

Assessment of Stress Incontinence in Indian Female CrossFit Trainers Aged 20-40 Years: A Cross-Sectional Study

Madhura Javadekar¹, Dr Rutika Shivdikar²

^{1,2}DPO's NETT College of Physiotherapy, Kolshet Road, Thane West, Maharashtra

Corresponding Author: Madhura Javadekar

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ABSTRACT

Background: Stress incontinence is involuntary and uncontrollable loss of urine which is caused by activities that elevate intra-abdominal pressure. Cross fit training involves exercises which are performed above the normal level of intensity of other form of exercises. Although these set of exercises strengthen abdominal muscles, they eventually cause weakening of pelvic floor muscles making them susceptible to develop stress incontinence.

Objective: To study and assess stress incontinence in Indian Female cross Fit trainers aged 20-40 years.

Method: n = 100 subjects were included in the study who then performed pad test. Based on the results of pad test, they were classified as continent or incontinent. Further they filled Questionnaire for urinary incontinence (QUID) which confirmed whether they were suffering from stress incontinence or urgency incontinence

Results: Female cross fit trainers in the age group of 20-40 years with an average of 23.67 (± 5.92 years), were segregated into 4 age groups, that is 20- 25 years, 26-30 years, 31-35 years and 36-40 years. Majority of females in age group of 36-40 were positive for pad test. Out of the total females positive, in nulligravid females, only 1 female was positive for pad test, in females who were primigravid 7 females were positive for pad test and in multigravida females that is females with 2 children 15 were positive for pad test.

Conclusion: The study concludes that there is a positive correlation between age of women and parity on incontinence.

Key Words: Stress urinary incontinence (SUI), Parity, Pelvic floor muscles (PFM)

INTRODUCTION

Stress urinary incontinence is defined by the International Continence Society as the difficulty or disturbance in normal functioning of individuals in performing activities of daily living due to any form of involuntary loss of urine on physical activity or on sneezing, coughing, laughing.^[1] It is Unintentional, unavoidable, accidental and involuntary loss of urine. It occurs during any types movement which in turn increases intra- abdominal pressure above normal levels.^[2] Amongst all types of urinary incontinence, this type is more common in young physically fit females who perform exercises.^[3]

Cross fit is a high intensity workout which involves exercises that target on strength of muscles, improvement of overall cardiopulmonary endurance and total body fitness. It was first developed by Greg Glassman at the start of 21st century that is in 2000. Cross Fit regimen involves combination functional movements which are performed at a very high intensity that involve jumping, running, squatting, climbing.^[4]

Cross- Fit training, while beneficial to physical health, can also be an independent risk factor for Stress urinary incontinence. Strenuous physical activity will cause strengthening of core muscles, but at the same time it will have detrimental effect on

pelvic floor by causing its weakness due to overload.

During high intensity exercises, there is rise in intra- abdominal pressure. The elevated intra- abdominal pressure produces a downward force. In order to balance out, this downward force is opposed by contraction of pelvic floor muscles (PFM) which produce upward force.^[5] In cross fit training females perform exercise for a specific period of time and with increased frequency. Hence, in order to balance the forces the pelvic floor muscles undergo repeated contraction and thus become more and more weak. This makes a female more susceptible to develop stress incontinence.

MATERIALS AND METHODS

Materials

Consent Form, Demographic data form, Case record form, Pen/ pencil, Pre-weighted Pad, Weighing scale, Questionnaire for urinary incontinence Diagnosis (QUID).

Methodology

Ethical clearance was taken from institutional ethical committee. A written consent was taken from subjects prior to participation. Subjects who are willing to participate were included in study. All participants were screened as per inclusion and exclusion criteria. Purpose of study and procedure was explained to subject prior to study. A brief history was taken to screen presence of any relevant symptoms. Subject was given a pre-weighted pad and explained how to perform a pad test. All subjects filled

questionnaire for urinary incontinence (QUID).

Steps to perform Pad test

For the 1-hour Pad Test, women are asked to wear pre-weighted pads and drink 500 ml of sodium-free liquid in < 15 minutes. After rest, they are instructed to exercise for 30 minutes, including walking, climbing up and down one flight of stairs, standing-up from sitting (10 x), coughing vigorously (10 x), running on the spot for 1 minute, bending to pick up an object from the floor (5 x) and washing hands for 1 minute in running water. Before and after the test, the weight of the pad is measured with a high-precision balance in order to determine the amount of leakage. The short term Pad Test may be performed with a fixed bladder volume of 150 to 300 ml, or with 50 to 75% of the functional bladder capacity

Interpretation of pad test:

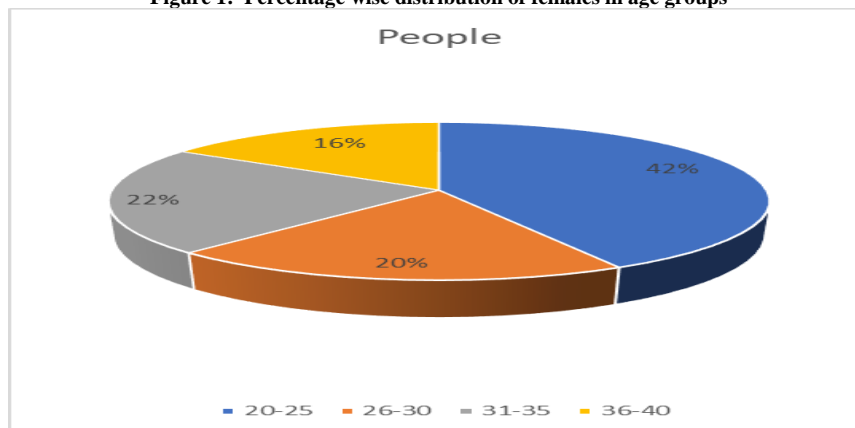
1. Increase of 1 to 10 g = mild incontinence
2. Increase of 11 to 50 g = moderate incontinence
3. Increase of > 50 g = severe incontinence

Statistical methods

Data was collected on a data sheet and encoded for computer analysis. Tables were made using Microsoft word and figures were plotted using Microsoft Excel. Computerized statistical analysis of the data was done and presented in the form of graph. Correlation between stress incontinence and parity was made using Pearson's test.

RESULTS

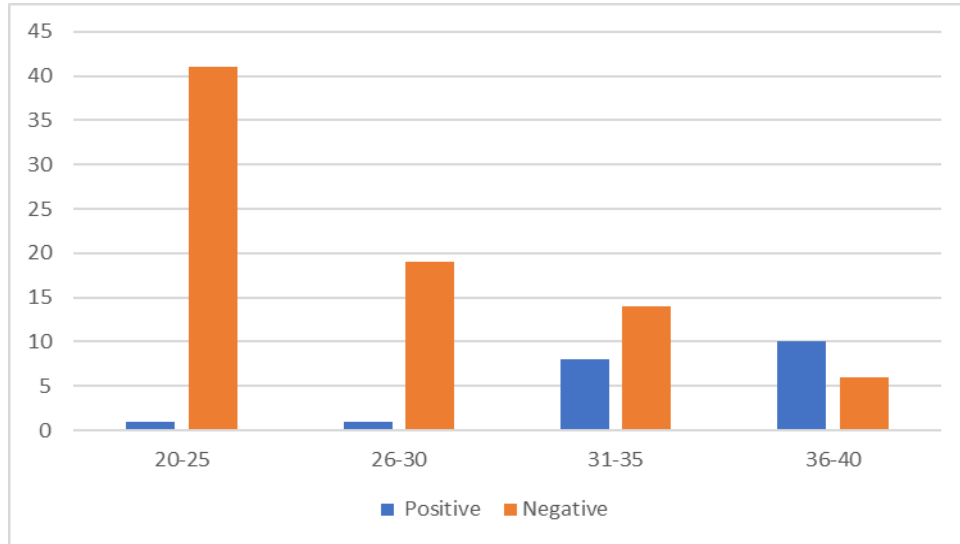
Figure 1: Percentage wise distribution of females in age groups



INTERPRETATION

Majority of participants are in the age group of 20- 25 years indicating the popularity of cross fit program among younger generation

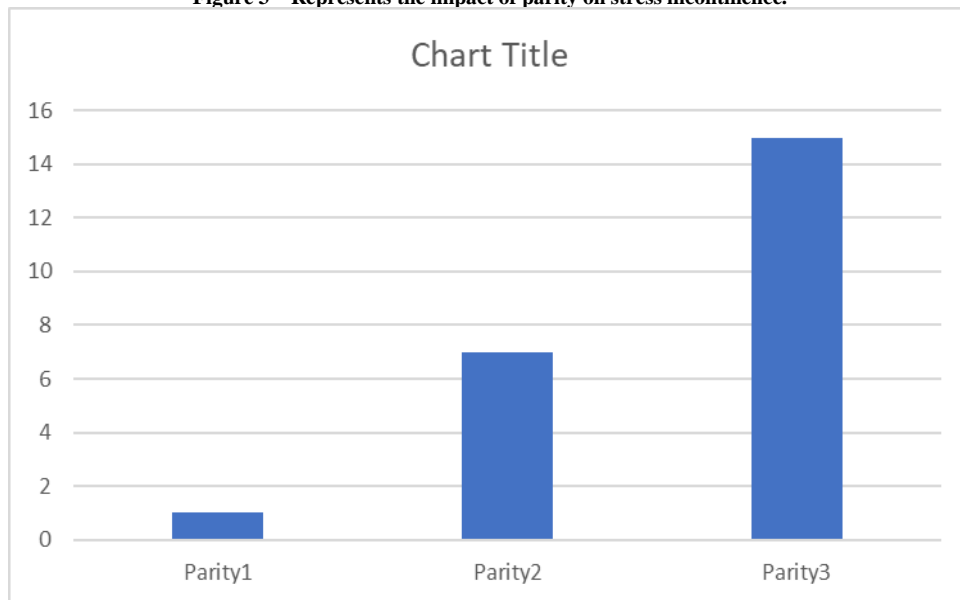
Figure 2: Represents number of participants who were positive for pad test in different age groups



INTERPRETATION

Majority of females in age group 36-40 are positive indicating that with increasing age there is weakness of pelvic floor muscles predisposing the female to development of stress urinary incontinence.

Figure 3 – Represents the impact of parity on stress incontinence.



INTERPRETATION

Out of all females positive, 65% of females were multigravida (that is having 2 child), 31% of females were primigravid and 4% of females were nulligravid. This indicates that stress incontinence is highly linked with

parity. That is females who practise cross fit and who have 1 or more child are at increased risk of developing stress incontinence.

Figure 4: Represents Correlation between stress incontinence and parity

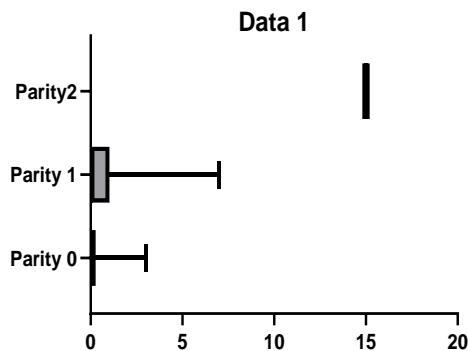


Table 4: Correlation between stress incontinence and parity using Pearson's test

Coefficient(r):	0.996616
N:	3
T statistic:	12.12436
DF:	1
P value	0.05

Interpretation

P value of 0.05 is considered to be statistically significant. The graph indicates that there is positive correlation between age of women and parity on stress incontinence.

DISCUSSION

Cross fit training is a high intensity workout. High impact exercises increase intra-abdominal pressure and ground reaction forces on pelvic floor muscles which causes its weakening. There can be various triggers like squatting, lifting weights, jumping, running, all of these which are a part of cross-fit regimen.

The exact pathology behind stress urinary incontinence is that sudden increase in intra-abdominal pressure can lead to a weakened elastic recoil and neuromuscular fatigability of pelvic floor muscles with cross fit training.^[6] According to "hammock hypothesis" the constant stretch to the connective tissues, that is ligaments and fascia of pelvic floor causes permanent damage to the tissues. Elevated intra-abdominal pressure during exercise is counteracted by pelvic floor muscles.^[7] Thus during high intensity workout pelvic floor muscles get fatigued as they have to

contract for longer periods to counteract increased intra-abdominal pressure eventually resulting in urine leakage. Another cause for urine leakage can be when upward directed force from pelvic floor muscle cannot balance the downward force from generated from abdomen during high intensity workout.^[5]

Our study involved 100 female cross fit trainers training over a minimum period of 1 month. These females were in the age group of 20-40 years. They were further subdivided in 4 age groups, that is 20-25 years, 26-30 years, 31-35 years, 36-40 years.

Our study is different in this regard from others that they did research on female athletes without any specific age group. Majority of them used online survey or a questionnaire to assess prevalence of stress incontinence.

In present study, all female cross fit trainers performed 1 hour pad test, in which they were asked to wear a pre-weighted pad and perform a specific set of exercises for 30 minutes. After which the pad was measured, based on which it was decided whether incontinence is there or not. Depending on the weight of the pad, the severity of incontinence was determined. In addition to that, they were asked to fill Questionnaire for stress urinary incontinence which further confirmed the type of incontinence the female was suffering from.

Iman Akefkhawailed et.al. did a pilot study on females who perform high impact exercises- CrossFit, kickboxing, and boot camp from all age groups were asked to fill an anonymous online questionnaire. Based on results of this questionnaire, out of total of 17 participants, 64.2% reported at least some urinary leakage during exercise. They found that CrossFit group were significantly ($p = 0.023$) more likely to report urinary leakage than those in the kickboxing and boot camp groups combined.^[1]

In our study, female cross fit trainers in the age group of 20-40 years with an average of 23.67 (± 5.92 years), were segregated into 4 age groups. Out of these 4 age groups,

majority of females, that is 42% were in the age group of 20-25 years, 20% females were in the age group of 26-30 years, 22% females were in the age group of 30-35 years and 16% females were in the age group of 36-40 years. These values reveal the growing popularity of cross fit regimen among young generation. More young ladies are preferring cross fit over other high intensity workout due to its positive effect on weight loss and strengthening of core muscles.

In age group of 20-25 years, 1 female was positive and 41 females were negative for pad test. In age group of 26-30 years, 1 female was positive and 19 females were negative for pad test. In age group of 31- 35 years, 8 females were positive and 14 females were negative for pad test. In age group of 36-40 years, 10 females were positive and 6 females were negative. These results indicate that majority of females from the age group of 36-40 were positive for pad test whereas very few females in the age group of 20-25 years were suffering from stress incontinence

This indicate that with increasing age the pelvic floor muscles of females become weak which make them susceptible to develop stress incontinence. Another factor which contribute to pelvic floor weakness in females with increasing age is parity.

There is evidence in literature suggesting a positive correlation between childbirth and urinary leakage. A study done by A Foldspang to relate prevalence of urinary incontinence with parity. A sample of 3114 females in age group of 30-59 years were selected. They were then assessed based on self administered questionnaire. Among clinical types of urinary incontinence stress incontinence consistently showed the strongest associations with indicators of parity. There results also showed that in women aged 30-44 years, nearly two thirds of prevalence of stress incontinence was attributed to parity.^[4]

In present study, we used pad test which is more reliable than any form of questionnaire to assess whether female is suffering from

stress incontinence or not. Based on these results, we assessed relation between parity and stress incontinence. In our study, the female cross fit trainers who were positive for pad test were further studied. In nulligravid females, only 1 female was positive for pad test, in females who were primigravid 7 females were positive for pad test and in multigravida females that is females with 2 children 15 were positive for pad test. These results indicate that there is positive correlation between stress incontinence and parity.

CONCLUSION

The study concludes that there is a positive correlation between age of women and parity on stress incontinence.

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