Management of Female Stress Urinary Incontinece

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Abstract— Stress Urinary Incontinence (SUI) or Urinary incontinence is the unexpected loss and leakage of urine. It's happens when physical and bodily activity or motion, for instance , coughing, sneezing, running or heavy rising which puts stress and pressure on bladder. The main reason of this leakage is that the sphincter muscles are in disorder and disable to control the bladder correctly and it's to open briefly. In the scope of this paper we performed a task analysis on the variety of treatments about stress urinary incontinence. First with non-surgical treatment and identified steps for surgical treatment such as: Colposuspension, Urethral Slings, Injection therapy Macroplastique and explain all steps in pre-surgery, surgery, and post-surgery procedure. As a result already explained what's the popular and common surgery which is now available and compare the rates of success and frailer between each of the surgery procedure.

Key words—Urinary Incontinece, Non-Surgical Treatment, TVT\TOT, Colosuspenstion, Fuzzy Cognative Maps and Urithral Slings.

1 Introduction

Stress Urinary Incontinence (SUI) is a side effect where there is spillage of urine on exertion or effort, or on sneezing, coughing, and heavy lifting. The International Continence Society (ICS) has supplanted the term 'real pressure incontinence' with 'urodynamic stress incontinence'. This condition is characterized as automatic spillage of urine observed amid urodynamics with expanded stomach weight without a detrusor withdrawal [1].

Urinary incontinence is a condition which impacts approximately 30-40% of more established American ladies, with the dominant part burdened with SUI. This is a socially problematic case that significantly affects human services costs, with American women having up to an 11% chance during their life of experiencing incontinence or urethra disability. The new wording identified that those with this condition can benefit from the development of therapeutic and careful treatments, all of which present difficulties [1].

There may also be a leak with minimally powerful exercises like standing up, strolling or twisting around. Urinary Incontinence is a typical and common bladder issue for ladies. It occurs less regularly in men. Human services and health care suppliers can discuss approaches to treat or deal with SUI indications. Your supplier ought to clarify the advantages and dangers of every choice to enable you to choose a suitable way to control the leakage of urine and return to normal. Keep in mind that few treatments work for everybody, and attempt more than one may need to be attempted to discover the one which works best [2, 3].

There are four kinds of urinary incontinence which occur in women, contingent upon the indications:

Stress incontinence: You can't "hold" or "pause" pee when coughing, sneezing, running or lifting something. The outcome is spilling or wetting.

Urgency incontinence: You regularly have a compelling impulse to urinate and can't reach the toilet before spillage of urine. A comparative issue is designated "overactive bladder" when you have a sudden compelling impulse to urinate, or you need to urinate frequently [4].

Overflow incontinence: This can be brought about by sensory and nervous system issues, for example, the mind not realizing that the bladder is full, or where urine is decreased to a stream on the grounds that there's a blockage somewhere in the urinary tract.

Functional incontinence: This is a type of urinary incontinence in which an individual is generally mindful of the need to urinate, yet for at least one physical or rational because they are unfit to get to a washroom. The leakage of urine can fluctuate, from little spillages to full purging of the bladder.

2 Causation of a Disease

Urinary incontinence is not an infection or disease; Incontinence is a side effect and symptom. It very well may be brought about by ordinary propensities, basic restorative conditions or physical issues. We can classify this into two types. First, temporary incontinence, when leakage of urine occurs when you have been drinking alcohol, caffeine and eating spicy foods, it also occurs when using medication to control heart and blood pressure. Second, permanent incontinence, the main causes of which are listed below:

1-Gestation and pregnancy: Hormonal fluctuations and the expanded load of the child can prompt pressure incontinence.

2- Travail and childbirth: Vaginal conveyance can debilitate muscles required for bladder observation and furthermore harm bladder nerves and strong tissue, prompting a dropped and disabled pelvic floor. With this prolapse and disabled urethra tract, the bladder or small digestive tract can get pushed down from the standard position and jut into the vagina. Such projections can be related to incontinence [3].

3- Getting older in age: when getting older changes with age also affects the bladder muscles and its ability to store urine with the same capacity before aging. Bladder constrictions turn out to be progressive when becoming older.

4-Menopause: When women reach the menopause and produce less estrogen. Estrogen is a hormone which helps main-

tain the covering of the bladder and urethra tract. Disintegration of these tissues can prompt incontinence [3].
5- Hysterectomy: Surgery to remove a part or the entirety of the uterus. This operation also has an effect on the pelvic floor muscles and damages the bladder and leads to incontinence.

3 SUI TREATMENT CHOICES

However, the treatment option depends on the type of incontinence and may be a combination of treatment needed to control the leakage of urine. A health specialist and doctor will likely propose the least intrusive medicines first and proceed onward to different choices if these methods are ineffective. Stress Urinary Incontinence can be classified into two categories, which are Non-Surgical Treatment and Surgical Treatment.

3.1 NON-SURGICAL TREATMENT

1-Life Style Changes: The first action doctors may recommend as a treatment to incontinence is bladder coaching to defer urinating after you have the inclination to go. You may begin by attempting to delay for 10 minutes each time you intend to urinate [3, 4]. Double Voiding is also another action which may be of benefit to control leakage of urine; it is a technique which lets you empty your bladder. Double voiding involves urinating, and at that point holding for a couple of minutes and attempting once more [4, 5].
Scheduled toilet trips are another way that lets some patients control incontinence by urinating on a schedule [3, 6]. Decreasing and reducing drinking liquids also has an effect over bladder control and controlling incontinence. It might be necessary to reduce or maintain a strategic distance from liquor, caffeine or acidic nourishment. Diminishing fluid utilization, shedding pounds or expanding physical movement can additionally aggravate the issue [3]. Cessation of smoking helps to reduce coughing and reduces pressure on the bladder and pelvic floor [7]. Losing weight decreases pressure on pelvic floor muscles and prevents it from weakening. Your indications may enhance, and could clear up totally, if an overabundance of weight is reduced [7].
2-Pelvic Muscle Exercise (Kegel Exercise): Pelvic floor exercises or Kegel practices reinforce the pelvic floor muscles, which bolster the uterus, bladder, small digestive tract and rectum. You can do Kegel work-outs, otherwise called pelvic floor muscle preparing, in whichever situation is convenient [8][20]. Kegel activities can improve the situation— by adhering to these guidelines by contracting and loosening up the pelvic floor muscles.
3- Physical Therapy and BIO Feedback: Biofeedback takes data and information about something occurring in the body and exhibits it such that you can see and imagine or hear and get it. Jumping on a scale to check and review your weight or having your circulatory strain taken are basic instances of biofeedback, which can be utilized to gauge anyone's reaction, for example, pulse or muscle compression and unwinding [10].
Biofeedback treatment utilizes PC diagrams and perceptible tones to demonstrate to you the muscles that you are working out. It likewise enables the advisor to gauge your muscle quality and individualize your activity program. It doesn't have any effect on your muscles. It is an encouraging device to enable you to figure out how to control and reinforce the pelvic floor.
4- Using a Pessary: Pessaries ought to be utilized by patients for whom traditionalist administration is fitting. A great possibility for a pessary preliminary may incorporate a pregnant patient, an old lady in whom medical and surgical procedure would be unsafe, and a lady whose past activity for stress incontinence fizzled. A pessary can likewise be utilized by ladies who just have pressure urinary incontinence with strenuous and robust exercise [11].
5- Medication: Duloxetine is a medicine that can assist in diminishing incontinence. It should be taken persistently as halting the medication will result in the spillage returning. Some women find that it reasons inadmissible symptoms. It isn't generally prescribed as a first line treatment; however, it is a choice to consider in the event that you would prefer not to have a careful system or are unfit to do as such [12].
Anticholinergics or antimuscarinics is another medicine that is used to control urge incontinence or stress incontinence, and include Detrol, Enablex, Oxytrol, Fesoterodine, Solifenacin and trospium [13].
Mirabegron was produced in Japan for an overactive bladder (OAB) and it is presently accessible around the world. This is in spite of the fact that this medication is contraindicated by beta-3 sense in the bladder, bringing about the unwinding of the detrusor muscle of bladder [14].
NICE (National Institute for Health and Care Excellence) also recommended using mirabegron for treating people with bladder and incontinence symptoms [15].
Alpha Blocker can also be useful for treating incontinence, and includes Flomax, Uroxatral, Silodosin, Doxazosin and terazosin, alpha blockers can help loosen up the muscles in the bladder neck, giving urine the opportunity to stream all the more effectively and enhance the side effects [16].
Estrogen is a characteristic hormone in the female body. As we become older, there is a continuous loss of estrogen and an increase in the average rate at which estrogen incrementally declines.
Topical estrogen ointment and cream has been talked about in this passage as a treatment choice for incontinence. It recommended that all treatment alternatives for incontinence are discussed with a specialist and doctor. You will require a remedy for estrogen cream and ought to know about the symptoms that can be related to using topical estrogen cream. They may incorporate bosom delicacy, vaginal dying, migraine, queasiness, and swelling [17].
6- Laser Therapy: IncontiLase is a progressive technique for anticipating urinary incontinence - a non-surgical treatment for mellow and temperate pressure of urinary incontinence.
Treatments with laser Er:YAG controls are done to upgrade the contracting and fixing of vaginal mucosa tissue and collagen-rich endopelvic belt and fascia to add more prominent help to the urinary bladder [18].

3.2 SURGICAL TREATMENT

When the different medications and non-surgical treatments for urinary incontinence are failing or unacceptable, medical and surgery procedure. Or different methods might be pre-

scribed. Prior to settling on a choice, talk about the dangers and advantages with a doctor and specialist, just as would be conceivable with any elective medicines [19].

If planning a pregnancy, this will influence your choice – the physical rate of pregnancy and labor can cause medicines to become less effective. Treatment may want to be delayed until after child-bearing age.

Any surgical procedure consists of three phases, which are pre-surgery, surgery, and post-surgery:

3.2.1 PRE-SURGERY

The first step and phase during surgery treatments is preparation (Fig. 1), your doctor or clinical staff advise you to stop smoking at least 6 weeks before and after surgery, and stop taking any medication that contains warfarin, aspirin and ibuprofen, because this kind of medicine can cause bleeding problems during and after surgical procedures, instead medications which contain acetaminophen can be used (for example, Tylenol) [20].The patients are also recommended to stop eating and drinking after midnight and not have breakfast in the morning because the patient's stomach has to be empty.

On the morning of surgery, tests such as urine, blood pressure, heart and some special tests, depending on the type of surgery, are conducted after that the patient is positioned in the lithotomy style.

The lithotomy status is regularly utilized amid labor and medical procedures and surgery in the pelvic floor area, urethra, and bladder.

The doctor used this position in order to make surgical procedures easier and gain to the exact part of surgery.

It includes lying on your back with your legs draped 90 degrees at your rumps. Your knees will be crisscrossed at 70 to 90 degrees, and cushioned ottomans connected to the table which will bolster your legs [21].

Anesthesia is another part of preparation of surgery and is divided into two parts, general anesthesia and spinal or local anesthesia.

General anesthesia is a blend of medications that place you in a sleep like state before a surgical procedure. When patients take general anesthesia, they don't feel any pain since they are totally oblivious. General anesthesia for the most part utilizes a blend of intravenous medications and breathed in gasses (analgesics) [22].

A combination of medicines is used for general anesthesia, such as Propofol 2.0-20.5 ML and Rocuroniom 0.6 ML [23].

Spinal (local) anesthesia is the second option that is used for some patients during surgery to control leakage of urine and incontinence. The most common types of spinal anesthesia that are used in the US are lidocaine, tetracaine, and bupivacaine. They are sedative operators normally utilized for spinal anesthesia and give a brief length of anesthesia and which are valuable for careful and obstetrical methodologies less than 60 minutes. Tetracaine and bupivacaine are utilized for strategies ranging from 2 to 5 hours [24].

The last step in the preparation phase is inserting a catheter and tube into the bladder, the main purpose of which is to drain and empty the bladder during and after surgery, catheter also useful to relive pain of the retention of urine and measuring the output of urine [25].

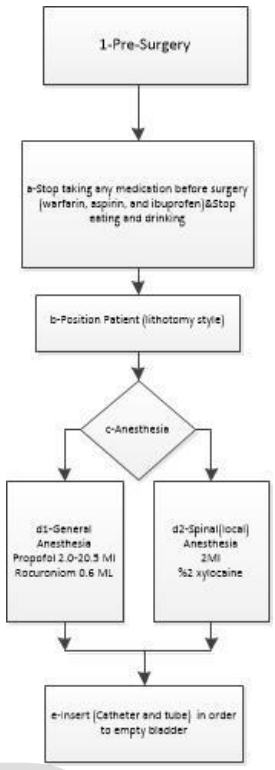

Fig. 1 Steps in Pre-Surgery

3.2.2 SURGERY

Surgical procedures depend on the type of surgery the surgeon chooses and which method is suitable to correctly control incontinence. Today, the following surgeries are available:

3.2.2.1 COLPOSUSPENSION

Colposuspension is a kind of operation and surgery that utilizes stitches to help and uphold the neck of the bladder in order to let it satiate and does not come down because of stress incontinence [26]. The bladder is tenderly dismembered far from the vagina and stitches are put inside the vagina linking it up to a piece of the pelvic bone [27]. Usually the process of the Colposuspension surgery is done through an abdominal incision, known as a bikini-line, or sometimes this surgery done without incision with only three or four cuts over the abdomen which is called a laparoscopic (key-hole) operation.

A-Keyhole (Laparoscopic): Keyhole is an operation done under general anesthesia and after the patient has gone through pre-surgery, a cystoscope and camera are passed to bladder via the urethra with ureteric catheters, then four or five cuts are made like ports on the abdomen, a small camera with special operating instrument is passed through the ports, making stitches to a strong tissue known as a "fascia" with two stitches for each side, ensuring that the stitches are not passed through the bladder or the surgical team may have to repeat the stitching procedure. When the stitches process has been successfully completed, the ureteric catheters are removed and small cats of the abdomen are closed [28].

B-Open Colposuspension (Bikini-line):

The next step after the preparation for the open colposuspension (bikini-line) surgery is starting with a position patient in the lithotomy style, which is an easier technique that allows surgeries to run through the steps quickly in a good manner, then cutting abdomen and making incisions in the bikini line of nearly 10 cm (4inches) [29]. When the abdomen is opened the focus is on reaching the bladder then starting to stitch from the vaginal wall on both sides to the bladder neck, making sure that the stitches are not passed through the bladder, and are finally put in a catheter tube into the bladder and allowed to rest for 48 hours after closing the abdominal incision [29].

Urethral Slings

This specialist operation makes a "sling" out of work or human fabric and tissues. At that point they put it under the cylinder and tube which urine goes through, which is called the urethra. The sling resembles a lounger that lifts and backs onto the urethra and the neck of the bladder (where the bladder interfaces with the urethra) to help avert spills and leaks [29].

3.2.2.2 mid-Urethral Slings

A mid-urethral sling (MUS) and its activities are a perceived negligibly intrusive careful treatment for stress urinary incontinence. MUS includes the section of a little piece of tape through either the retropubic or obturator area, with passage or leave focused at the lower stomach area or crotch, separately [30].We can classify in to three types which are:

A-Tension-free Vaginal Tape (TVT/TVT-O):

The tension-free vaginal tape sling [42], which is also called retropubic [29] and tension free vaginal tape-obturator (TVT-O), is a surgical process using slings to raise and lift the neck of the bladder (Fig. 2), The TVT framework comprises a reusable hardened steel introducer lug and handle, a reusable inflexible catheter manage, and the single-use gadget. The TVT gadget comprises a 1 × 40-cm strip of polypropylene work secured by a plastic sheath connected onto two bended hardened steel needles [31].

The procedure is often performed using local anesthesia and with intravenous sedation, putting the patient into the lithotomy position then signing two exit dots and making an incision on the abdomen (0.5-1.0 cm) [31]. After that making sure that the incision and dots are passed and successfully perforate the Obturator Membrane. The specialist presses the safety winged guide and the helical passer via the vagina and pulls out the handle across to the midline after which they rotate the helical passer and cross it over the skin, making sure that the needle of the passer successfully passes through skin, finally removing the helical passer and pulling the plastic pipe [32]. They repeat the same procedure on the other side and take off the sheath with set tension and close the vaginal and abdomen incision.

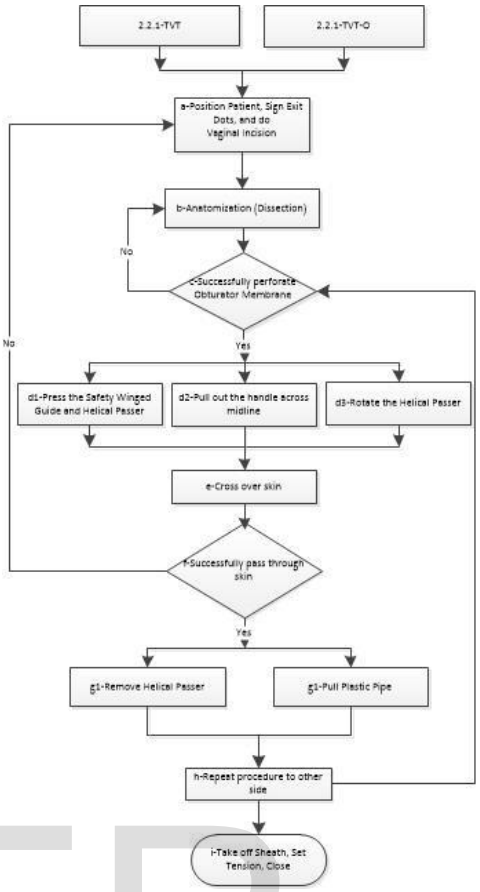

Fig. 2 Steps TVT/TVT-O

B-TOT- ransobtrurator tape:

This is also a surgical procedure to control stress urinary incontinence and it is run with general or spinal anesthesia, this operation requires a small incision of the wall of the vagina and the tape is introduced permanently under the urethra [31] [32].

The steps and the procedure (Fig. 10) are undertaken when the patient is ready and the patient is positioned for a lithotomy, then signing of the exit dots which are two small abdominal incisions, a vaginal incision is also used to pass a helical passer easer, if the surgeon successfully perforates the inner thigh they start to pass the helical is introduced to the inner thigh incision through an obturator membrane, repeating the same procedure on the other side, after that it is already attached with synthetic polypropylene tape to the helical and placed in the tape to sub-urethral incision , when the tape is placed under the urethra and the neck of the bladder adjusts the tape, if the patient has a lot incontinence the surgeon will tighten the tape,, finally cutting the tape bilaterally and closing the incision with dermabond glue and also closing the incision of the sub-urethral and vagina with three sutures [33] [34].

3.2.2.3 Mini Slings

Mini Arc Sling is another surgical treatment to control and fix the stress incontinence issue, this procedure can also run through general spinal anesthesia, when the patient is ready for the procedure the surgeon will set the patient into the lithotomy position and make a vaginal incision of approximately 1.5cm and dissect the inferior pubic ramus to nearly 1-1.5 cm [35, 36], then inserting the needle and locating the ischiopubic ramus where the adductor longus ligament and the

second rate pubic ramus meet and the needle inclusion ought to be gone for the area of this score.
After locating and inserting needle into the exact area the surgeon will place the integrated self-fixating tips across the needle by gliding it over the finish of the needle. This is put in the needle with the sling assembly towards the signed position, making sure that the sling is in the midline of the urethra, repeating the procedure above on the other side, finally putting the sling into its exact and signed place the surgeon will close the vaginal incision [36].

3.2.2.4 Injection Therapy (Macroplastique)

Macroplastique is a urethral bulking and it is useful to control and reduce incontinence, the success of the procedure depends on the type and rate of incontinence that the patient has, when positioning the patient for a lithotomy they then administrate and prepare the Macropastique injection, the procedure starts with local anesthesia 2% lidocaine and the surgeon puts the cystoscope in through the urethra in order to let them to see the bladder neck during the procedure, after that they insert the needle until the urethral wall is1 cm deep and is then injected with a volume of Macroplasique in the 6 o'clock position, the surgeon has to wait 30 seconds before pulling the needle out from the tissue to end and limit the product, then changes the syringe and repeats the injection in the 2 and 10 o'clock position. The surgeon decides whether to use a catheter; if the patient cannot urinate as usual they have to use a small intermittent catheter in order to empty the bladder after the injection [37].

3.2.3 Post-Surgery

After each surgical procedure some actions are required which the patient must follow so that the surgery works exactly and they get the whole benefit from it.24-48 hours after surgery the nurse or specialist removes the catheter from the bladder, if the patient had stiches on the abdomen (bikini line) and vaginal stiches they should be removed 1 week after the surgery day, when the patient has no pain with surgery there are some things which the patient must not do, such as: do not bathe or swim for several weeks, refrain from intercourse for 4 weeks, no lifting over 10 pounds until 4 weeks after surgery, and the patient needs at least 1 week before resuming work.
In case the patient has a lot of pain and prolapse and break down of the vagina, the doctor and specialist recommends using a vaginal cream and some medicines to reduce the pain such as: Naproxin twice a day and Tylenol 3 with codeine [38], if this does not work the surgeon my decide to remove the mesh or slings [39].

4 METHOD

A Fuzzy Cognitive Map is a delicate processing and soft computing system that pursues a thinking approach such as the human decision creating process. Delicate processing procedures have been researched and proposed for the depiction and displaying of complex and hard systems [40]. To decide a real nursing determination, characterizing attributes that incorporate emotional and target information, signs and side effects must be available [41]. All the characterizing attributes endorsed by the NANDA-I [42] were utilized in the examination.
Fuzzy Cognitive Maps were introduced by Axelord (1970) [44, 45] as a formal method to represent social logical and scientific information and to display basic decision-creating in social and political frameworks and systems. At that point, Kosko [45] presented FCM. A Fuzzy Cognitive Maps delineates the model of a framework and system utilizing a diagram of ideas and revealing the circumstances and logical results among concepts (Fig. 3).

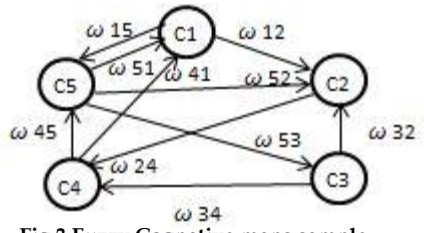

Fig.3 Fuzzy Cognative maps sample

An FCM portrays the conduct of a system as far as concepts; every concept appears as a state, variable or distinctive for the system. Estimations of concepts (nodes) change after some time, and take esteems and value in the interim (0; 1) and this value appears as a measure of the quantity of the concept (C) [54]. The causal connections between nodes appear by coordinated weighted edges (ω_{ii}) that represent the amount one idea impacts upon the interconnected ideas, and the causal loads of the interconnections have a place in the interim (-1; 1) [51, 55]. The weighted edges appear as a degree of the fuzzy connection and relation between the concept (C_i) and (C_i). When this connection and relation is plus and positive, $\omega_{ii} > 0$ else ω_{ii} is negative [40, 45].
Since the notion or and the interconnection esteems were characterized, the FCM was set up to shape the system. Its concepts had their underlying qualities controlled by the master and after that the system was strongly handled. For each progression of reenactment, the estimation of each term was dictated by the impact of ideas interconnected and weighted by their comparing loads by the following equation (1).

$$A_i^{p+1}=f\left(\sum_{\substack{j=1\\ j\neq 1}}^{n}\omega ij A^p j\right) \quad (1)$$

Where A_i^{p+1} is the value of the concept (C_i) at stride $p+1$, A_i is the value of concept (C_i) at stride p, ω_i the value of the interconnection between concepts (C_i) and (C_i) and f is a relocate function, which guarantees that the estimations of ideas stay in the interim [0, 1] amid the dynamic procedure [40, 45].
The relocate function f has a place with the group of squeezing function, and normally the function used is as shown below:

$$f(x)=\frac{1}{1+\exp(-\lambda x)} \quad (2)$$

This is a unipolar relocate function, where λ greater than 0 decides the steepness of the constant function $f(x)$.

5 Results

Values from the whole concepts and weights on the Fuzzy Cognitive Maps own fuzzy nature which acting problems, state and factors utilizing relocate function thought. These fuzzy factors and variables should be identified so as to utilize numerical capacities and compute the relating results. In this way, estimations and values of ideas have a place with the interval [0, 1] and estimations of weights to the interval [-1, 1], utilizing the relocate function work the determined values of ideas after every recreation step will have a place to the interval [0, 1] where ideas take esteems [41].

Table 1- Diagnoses Specified by the physician experts and fuzzy cognitive maps.

Diagonsis	Physican Expert	Fuzzy Cognitive Maps
Reflex with urinary retention	0	1
Stress urinary with urinary reterntion	0	1
Urge incontinence with stress	97	116
Urge incontinence with stress and functional	0	8
Urge with reflex and retention	0	1
Urge incontinces with total incontinece	0	3
Urge incontinence with stress and retention	0	2
Urge incontinence with retention	0	4
Urge with functional incontinence	0	5
Reflex and total urinary incotinence	0	1
Totaly urinary incontinence	12	1
Urinary retention	14	9
Urge urinary incontinence	17	21
Stress urinary inconitnence	54	19
Functional urinary incontinence	0	0
Refelex incontinence	1	3
Total of the diagonsis	195	195

Build up the fuzzy chart structure of the FCM, comprising of concept-hubs that perform to the key standards factors-elements of the framework task and operation. More in particular, specialists are approached to depict the connections between ideas what's more; they already use IF–THEN standards to legitimize their circumstances and logical results proposals among ideas, inducing an etymological load for every interconnection.
Table 1 displays the diagnoses specified by the doctor experts and by the fuzzy cognitive maps. Estimate to the doctor experts, the FCM was set lesser 35 situations of SUI and lesser 11 situations of the total urinary incontinence.

6 Conclusions

Albeit a portion of the phrasing has changed, the essential finding of Stress Urinary Incontinence continues as before. A more profound comprehension of the life systems and neurophysiology of the less high urinary tract have encouraged survey sphincter brokenness and disable to control urine and hypermobile bladder neck on a covering range of incontinence. Additionally, new information in regards to the neuro-urology association has induced version pharmacologic medicines that can be utilized rather than, or working together with, other settled moderate treatments, for example, pelvic muscle practice programs and electronic incitement and Pessary therapy. After disappointment of preservationist and non-surgical treatment, medical procedure and surgical treatment might be shown for SUI after the best possible work-up as sketched out. The decision of a sub-urethral sling or retropubic Burch for urine leakage and incontinence, both roughly approach in present moment and long haul achievement may depend on acquiring urodynamics on speculated patients and finding an ineffectively working urethral sphincter instrument. The advancement of the modern mid urethra slings (TVT) may deter this refinement and fill in as a negligibly intrusive option for all pressure incontinence with some versatility.

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