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Comparison of Pelvic Floor Muscle Strength and Female Sexual Function in Primiparous After Vaginal Delivery with Caesarean Section

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ABSTRACT--- *A woman's body undergoes many transformations during pregnancy. One of these physical changes affecting the pelvic floor as the muscles work harder to maintain the stability of the spine and the pelvis to support the developing fetus. Unfortunately, these normal pelvic floor can lead to permanent pelvic floor damage during childbirth, including various types of pelvic floor dysfunction. Pregnancy also triggers change in sexual function as well. As pregnancy progresses, women report poorer sexual function. This study aims to analyse the comparison of pelvic floor muscle strength and sexual function in primiparous women after vaginal delivery and caesarean section. Research conducted from April 2019 to January 2020 with total of 92 subjects (46 with vaginal delivery and 46 women with caesarean section). The characteristics of the subjects obtained. The majority are 20-25 years old (41.3-60.9%), unemployed (71.7-87%), last education in junior-high school (65.2%), normal BMI (56.5- 63.1%), baby birth weight 2500-3500g (52.2% -63%). Statistical analysis was performed using Chi Square. The average pelvic floor muscle strength in both groups was 43.92 cmH2O. To compare the strength of pelvic floor muscles and sexual function were analyzed using the Independent T-Test with p = 0.403 and p = 0.213 (p>0.05). There is no difference in pelvic floor muscle strength and sexual function in primiparous women after vaginal delivery and caesarean section.*

Keywords--- *Pelvic Floor Muscle, Female Sexual Function, Primiparous, Vaginal Delivery, Caesarean Section*

I. INTRODUCTION

Pelvic floor muscle has important role in supporting the pelvic and abdomen organ and controlling urine and fesses removal, and also has certain effects due to sexual function (Mendes et al., 2016). Some research has stated that age, pregnancy, vaginal delivery, parity, second stage duration, difficulties of labour by caesarean section and

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baby's birth weight, perineum rupture, hormonal and mechanical factors, and neurologist factor relating to the dysfunction of pelvic floor muscles (Riesco et al., 2010; Distefano, 2015). Pregnancy may come with emotionally and physical changes to women (Palmezoni et al., 2017). Those changes can affect the pelvic floor muscles from the beginning of the a pregnancy until time of labor, which cause dysfunction of pelvic floor muscles (Palmezoni et al., 2017;Mendes et al., 2016).

Women sexual function connect to their physical and physiological factor, not to mention social culture (Menezes Franco et al., 2017;santos et al., 2017). Sexual dysfunction prevalence on women is around 38% - 85,2% (Menezes Franco et al., 2017). The symptoms of sexual dysfunction on women come from the sensation or sexual experience and described as sexual interest disorder, orgasm, and sexual penetration (Ozdemir, Pehlivan, and Melekoglu, 2017). Pregnancy and labour are considered to be the risk factors that can lead to sexual dysfunction (Santos et al., 2017). Female Sexual Index (FSFI) is the Method to rate women sexual dysfunction by using questionnaire (Ozdemir, Pehlivan, Melekoglu, 20It17). During pregnancy a woman experience a decrease of sexual activity from the beginning of the pregnancy Until post partum. It is reported that sexual activity decrease from 94% on the first trimester and 90% on the second trimester and also 77% on the third trimester (Santos et al., 2017). It is also reported that sexual function changes on post partum women go around 22% - 86% (Citak et al., 2010).

Kegel also stated that the weakness of pelvic floor muscle can cause women to unable to reach orgasm (Menezes Franco et al., 2017). Vaginal delivery is mentioned to cause great damage on pelvic floor muscle and some neuro system on woman's sexual organ and can decrease twice of sexual function after post partum (Citak et al., 2010). Snooks and Sawsh reported that damage to the pudendal nerve commonly happens after vaginal delivery, this May appear to be prevented by going through caesarean section delivery. Measuring the strength of pelvic floor muscles is essential as prevention, diagnosis, and management of pelvic floor muscles dysfunction and sexual dysfunction problems (Mendes et al., 2016). Based on the description above, it is necessary to do the research about the Comparison of pelvic floor muscles and women's sexual function on primiparous post vaginal delivery and caesarean section.

II. METHODOLOGY

This research is a cohort prospective to compare the strength of pelvic floor muscles and woman's sexual function on primiparous after vaginal delivery and caesarean section delivery. The research was conducted at some Teaching Hospitals, Department of Obstetric and Gynecology Medical Faculty Hasanuddin University which is Dr. Wahidin Sudirohusodo Hospital and other Teaching Hospitals. The research was conducted from April 2019 to January 2020. The sample taking was done by using the consecutive sampling technique, where the samples have to required certain characteristic in order to fulfil the inclusion criteria. There are 92 samples calculated by using categorical analysis formula which is 46 for vaginal group and 46 for caesarean section group. The samples on this research are primparous that have undergone the labor at Dr. Wahidin Sudirohusodo Hospital and other educational networking Hospitals that qualified the inclusion criteria, those with the age 20-35 y.o, with newborn's weight 2500 - 4000 grams, living at the same house as their husband's and sexually active and also with no systemic disease. Subjects with level 3 and 4 perineum ruptures during labor who cannot be contacted for pelvic floor muscles strength measurement are excluded from the research. The operational procedures of the research is using

Female Sexual Function Index (FSFI) questionnaire to rate the sexual function and using Peritron perineometer to rate the strength on pelvic floor muscles. Subjects will be contacted 8 - 12 weeks after labor and come for check ups and measured the pelvic floor muscle and the sexual function.

The data are taken through computerized data analysis program and followed by analysis. The demographic characteristic relation like age, occupation, educational background, method of labor, newborn's weight and body mass index are analysed by using Pearson Chi Square Test. And to compare the strength of pelvic floor muscles and sexual function on vaginal delivery group with caesarean section delivery group, the analysis is using T-test independent to determine significant difference between two groups. Pelvic floor muscles strength and sexual function on each primparous groups that undergo vaginal and caesarean section delivery are analysed by using Pearson coefficient correlation.

III. RESULT

The research is performed on 92 samples that qualified the inclusion criteria. The subjects of the research are divided into two groups, 46 subjects (50%) in the vaginal delivery group and another 46 subjects (50%) in the caesarean section group. During the research we were faced by some obstacles, there were some subjects that had to be excluded for not committed to come for check ups after the delivery which extend the duration of this research and unsuitable number of samples. The check up point of this research is St. Khadijah 1 Hospital Makassar, as it is one of Teaching Hospital Networks, therefore it would be easier to coordinate during check ups and subject data collection.

The research subject demography characteristic consist of age, occupation, educational background, body mass index, birth body weight as shown on Table 1. The data on Table 1 shows the largest number of age group is the the research samples on both groups, vaginal delivery or even caesarean section delivery, which appears at range of 20 - 25 years old. Most of the research subject have no steady job or regular housewife. The highest education characteristic found on both groups are Junior High School to Senior High School, 30 People (65,2%) for each group. Body mass index on both groups has characteristic similarities, which most of them are normal. The most number on birth weight for vaginal delivery group have the range of 2500 - 3000 grams which are people (52,2%) and for caesarean section group 3001 - 3500 grams which are 29 People (63%). Based on the data, it can be concludes that research characteristic subject, taken from the age, occupation, body mass index, and newborn's weight do not show any significant relation to the chosen delivery Method with the score of $p > 0,05$.

The data on Table 2 shows average strength of pelvic floor muscles is cmH2O, each for both groups 42,74 cmH2O ± 11,98 SD on vaginal delivery group and 45,11 cmH2O ± 15,20 SD on caesarean section delivery group, and both groups have insignificant difference with the score $p = 0,409$.

Table 3 shows that the result of the measuring the strength of pelvic floor muscles using perineometer, the lowest rate is 14,9 mmHg and the highest is 97,2 mmHg. For the average rate of the pelvic gloor muscle strength measurement on both research subject groups, the result is 43,92 mmHg.

The data on Table 4 shows that the relation between pelvic floor muscles strength and sexual function on vaginal delivery and caesarean section delivery proved that there is no significant relation between sexual function and pelvic floor muscle strength with the delivery method, with $p > 0,05$.

The average rate of pelvic floor muscles strength and sexual function on both groups don not show any significant difference, with each score p = 0,403 and p = 0,213 as seen on Table 5.

Table 1. Demographic characteristics of research subjects

Variable	After vaginal delivery group n = 46	%	After caesarean section group n = 46	%	p*
Age (years old)					
• 20 – 25	28	60.9	19	41.3	
• 26 – 30	12	26.1	18	39.1	0.172
• 31 – 35	6	13.0	9	19.6	
Occupation					
• Employed	13	28.3	6	13.0	0.071
• Unemployed	33	71.7	40	87.0	
Education					
• Kindergarten – Elementary school	2	4.3	7	15.2	
• Junior high school – Senior high school	30	65.2	30	65.2	0.145
• D3 – S1	14	30.5	9	19.6	
BMI					
• Underweight	3	6.5	1	2.2	
• Normal	29	63.1	26	56.5	0.582
• Overweight	10	21.7	13	28.3	
• Obese	4	8.7	6	13.0	
Birth weight					
• 2500 – 3000	24	52.2	13	28.3	
• 3001 – 3500	18	39.1	29	63.0	0,054
• 3500 – 4000	4	8.7	4	8.7	

Table 2. The comparison of pelvic floor muscle average strength and sexual function in primiparous women after vaginal delivery and caesarean section using perineometer

	N	Mean	SD	p*
Vaginal delivery	46	42.74	1.98	0.409
Caesarean Section	46	45.11	15.20	

Table 3. Measurement description of pelvic floor muscle strength using perineometer

	N	Minimum	Maximum	Mean	Std
Perineometer	92	14.9	87.2	43.92	13.66

Table 4. Relationship between pelvic floor muscle strength and sexual function with delivery method

Variable	After vaginal delivery group n = 46	%	After caesarean section group n = 46	%	p*
FSFI					
• Normal	37	80.4	40	87.0	0.397
• Dysfunction	9	19.6	6	13.0	
PFM Strenght					
• Low	24	52.2	18	39.1	0.209
• Normal	22	47,.8	28	60.9	

Table 5. Measurement description of pelvic floor muscle strength and sexual function

	N	Mean	Std	p*
FSFI				
Vaginal delivery	46	1.2	0.41	0.403
Caesarean Section	46	1.1	0.34	
PFM Strenght				
Vaginal delivery	46	1.4	0.51	0.213
Caesarean Section	46	1.6	0.49	

IV. DISCUSSION

The purpose of the research is to compare woman's pelvic floor muscles strength and sexual function on primparous vaginal delivery and caesarean section delivery. The primparous is chosen to be the subjects of the research to avoid any misguided factors that are possible to be found on multipara deliveries. The nullipara group is the group with the strongest average pelvic floor muscles strength (Afshari, 2016). Thefore, the primparous group can be considered to be representative in measuring pelvic floor muscles strength post partum.

The data from the Central Bureu of Statistic shows that first media age of marriage of the group of women aged 25 - 29 in 2017 is the age of 22,9 to women living in the city and 20.9 to the women living in the country side. The first media age of marriage on the group of women ages 25 - 29 in 2017 in South Sulawesi is 21.5 years (Central of Statistic Bureu, 2018). Age is naturally affected on the decrease of sexuality aspect, where women's Best sexual activity appears at young age, and it will decrease as they grow older (Baksu et al., 2007). The pelvic floor muscles strength is affected by some risk factors, which caused the weakness and loose on the pelvic muscle, age factor is one of those factors. The highest number of samples on each group in this research are the age group of 20 - 25. This matches the data from the Central Bureu of Statistic and the existed research data that marriage age media comes on the average of 21 - 25 years of age or less than 30 year old.

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Most subjects in this research, vaginal and caesarean section delivery, are women with no steady Jobs or having the activity as regular housewife. This May affect their sexual lives after labor. Based on the data from the Central Bureu of Statistic, it is stated that the number of women's working participate on in Indonesia does not have any significant changes from year to year. Women's worrking participate on (percentage of total workforce on working age) in 2018 is 55,44% (Central Bureu of Statistic, 2018). Worries come on financial issue, social economy (occupation), this includes insurance for labor that affects couple in living their social life (Abdool et al., 2009). This is the opposite of the data from the BPS, probably occurs because the subjects prefer to stay jobless during pregnancy, therefore many of the subjects decide to become housewife during their pregnancies. From this research, it is mentioned why they decide to quit their Jobs after they got pregnant, because they believe is it difficult for them to have double role, as working women and as a housewife. Other opinion also stated that differences comes with the Role of husband and wife. Other reason comes from the husband that ask their wives to stop working, because they are financially stable. Gayatri (2012) research stated that a mother who plays double roles during pregnancy tends to have psychological disorders, such as stressed, depressed, sad, crying continuously.

The relation between educational background and sexual satisfaction is still debatable until now. A good education level comes to positive effect on sexual function introduction, another effect comes from myths, which can be wrong but considered to be right for have been known for long, even from generation to generation, with adequate knowledge, the less the effect because they know that information is wrong (Pangkahila, 2005; Windhu, 2009) .

Data from basic health research Indonesian Ministry of Health (2013) shows that 62,68% of Indonesia citizens have normal body mass index. Another literatures states the bigger the body mass index the weaker the pelvic floor muscle. Epidemiologically, it is known that there is a relation between obesity and pelvic floor muscle disturbance (Santi, 2007). The research can not prove any relation between body mass index and labor ($p > 0.05$). A mother with less body mass index before pregnancy, should be able to gain more weight more than a mother with normal body mass index before pregnancy because their physiological needs is bigger in order to support their pregnancies. Unsuitable increase of body weight may give negative cause to the mother and the baby (Nurhayati, 2015).

The bigger the baby added with long stage two partus, will affect the pudenda denervation nerve. This affect the urine incontinence incident and faecal in the future, this May decrease the post partum sexual wuality (Harris, 2003). Data is taken from the National Health Indicator Survey in 2016 (Siskernas, 2016), which explains newborn's body weight in Indonesia 88,4% is in the range of 2500 - 3999 grams. The research stated that there are difference result that come from 2 groups of research which is the most vaginal delivery with the weight of 2500 - 3000 grams, 52.2%, and the caesarean section group with the weight of 3000 - 3500 grams, 63%. Yet, the difference has no meaningful relation with the score of $p > 0.05$.

The average pelvic floor muscles strength on primparous that have undergone vaginal delivery have lower rate compare to caesarean section group. The statistical test result by using independent T-Test, it is know that there is no meaningful difference between vaginal delivery group and caesarean section group on the pelvic floor muscle strength. On this research we found that average pelvic floor muscles on women post partum with vaginal delivery 42.74 cmH_2O and caesarean section delivery has 45.11 cmH_2O. It is different from the research conducted by Afshari et al (2016) that shows average pelvic floor muscles strength on vaginal delivery with episiotomy is 21.71

± 14 cmH_2O and vaginal delivery without episiotomy is 53.88 ± 20.9 cmH_2O. Another result shows that average pelvic floor muscles strength on caesarean section effectively 52.9 ± 21.29 cmH_2O and emergency caesarean section is 48.97 ± 21.04 cmH_2O. Friednman et al. (2012) shows different result where the primparous media of pelvic floor muscles strength for those who underwent vaginal delivery, caesarean section stage two of delivery each for 27 cmH_2O dan 36.5 cmH_2O. Yet the research does not specifically elaborate the procedures in vaginal delivery, whether episiotomy is conducted before the delivery and we also do not divided the caesarean section, whether it is elective or emergency. This is why the result of our research is different from the previous one.

The analysis shows no significant difference between vaginal delivery and caesarean section delivery concerning pelvic floor muscles strength. But they clinically have differences, where normal pelvic floor muscles strength is higher on caesarean section delivery than the one with vaginal delivery. Other research explains about the relation of damage on pelvic floor muscles on nullipara based on delivery procedure, this comes with meaningful relation between caesarean section (OR 2,5,95% CI 1.5-4.3), normal delivery (OR 3,4, 95% CI 2.4-4.9) equiped delivery (OR 4.3 95% CI 2.8-6.6). Vaginal delivery cause neurological changes on pelvic floor muscles that gives direct effect on pundedus nerve conduction, vagina contraction strength and uretra closing velocity pressure. Ani lavetory muscles demage comes muscle damage during labor directly and indirectly because nerve damage which leads to pelvic porlaps or urine incontinence and sexual dysfunction (Betozzi et al., 2011). Research conducted by Allen and Hosker using perineometric, show the decrease of strength of pelvic floor muscles contraction significantly and persistently to women post partum (Culligan, 2007).

From the research, it is know that sexual dysfunction of primiparous women after vaginal delivery and caesarean section delivery are not statistically different with $p > 0,05$. But clinically have different rate where women who conducted vaginal delivery are more with sexual dysfunction compare to women who conducted caesarean section. The research whos the number of Postpartum Female Sexual Dysfunction of the first three months after labor is 70.6% decreasing to 55.6% 4 to 6 months and decrease to 34,2% 6 months after labor (Breslin & Lucas, 2003). Perineum and dspareunia pain are post partum problem that can disturb normal sexual function, which may lead to perineum trauma, episiotomy, and delivery instrument (Basson, 2004). Sexual dysfunction to women post partum can cause changes on the patterns for their sexual intercourse by the decreasing of sexual frequancy. This is supported by the statement from Von Sydow (1999) married couple will begin to have sexual intercourse after the seventh or the eighth week post delivery, where women commonly repot the decrease of sexual activity frequency that go for the first year post partum.

V. CONCLUSION

Based on the result and the discussion of the research, it can be concludes that there is no difference on pelvic floor muscles to primiparous women that have gone through vaginal delivery or caesarean section delivery.

REFERENCES

1. Abdool,Z, Thakar, R., Sultan, A.H. 2009. Postpartum Female Sexual Function: A Review. European Journal of Obstetrics & Gynecology and Reproductive Biology; 2009.04.014

2. Afshari, P., Dabagh, F., et al. 2016. Comparison of Pelvic Floor Muscle Strength in Nulliparous Women and Those with Normal Vaginal Delivery and Caesarean Section. Int Urogynecol J.
3. Badan Pusat Statistik. 2018. Statistik Indonesia 2018. Jakarta: Badan Pusat Statistik
4. Baessler, K., Schuessler, B. 2003. Chilbirth Induced Trauma to The Urethral Continence Mechanism: Review and Recommendations
5. Baksu, B., Davas, I., Agar, E., Akyol, A., Varolan, A. 2007. The effect of mode of delivery on postpartum sexual functioning in primiparous women. Int Urogynecol J Pelvic Floor Dysfunct. 18(4):401–6.
6. Barber MD. Contemporary views on female pelvic anatomy. Cleveland clinic journal of medicine 2005; 72:S4-S11.
7. Barrett, G., Peacock, J., Victor, CR., Manyonda, I. 2005. Cesarean section and postnatal sexual health. Birth;32(4):306–11
8. Basson, R. 2004. Revised Definitions of Women's Sexual Dysfunction. Canada : Journal of Sexual Medicine, Vol. 1, No. 1: 40-8.
9. Basson, R., dkk. 2000. Report of International Consensus Development Conference on Sexual Dysfunction: definitions and classifications.J Urol. 163: 888 – 93.
10. Bertozzi, S., Londero A.P., Frucalzo,A., Driul, L., Delneri, C., Calcagno, P., Marchesoni, D. 2011. Impact of Episiotomy on Pelvic Floor Disorders and Their Influence on Women's Wellness after The Sixth Month Postpartum: a Retrospective Study
11. Breslin, E.T., & Lucas, V.A. 2003. Women's Health Nursing toward Evidence Based Practice. Missouri : Elsevier Science.
12. Brtnicka, H., Weiss, P., Zverina, J. 2009. Human sexuality during pregnancy and the postpartum period: A Review.Bratisl Lek Listy.110(7):427-431
13. Burdge GC, Hoile SP, Uller T, Thomas NA, Gluckman PD, Hanson MA, dkk. 2011. Progressive, Transgenerational changes in offspring phenotype and epigenotype following nutritional transition. PLoS One ;6(11): e28282.
14. Caroci, A. de S. et al. 2014. 'Evaluation of perineal muscle strength in the first trimester of pregnancy', Revista Latino-Americana de Enfermagem, 22(6), pp. 893–901. doi: 10.1590/0104-1169.3600.2492.
15. Citak, N. et al. 2010. 'Postpartum sexual function of women and the effects of early pelvic floor muscle exercises', Acta Obstetricia et Gynecologica Scandinavica, 89(6), pp. 817–822. doi: 10.3109/00016341003801623.
16. Culligan P.J., Goldberg, R.P. 2007. Urogynecology in Primary Care. London: Springer Verlag London. p. 21-33.
17. Cunningham, F.G., Leveno, K.J., et al. 2014. Williams Obstetrics 24th Ed.McGraw-Hill Education: New York.
18. Distefano, M. D. 2015. 'NIH Public Access', 111(5), pp. 213–223. doi: 10.1007/978-1-62703-673-3.
19. Friedman, S., Blomquist, J.L., et al. 2012. Pelvic Muscle Strength after Childbirth. Obstet Gynecol. 120(5):1021-28.
20. Gameiro, M. O. et al. 2013. 'Pelvic floor muscle strength evaluation in different body positions in nulliparous healthy women and its correlation with sexual activity', International braz j urol, 39(6), pp. 847–852. doi: 10.1590/S1677-5538.IBJU.2013.06.11.

21. Gayatri M. 2012. Beban ganda pada ibu selama kehamilan dengan status ekonomi rendah di wilayah kerja puskesmas mergangsan. Yogyakarta
22. Harris, WH. 2003. Repair of an Episiotomy.East Afr Med J. 80(7):351-6
23. Hoffman, B.L., Schorge, J.O., et al. 2016. Williams Gynecology 3rd. McGraw-Hill Education: New York
24. Lubis et al., 2015. Perbedaan fungsi seksual pada wanita pasca persalinan spontan dengan seksio sesaria dengan menggunakan Female Sexual Function Index (FSFI) di Rumah Sakit Umum Pusat H. Adam Malik dan rumah sakit jejaring Fakultas Kedokteran Universitas Sumatera Utara Medan. Medan : FK USU
25. Lubis, D. L.,. 2009. 'Kekuatan otot dasar panggul pada wanita pasca persalinan normal dan pasca seksio sesarea dengan perineometer '. Medan
26. Lukacs, E., Lawrence, J.M., Contretas, R., Nager C.W., Luber, K.M. 2005. Parity, Mode of Delivery, and Pelvic Floor Disorders.
27. Mac Lenan HA. Taylor AW, Wilson DH, Wilson D. The prevalence parity and mode of delivery. Br J Obstet Gynaecol 2000; 107 : 1460-70.
28. Masters, WH., Johnson, VE. 1960. The human female: anatomy of sexual response. Minn Med. 43:31–6
29. Megaputra I.G., 2012. 'Dampak kehamilan dan persalinan terhadap dasar panggul', Denpasar : FK UNUD .pp. 1–45.
30. Mendes, E. de P. B. et al. 2016. 'Pelvic floor muscle strength in primiparous women according to the delivery type: cross-sectional study', Revista Latino-Americana de Enfermagem, 24(0). doi: 10.1590/1518-8345.0926.2758.
31. Menezes Franco, M. et al. 2017. 'Relationship between pelvic floor muscle strength and sexual dysfunction in postmenopausal women: a cross-sectional study', International Urogynecology Journal. International Urogynecology Journal, 28(6), pp. 931–936. doi: 10.1007/s00192-016-3211-5
32. Murray S, Chaote A. 2005. Research in pelvic floor muscle strength in postpartum and nulliparous women
33. Nurhayati E., 2015. Indeks Massa Tubuh (IMT) Pra Hamil dan Kenaikan Berat Badan Ibu Selama Hamil Berhubungan dengan Berat Badan Bayi Lahir Pregnancy are Related with Infant Birth Weight, pp. 1–5.
34. Oboro, VO., Tabowei, TO. 2002. Sexual function after childbirth in Nigerian women. Int J Gynecol Obstet. 78(3):249–50
35. Ota E, Haruna M, Suzuki M, Anh DD, Tho LH, Tam NTT, et al. 2011. Maternal body mass index and gestational weight gain and their association with perinatal outcomes in Vietnam. Bull World Health Organ;89(2):127–36. Available from: http://www.ncbi.nlm.nih.gov/ pubmed/21346924
36. Ozdemir, F. C., Pehlivan, E. and Melekoglu, R. 2017. 'Pelvic floor muscle strength of women consulting at the gynecology outpatient clinics and its correlation with sexual dysfunction: A cross-sectional study', Pakistan Journal of Medical Sciences, 33(4), pp. 854–859. doi: 10.12669/pjms.334.12250
37. Palmezoni, V. P. et al. .2017. 'Pelvic floor muscle strength in primigravidae and non-pregnant nulliparous women: a comparative study', International Urogynecology Journal. International Urogynecology Journal, 28(1), pp. 131–137. doi: 10.1007/s00192-016-3088-3
38. Pangkahila, W. 2005. Peranan Seksologi dalam Kesehatan Reproduksi.. Dalam : Martaadisoebrata D, Astrawinata R, Saifudin, A.B., editors. Bunga Rampai Obstetri dan Ginekologi Sosial. Jakarta : Yayasan Bina Pustaka Sarwono Prawirohardjo. hal. 64-89
39. Piliansjah, Somad NM. 2003. Pengukuran kekuatan otot dasar panggul wanita dengan perineometer. Dibawakan pada PIT XIII POGI. Bandung

40. Rahmani, N. And Mohseni-Bandpei, M.A. 2009. Application of Perineometer in the Assessment of Pelvic Floor Muscle Strength and Endurance: A Reliability Study. Journal of Bodywork & MovementTherapies. 15: 209-14
41. Raina, R. et al ., 2007. Female sexual dysfunction: classification, pathophysiology, and management, a Glickman Urological Institute and Department of Obstetrics and Gynecology, Cleveland Clinic Foundation; and b Department of Internal Medicine and Pediatrics, Case Western Reserve University (Metro Health Medical Center), Cleveland, Ohio.
42. Riesco, M. L. G. et al. .2010. 'Perineal Muscle Strength During Pregnancy and Postpartum: the Correlation Between Perineometry and Digital Vaginal Palpation', Revista Latino-Americana de Enfermagem, 18(6), pp. 1138–1144. doi: 10.1590/S0104-11692010000600014.
43. Rosen, R., dkk. 2000. The Female sexual function index (FSFI): A Multidimensional Self-report Instrument for the Assesment of Female Sexual Function. Journal of Sex and Marital Therapy.26(2):191-208
44. Rusli, A. I., Ocviyanti, D. and Mansyur, M. 2011. 'Hubungan Peningkatan Berat Badan Ibu Hamil Dengan Lama Persalinan '. Jakarta
45. Santi D, Junizaf. 2007. Hubungan antara seksio berencana dan seksio darurat pada wanita primipara dengan kejadian stres inkontinensia. Dibawakan pada PIT XVI POGI. Mataram
46. Santos, M. D. et al. 2017. 'Evaluation of pelvic floor muscle strength and its correlation with sexual function in primigravid and non-pregnant women: A cross-sectional study', Neurourology and Urodynamics, (January). doi: 10.1002/nau.23353
47. Signorello, LB., Harlow, BL., Chekos, AK., Repke, JT. 2001. Postpartum sexual functioning and its relationship to perineal trauma: a retrospective cohort study of primiparous women. Am J Obstet Gynecol.184(5):881–8.
48. Susanto S. 2007. Status perineum post partum sebagai prediktor kelemahan otot dasar panggul pada primipara. Dibawakan pada PT XVI POGI. Mataram
49. Tacker, Banta. 1983. The Dangers of Episiotomy, It isn't just a bit 'sore'. Available from : http://www.vaccineriskawareness.com/The- Dangers-of-Episiotomy
50. Vasavada, S.P., Appell, R.A., Sand, P.K., Raz, S. 2005 Female Urology, Urogynecology and Voiding Dysfunction. New York: Marcel Dekker. p. 95-118.
51. Walters, M.D. and Karram, M.M. 2015. Urogyncology and Reconstructive Pelvic Surgery 4th Ed. Elsevier Saunders: Philadelphia
52. Windhu, S.C. 2009. Disfungsi Seksual : Tinjauan Fisiologi dan Patologis Terhadap Seksualitas. Yogyakarta : Andi