderen heeft u gehad inclusief eventuele

keizersnedes?   ...

What was the fetal weight of your first child?   ... gr

Wat was het gewicht van uw eerste kind?   *... gr*

How long did it take to fill in the modified Dutch version of the   ... minutes

UR-Choice?

Hoeveel tijd heeft het u gekost de aangepaste Nederlandse versie ... minuten

 van de UR-Choice in te vullen?

Where the questions clearly formulated?   yes / no

Waren de vragen duidelijk voor u?   *ja / nee*

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