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Risk Factors Associated with Urinary Incontinence in Elderly People: A Case Control Study.

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"Risk Factors Associated with Urinary Incontinence in Elderly People: A Case Control Study"

Submitted by **Arnab Charles Desai** for the partial fulfillment of the requirement for the degree of Bachelor of Science in Physiotherapy.

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DECLARATION

This work has never before been approved in full for a degree, nor is it presently being presented as a candidate for one. A portion of the criteria for the B.Sc. in Physiotherapy degree are being met by submitting this dissertation.

I confirm that I will receive an inadequate rating and be subject to disciplinary action from the appropriate authorities if it is found in my work that I have plagiarized or otherwise cheated. I guarantee that the electronic copy and bound version of the thesis are the same.

If the results of this project are published in the future, the research supervisor will be very concerned. The Saic College of Medical Science and Technology (SCMST) department of physiotherapy will permit, and the project will be properly credited as a graduate thesis.

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LIST OF ACRONYMS

ADLs	Activities of Daily Living
BMI	Body Mass Index
CI	Confidence Interval
ICIQ-UI SF	International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form
ICS	International Continence Society
IRB	Institutional Review Board
MUI	Mixed Urinary Incontinence
OR	Odds Ratio
ROM	Range of Motion
RUIS	Revised Urinary Incontinence Scale
SD	Standard Deviation
SPSS	Statistical Package for Social Sciences
SUI	Stress Urinary Incontinence
TENS	Transcutaneous Electrical Nerve Stimulation
UI	Urinary Incontinence
UUI	Urge Urinary Incontinence
VAS	Visual Analog Scale
WHO	World Health Organization

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ABSTRACT

Introduction: Urinary incontinence (UI), or the involuntary leakage of urine, is a common health problem among older adults globally. It has a great impact on physical function, psychological well-being, and social quality of life of the affected individuals. Identifying the contributing risk factors is crucial for implementing early interventions and improving elderly care, especially in countries like Bangladesh where geriatric health services are still developing. **Objectives:** The objective was to identify the risk factors associated with urinary incontinence in elderly people. **Methodology:** A case-control study was conducted among 126 participants, with 63 participants in the case group (with UI) and 63 in the control group (without UI). Data were collected from six healthcare and residential centers in Dhaka using face-to-face interviews and a structured questionnaire. The Revised Urinary Incontinence Scale (RUIS) and International Consultation on Incontinence Questionnaire-UI Short Form (ICIQ-UI SF) were used to assess severity. Statistical analysis was performed using SPSS, including chi-square tests and odds ratios. **Result:** Height percentage of participants in cases 50.8% were in the age group of 60 - 64 years and 66.7%% in the control group. In the case group, 50.8% participants were male, 42.9% participants were female and 6.3% participants were third gender. Similarly, in the control group, 47.6% participants were male, 50.8% participants were female and 1.6% participants were third gender. The study revealed a strong association between UI and factors such as diabetes (OR = 5.5), hypertension (OR = 3.545), kidney disease, and lack of physical exercise (OR = 0.198). Symptom patterns indicated that 84.1% of cases experienced leakage before reaching the toilet, and 54% during sneezing or coughing. The majority of UI cases were classified as mild to moderate. RUIS and ICIQ-UI SF showed good & excellent reliability with a Cronbach's Alpha of 0.886 & 0.926. Extended family living being more associated with UI. Statistical significance was found across multiple risk factors ($p < 0.001$). **Conclusion:** Urinary incontinence among the elderly in Bangladesh is significantly associated with various medical, lifestyle, and demographic risk factors. Early identification and appropriate interventions, including physiotherapy and lifestyle modifications, can play a vital role in managing and reducing the impact of UI.

Key words: *Urinary Incontinence, Elderly, Risk factors, physiotherapy, Case-Control Study.*

CHAPTER- I INTRODUCTION

1.1 : Background

Urinary Incontinence (UI) has been defined as involuntary loss of urine or uncontrollable escape of urine, which objectively causes social and hygienic problem (D'Ancona et al. 2019, p. 433). Man and Women are both affected in Urinary incontinency. Saying that, women are affected more than men (Tuda et al. 2020, pp. 402). Urinary incontinence (UI) is a common condition that not only causes the erosion of quality of life and overall well-being but also has considerable economic impact on the healthcare services (Wagner et al. 2017, pp. 2479-2512).

It is one of the greatest health challenges of the twenty-first century, particularly more prevalent in women (Nipa et al. 2022, pp. 1-5). Throughout the world, there are millions of reports of symptoms of incontinence of urine by women. Greater awareness of its social and personal effect has stimulated more attention to the condition. Population-based research has supplied data that indicate approximately 10% of women of adult age are affected, prevalence always greater in women than in men (Milsom et al. 2016, pp. 15-107).

According to a recent American study conducted using data collected by the National Health and Nutrition Examination Survey (NHANES) from 2015 to 2018, an estimated 62% of women suffer from urinary incontinence, with 32.4% of all women having symptoms on a monthly basis. Almost all of the 31% of incontinent patients present with mixed symptoms, 37.5% presented with stress incontinence, 22% with urge incontinence, and about 9% with unknown incontinence. About 22% of the patients present with moderate or severe loss of bladder control. Research conducted by (Patel et al. 2022, pp. 181-187). The bladder and urethra work together physiologically to hold and drain urine; failure of this function results in UI.

Stress incontinence results from intrinsic sphincter deficiency and urethral hypermobility. Urgency urine incontinence results from overactive afferent input from the bladder and impaired processing of the afferent input in the brain (Wyndaele and Hashim 2017, pp. 282-288). The most prevalent types are overflow UI, which is

prevalent in older men due to blockage of the prostate; urgency UI, which is more prevalent in older individuals; stress UI, which is prevalent in women during pregnancy, postpartum, and menopause, and seen in men after prostate surgery; and functional incontinence, which happens when physical or cognitive impairment or the lack of toileting assistance renders them unable to get to the bathroom in time. Clinically, MUI will likely have more than one form and etiology. Skin problems, risk of falling, depression and anxiety, stigma, and decreased quality of life are some other physical and psychological consequences of UI (Murphy et al. 2022, p. 1).

Obesity, menopause, and aging are some of the causative factors that result in UI because UI is more common in middle-aged women (30-40%). For this reason, the sample population for the intent of this study was chosen as individuals with the age group 40-65 years. This is because UI occurs more frequently in this age group, and menopause-triggered changes in the mind serve to enhance UI symptoms by lowering estrogen and weakening pelvic floor muscles (Porto et al. 2025, pp. 1-9). Pelvic organ prolapse (POP) most often is associated with urinary disorders, such as stress urinary incontinence (SUI), urgency/urgency urinary incontinence, and voiding dysfunction/urinary retention. Most female patients with POP and incontinence will present mixed urinary incontinence symptoms (Espuna-Pons et al. 2020, pp. 819-825).

In most studies, the intensity of the symptom of UI corresponds to the impact degree. Such women's lives are therefore significantly influenced by how severe UI symptoms in various domains are, for example, physical (e.g., lack of energy due to disturbed sleep), psychological (e.g., low self-esteem), social (e.g., loneliness), sexual (e.g., sexual fulfillment), and economic (e.g., increased expense of personal hygiene products). In addition, the severity of UI symptoms may have occupational implications, hence reducing workplace productivity (Pizzol et al. 2021, pp. 25-35).

The Duchenne and Becker muscular dystrophy (D/BMD), which are progressive atrophies of muscle, are defined by the lack or diminished expression of the cytoskeletal protein dystrophin. LUTS appear not to affect daily functioning as significantly as UI. Indeed, 71% of the boys aged 4-33 with D/BMD report LUTS, but merely 29% find them "bothersome". There are a high number of younger child may have skewed the 29% of those reporting UI. Although nearly 90% of men with DMD (aged over 19

years) have one or more LUTS reported, incontinence of urine is only 15% of cases when defined in terms of a yes-or-no response (Morse et al. 2020, pp. 1-9). Risk factors are characteristics, conditions, behaviors, or exposures which put a person at greater risk for disease or injury. Risk factors usually fall into one of the following categories: Individual behavior is linked with behavioral risk factors, and these can be changed or eliminated by alterations in one's lifestyle or behavior. Risk factors linked to an individual's physiology are known as physiological risk factors. Lifestyle, genetics, and other general variables may influence them. The population as a whole is influenced by population risk factors. Physical, chemical, biological, social, economic, cultural, and political conditions all qualify as environmental risk factors. Genetic makeup provides the foundation for genetic risk factors (Olagundoye et al. 2024, pp. 1-19).

Sari (2021, pp. 27-33) found a 6% prevalence of urinary incontinence (UI). National survey findings by Sumardi et al. (2014, pp. 175-182) placed the overall prevalence in Indonesia at 13%. In support of these findings, the Indonesian Continence Society informed that, among 2,765 respondents, the most prevalent subtypes were overactive bladder (OAB) wet type (4.1%) and stress UI (4.0%). The incidence of UI was strongly related to age, rising to 22.2% in those over 60 years compared to 12.0% in adults aged 18-59 years, showing considerable age-related risk (Indonesia 2018, p. 1).

Age, additional chronic illnesses, and growing obesity are some of the factors said to be behind the rising surge of diabetes mellitus, or diabetes. Retinopathy, neuropathy, and nephropathy are some of the consequences that can be expected to rise with the rising prevalence of diabetes (Lowenstein et al. 2021, pp. 855-867). Diabetes and UI are linked in many studies, resent research examining diabetes as a risk factor for UI has had mixed results, with the overwhelming majority reporting that women with diabetes are at higher risk (Phelan et al. 2015, pp. 206-212).

The incidence of urinary incontinence (UI) is different across studies and populations and is observed to vary in frequency and severity. UI was reported to be affecting 38.4% of people aged 65 years and above in a Sao Paulo, Brazil report. It was much higher among females (50%) compared to males (18.3%). Prevalence of UI also varies among women 50 years and above from 26.2% to 52.3%, which identifies the gender inequality in the trend of prevalence of the condition (Reigota et al. 2016, pp. 62-68). According

to studies in Middle Eastern nations, 52% of the population suffer from urinary incontinence and have been reported to increase with age (Javanmardifard et al. 2022, pp. 1-10). According to studies in Iran, 62.2% of females over 60 years old had urinary incontinence, and a third of older women in Babol city had urinary incontinence (Morowatisharifabad et al. 2015, pp. 27-31). Because both biological and social factors lead to gender difference, gender has become a relevant demographic determinant of UI risk. Men are at risk of urgency or overflow incontinence from prostate disease or surgery (Gacci et al. 2022, pp. 387-398).

Stroke patients with UI are able to maintain only 40% of activities of daily living after stroke, whereas 70% of activities of daily living are maintained by stroke patients without UI. UI is related to weakness of the body. The more the physical frailty, the more the risk of UI (Heltty 2022, p. 1). Because of the physical limitation or other disability, UI patients after stroke become dependent and are not able to perform activities of daily living. Functional UI is due to impairment in the performance of activity of daily living, which may hinder an individual from using the bathroom when necessary (Schumpf et al. p. 17).

According to Bangladesh's data on statistics, between 1974 and 2012, the population's age fluctuated between 1.38 million and 7.59 million. Bangladesh ranks seventh among countries by population (152.51 million) and density (1015 people per square kilometre) (Barikdar and Lasker 2016, pp. 27-36). UI prevalence increases with age and affects more than 40% of women who are 70 years and older. It occurs more among frail older adults as well as nursing home residents. Although many women experience instances of urinary incontinence, the problem is rarely reported to health professionals. In recent times, awareness of the condition has led more individuals to seek care at medical facilities. In older women, UI may cause exclusion from family life and is a determining factor in decisions on care in institutions. Aside from its direct effect, UI also places a tremendous economic burden on healthcare systems (Wagner et al. 2017, pp. 2479-2512). Kaynar and Kalkan (2024, pp. 42-51) found that in China and Western women analyses revealed the risk factors to be different across subtypes of urinary incontinence, eg. alcohol intake and surgery for urgency urinary incontinence and race, BMI and depression for stress urinary incontinence.

In 2018, the prevalence of UI among elderly Russian women was 40.2%, and in India the overall prevalence was as high as 46.3% (Batmani et al. 2021, pp. 1-17). Clinical misconceptions about gender-specific differences in UI lead to suboptimal care. Risk factors such as smoking, depression, weak pelvic muscles, and inactive lifestyle can cause significant effects on UI outcomes (Nazzal et al. 2021, p. 42).The development of urinary incontinence (UI) is influenced by multiple risk factors, including medical conditions, lifestyle behaviors, and physiological changes. Besides older age, other components such as a history of cardiovascular disease, absence of regular exercise, obesity, smoking, and impairment of functional health are significant as well. Adding to the risk profile are also psychological issues, diabetes, gastrointestinal disorders, chronic cough, and prior urinary tract surgery. Urogynecological surgery, menopause, vaginal delivery, high parity, post-childbirth incontinence, urogenital infections, and hormone replacement therapy are other female risk factors (Alaish et al. 2024, p. 780).

Urinary incontinence (UI) in India has been reported to have a prevalence of 27.1%. Among UI subtypes, mixed UI was 30.9%, stress UI was 18.9%, and urgency UI was 2.6%. Overall, the prevalence of UI in women was 9.4% (Soni and Bindra 2023, pp. 2185-2191). Islam et al. (2018, pp. 558-564) examined that 23.7% had UI prevalence and 35.3% had at least one weakness of pelvice floor muscle in Bangladesh among women aged 40-49 years. Stress UI was 5.4%, urgency UI was 11.3% and mixed UI was 7.0%. So, urgency UI was the most prevalent type of UI among women in mid-age but postmenopausal women were more likely to have urgency UI significantly. In Brazil, 16.3% of women aged 12 to 24 months postpartum had urinary incontinence. UI in postpartum women is also caused by pregnancy weight gain (Magnani et al. 2019, pp. 1003-1011). Prior abdominal surgery may render the pelvic support and continence systems even more susceptible. Menopause duration, mode of delivery, and obstetric history also affect the ability of a woman to manage her bladder and reinforce her pelvic floor (Wojcik et al. 2022, pp. 1018-1027).

A common and important causative factor fall in the elderly patients with urgency urinary incontinence is the fact that it affects 40% of women more than 70 years, and this is going to increase to greater than 50% by the year 2050 (Wu et al. 2014, pp. 141-148). The risk of urinary incontinence is that it has increased in late life, such as number of births, abortions, and giving birth; recurring urinary tract infections, prolapse of the

uterus, urogenital surgery, diabetes, smoking, and constipation, etc. Miscarriage, giving large babies, and the use of urinary catheter do not affect the development of UI (Ghasemi et al. 2024, pp. 1-14). Up to 83% of UI during the second time pregnancy and up to 34% of UI during the first time pregnancy. About 38% of postpartum women and 42% of pregnant women have UI (Rajavuori et al. 2022, pp. 1-4). The study added that UI develops in 34% of smokers, 8.8% of individuals with urogenital infection, and 15.3% genital prolapse. 15.3% pelvic organ prolapse reported that they had urinary incontinence, and 21.9% of them had diabetes (Kilic 2016, pp. 1-9).

In Hungary, regarding the prevalence of UI. According to a precious 2001 survey, 56% of them said they had experienced some kind of UI symptoms. 36% more of the participants stated they had UI. Another survey in Hungary stated 33.9% of the interviewers had leakage of urine at some time in their lifetime. In addition, 8.6% reported that they had UI more than once a day, but 1.0% reported that they had UI all day (Debes et al. 2025, p. 27288). According to a recent study in Hungary, 31% of women 50 years of age or older had sarcopenia (Pap et al. 2022, p. 207).

In Malaysia, UI is more prevalent among older women who live in rural areas compared to those who live in urban regions. And also examined that UI are susceptible to skin infections, sexual dysfunction, negative self-concept, dependence, sadness, weakness, institutionalization, added caring burden, and economic burden (Murukesu et al. 2019, pp. 1-11). According to US Census Bureau statistics, in 2001 an estimated 3.4 million US men aged 60 and older living in nursing homes or communities had UI, which was also linked with a higher chance of early death. Suggestions for increased research among older men have been made due to the fact that UI is underreported and undertreated among them. Aside from the fact that men tend to seek medical care less than women, a feminizing orientation of attitudes toward urine incontinence has created health disparities and inequalities among treatments for continence in men. The majority of sponsored research has concentrated on women, although older men and women experience equally deteriorating impacts of UI on the health related quality of life (Olagundoye et al. 2023, p. 534).

Conservative treatment, such as lifestyle modification, physiotherapy, drug therapy, support devices, behavior modification, and non-pharmacologic treatment, is very effective and the mainstay of UI treatment in the elderly patient. Physiotherapy is

recommended by the World Health Organization as the first-line treatment for women with UI, one other conservative option. Studies conducted by (Ghaderi and Oskouei 2014, pp. 1493-1499). Healthcare systems across the globe require more solutions to address the needs of women (Lamin et al. 2016, p. 10).

Limited economic resources and human capacity continue to appear to be hindering accessible treatment (Berre and Dumoulin 2022, pp. 86-94). To meet these specifications, one recent randomised controlled trial, Group Rehabilitation or Individual Physiotherapy, PFMT found that, as it required fewer resources and was therefore more economical (Dumoulin et al. 2017, p. 544). It was not inferior to individual PFMT for the management of older women with UI. Group PFMT has also been reported to help adults and older adults with symptoms of UI in other research (Berre et al. 2023, p. 5791).

According to Ingelman-Sundberg classification and International Continence Society standards which state that, UI may be mild or severe. Due to ignorance, perception, and shamefulness of taking the patient for medical treatment, and negligence on the practitioner's part for the elderly women with mild to moderate UI, it is overlooked at an early stage. An individual's social, psychological, and physical health alters significantly in a number of ways as UI stages progress to severe (Zhang et al. 2022, pp. 1-13). Some studies have reported prevalence only when urinary leakage occurs at specific frequencies, such as daily, weekly, monthly, or yearly episodes. Such heterogeneity in definitions renders the comparison of findings between populations challenging. Despite these differences, literature agrees with the view that the prevalence of urinary incontinence (UI) with age rises in women, yet there is no consensus regarding the exact pattern of increase (Milsom et al. 2016, pp. 15-107).

Ghaderi et al. (2016, pp. 50-54) conducted research on 200 low back pain women and indicated that 78% of the patients experienced stress urinary incontinence (UI), or involuntary leakage of urine on effort or exertion, or on sneezing or coughing, or with urgency, or on felling or strain. Stress UI is extremely prevalent in women, and age, pregnancy, delivery, and endocrine disease are factors that raise its prevalence. Urinary incontinence (UI) has a great negative impact on overall health and quality of life, extending into social, psychological, occupational, physical, and sexual areas of well-being. The spine's stability system incorporates muscular, structural, and neural

subsystems, which function together to provide mechanical stability. Spinal stability muscles also offer a sheath around the spine and abdomen and synergize as the diaphragm does superiorly, supported inferiorly by the pelvic floor muscles (PFM), anteriorly by the transversus abdominis, and posteriorly by the deep lumbar extensor muscles. The PFM not only play a crucial role in trunk and lumbo-pelvic stability but also in urinary continence. It has been shown by research that stabilization exercises of the pelvic floor can improve both urinary incontinence (UI) and low back pain (LBP) simultaneously. Milsom and Gyhagen (2019, pp. 217-222) acknowledge that obesity has also been consistently suggested as a risk factor for incontinence. For each 5 kg/m2 increase in body mass index (BMI), there is a risk that is 60-100% greater for daily incontinence.

The purpose of this study is to determine the risk factors implicated in the development of urinary incontinence among the elderly. Urinary incontinence is a common condition that negatively affects the quality of life of those affected, especially persons over 60 years old. This research aims to examine the correlation of different factors such as age, sex, medical history, childbearing, lifestyle factors, and other environmental and physiological conditions with urinary incontinence. By these factors, the research aims to have a deeper understanding of the etiology of urinary incontinence and help develop effective prevention and control strategies. The findings can help to raise awareness, increase early detection, and guide treatment plans to reduce the impact of this condition on the daily lives of the affected population.

1.2 : Justification:

Urinary incontinence (UI) is a prevalent condition that affects physical health, mental well-being, and overall quality of life. It is associated with several complications, including skin irritation, urinary tract infections, and a higher risk of falls, as well as psychological challenges such as anxiety and depression. Even with urinary incontinence having a high incidence and prevalence in the world, there persist gaps in our knowledge of which social-demographic, lifestyle, health care, and environmental risk factors are related to causing incontinence. Recent research typically missed an exhaustive review of such factors, specifically in different social situations related to healthcare. Because the worldwide population ages, the prevalence of urinary incontinence will also increase, causing even more stress on, caregivers, and the healthcare system. In Bangladesh, urinary incontinence is an increasingly recognized health issue, and physiotherapists can play a key role by collecting detailed information on women's incontinence symptoms. Also, they can be aware of problems during treatments. When it is finished, it will be helpful for other health professionals like doctors, physicians, therapists, nurses, etc., to take extra information about urinary incontinence. It will also be helpful for them to make future research about urinary incontinence conditions among older adults based on my research.

1.3 : Research question:

- What were the risk factors associated with urinary incontinence in elderly people?

1.4: Research Hypothesis

Null hypothesis (Ho):

There was no significant association between the identified risk factors and urinary incontinence in elderly people.

$\mu 1 - \mu 2 \neq 0$ or $\mu 1 \neq \mu 2$

Alternative hypothesis (Ha):

There was a significant association between one or more risk factors (such as age, BMI, chronic diseases, smoking, physical activity level, etc.) and urinary incontinence in elderly people.

$\mu 1 - \mu 2 = 0$ or $\mu 1 \geq \mu 1$

Here,

H0 = Null hypothesis

Ha = Alternative hypothesis

$\mu 1$ = Mean of population 1

$\mu 2$ = Mean of population 2

1.5: Objectives of study:

1.5.1: General objective:

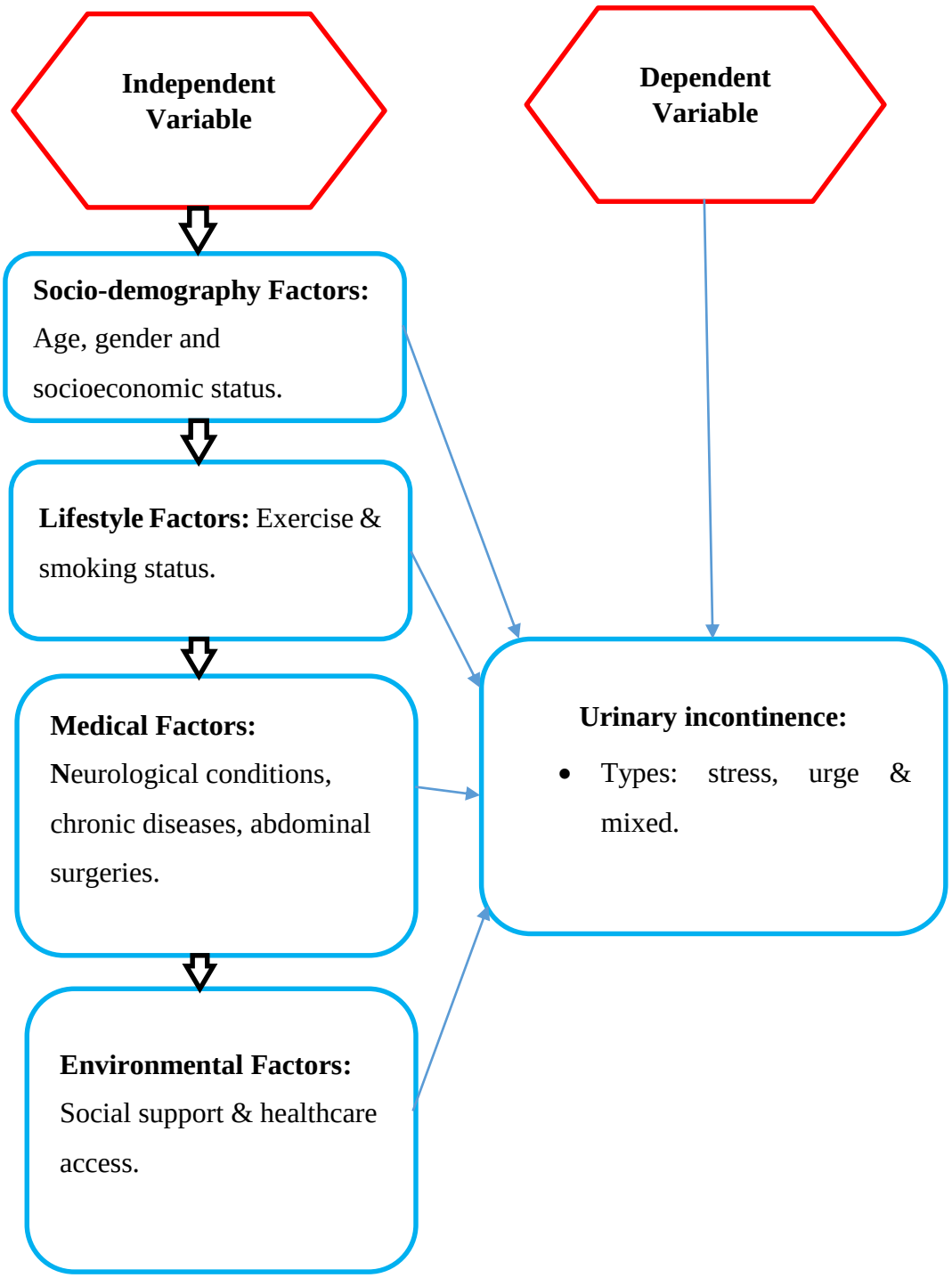
- To identify the risk factors associated with urinary incontinence in elderly people.

1.5.2: Specific objectives:

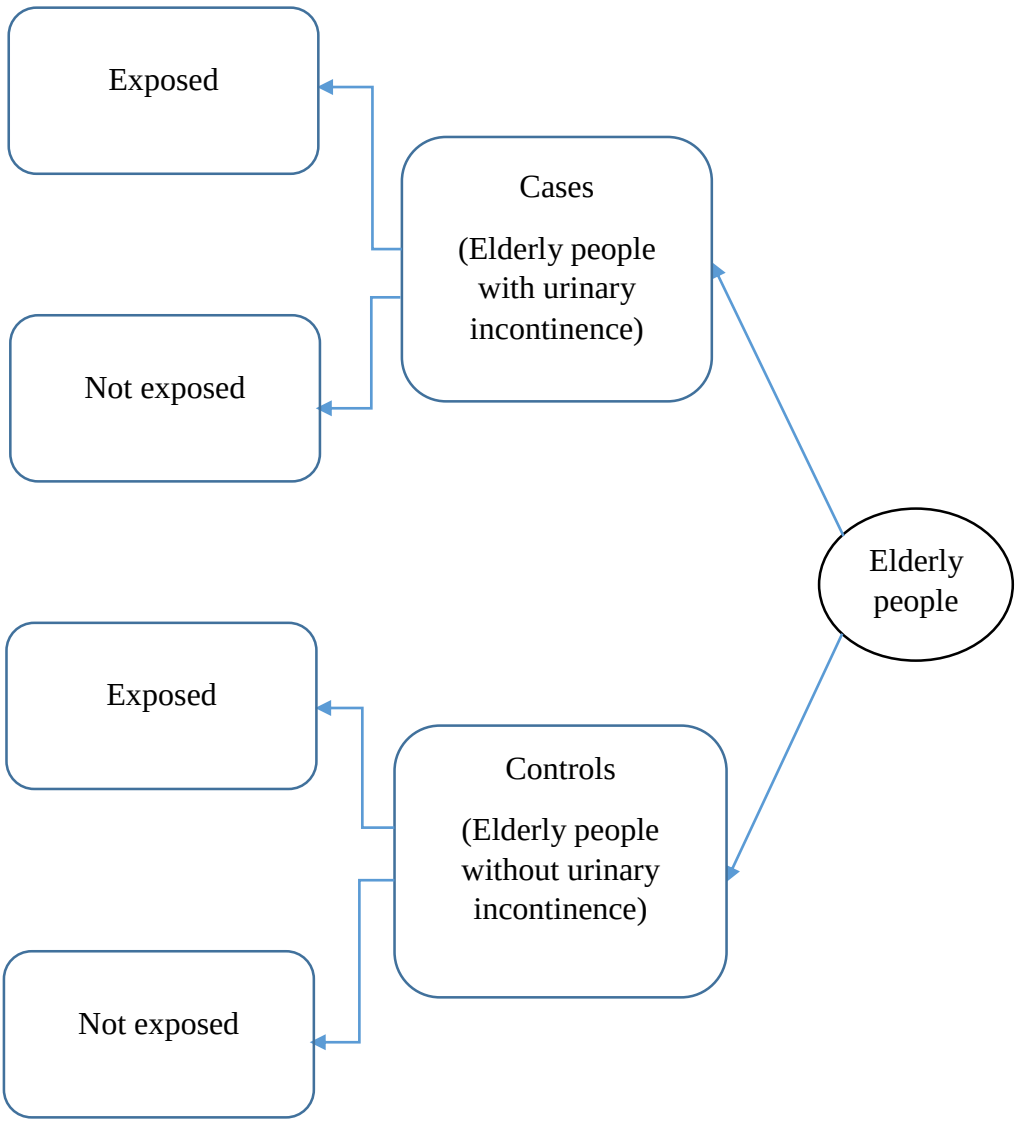
- To select elderly people with urinary incontinence as cases for the present study.
- To select elderly people without urinary incontinence as controls for the present study.
- To identify the socio-demographic characteristics associated with urinary incontinence in the case and control groups among elderly people.
- To assess the severity of urinary incontinence among elderly people in the case group for the present study.
- To determine the frequency of urinary incontinence among elderly people in the case group.
- To identify and compare the risk factors between the case and control groups among the elderly for the present study.

1.6: Conceptual framework:

1.6.1: Variables of the study:



1.7: Flow chart:



1.8: Operational Definitions:

Urinary Incontinence (UI): It is the involuntary leakage of urine or the constant sensation of wetness.

Stress Urinary Incontinence (SUI): It is the involuntary leakage of urine on physical exertion or activity, such as sneezing, coughing, quick walking, running upstairs, or standing.

Urge Urinary Incontinence (UUI): It is the involuntary leakage of urine that occurs simultaneously with, or is immediately preceded by, a sudden and strong urge to urinate.

Mixed Urinary Incontinence (MUI): It is the involuntary leakage of urine that may occur with a sudden urge, with physical activity, or with sneezing or coughing.

Elderly people: Aging, a universal biological process, is usually indicated by chronological age, and persons in the 60 years and older age group are generally regarded as elderly.

Diabetes: Diabetes is a chronic metabolic disorder distinguished by high blood glucose levels and accompanied by damage to the heart, blood vessels, eyes, kidneys, and nerves.

Hypertension: If blood pressure is persistently higher than normal in a quietly resting individual then its hypertension.

Obesity: Obesity is a chronic, multifactorial disease that is marked by excessive body fat, which interferes with metabolism and exposes individuals to many serious complications of health.

Stroke: Stroke is a cerebrovascular disease. A stroke occurs when the blood flow to the brain is interrupted, either due to a blockage or sudden hemorrhage.

CHAPTER- II LITERATURE REVIEW

UI is described by the International Incontinence Society (ICS) as being an involuntary loss of urine that affects all ages but mostly more than fifth decade of life (Chang et al. 2017, pp. 43-50). UI is also described as an uncontrollable and involuntary leakage of urine through the urethra (Peroni et al. 2022, pp. 1-5). Urinary incontinence is gaining more prominence as people age, particularly when they are 65. In context, the prevalence of UI is over 329 million individuals living within the United States. At least one symptomatic pelvic floor disorder impacted one-third of Bangladeshi women between 30 and 59; risk factors being self-reported diabetes, increased parity, decreased socioeconomic status and older age (Islam et al. 2016, pp. 18-23).

Urinary incontinence (UI) is a condition affecting over 423 million individuals worldwide, three times more common among women compared to mens. It impacts the victim's personal, social, psychological, professional, and physical lives negatively (Alshenqeti et al. 2022, pp. 1-15). UI can occur on a daily basis, several times a day or possibly rarely. In older women, stress incontinence is more prevalent. However, mixed incontinence (29%) is more common in elderly women stress incontinence is most common (49%) in all ages and pure urge incontinence (21%) (Begum et al. 2019, p. 160). Childbirth, age, obesity, functional impairment, family history, constipation, smoking, genitourinary prolapsed or other medical condition may cause UI in females. 30% females are affected after first vaginal delivery (Tadir et al. 2017, pp. 137-159).

In older men with frailty, Corral-Perez et al. (2024, pp. 1-30) reversible risk factors of UI were physical restraints, environmental barriers, and urinary tract infection. Non-reversible risk factors included cognitive impairment, diabetes mellitus, physical disabilities, and older age. KK, Putri and Wijaya (2024, pp. 31-36) believed that male residents' continence may be influenced by different levels and types of physical activity as well as conditions like diabetes or neurological disease.

In elderly patients, psychiatric illnesses such as depression and anxiety are connected with UI but tend to be overlooked, thus decreasing life satisfaction. Urinary urgency has also been found to be connected with conditions of old age, such as falls. UI

manifests differently in different dementias. In Alzheimer's patients, it usually manifests after a prominent cognitive deterioration, whereas in Lewy body dementia, it may manifest earlier. Lower mini-mental state exam scores correlate with prevalence of UI, according to studies. Patients with new-onset UI and concomitant cognitive impairment and gait abnormalities should be investigated for normal pressure hydrocephalus as a cause. Older patients in general with UI are more likely than non-UI patients to have a variety of states of disease (Mainu et al. 2023, pp. 15-20).

Urinary incontinence is present in 50% American women at some point during their lives. A population based survey had been done for the reasons of study of frequency, volume and severity of urinary leakage among women. 6000 women aged between 30-90 years had participated who were part of a big health maintenance organization in Washington state. After excluding factors, 3536 patient had been enrolled. Frequency of urinary incontinence was 45% in Washington. The study was measured using incontinence Quality of life instrument, Likert scale, Patient Health Questionnaire. Incontinence of urine is increasing with age. The prevalence of UI among women is 55% for age group 80-90 years, 51% for age group 60-69 years, 48% for 50-59 years, 41% for 40-49 years, and 28% for women aged 30-39% years. Diabetes, advanced age, major depression, hysterectomy history, mode of delivery was the factors associated with UI. Pelvic muscles were damaged as a result of vaginal delivery causing UI. 17% of women are affected by UI for vaginal delivery in US (Verbee and Hayward 2019, pp. 559-564).

Urinary incontinence (UI) has been researched up to 20 years after one delivery in certain studies. Risk of developing UI was 71% higher after vaginal delivery compared to Cesarean section, and incidence of UI more than 10 years post-delivery was nearly doubled following vaginal delivery. There was no statistically significant difference in long-term incidence of UI between those who delivered by acute or elective Cesarean sections, which means that the risk is mostly attributed to baby passing through the pelvic floor at delivery. Maternal weight also mattered; multivariate regression analyses revealed an 8% rise in UI risk with every unit rise in BMI, and both modes of delivery had UI present. Current BMI was the best predictor of UI and showed that it has a significant role to be played as a modifiable risk factor. In vaginally delivered women, incontinence rates rose with higher infant birth weight, a pattern not observed in

Cesarean births. In general, prevalence of UI increased with age at motherhood, at an estimated incidence per annum increase of 3% per year (Hage-Fransen et al. 2021, pp. 374-382). Lower education level women had greater adverse effects on impact, and educational level was an independent predictor of Workplace Productivity impact of severity of UI symptoms. This is in agreement with other research that brought to light women with fewer levels of education have deficits in knowledge related to pelvic health, such as risk factors and preventive methods of UI (Manso et al. 2023, pp. 3657-3662).

Diabetic women with UI had a prevalence of 50.3%. Diabetic women had 54% higher chances of UI than diabetic-free women, though the impact was moderated when confounding factors were controlled and statistical significance was not achieved. Females taking greater than one anti-diabetic agent had 2.75 times higher chances of UI than diabetic-free women, suggesting that UI should be taken into account when counseling those with fulminant diabetes. No correlation with long-term diabetes was established for UI. BMI and age were the most significant predictors of UI (Lowenstein et al. 2021, pp. 855-867).

Parker-Autry et al. (2017, pp. 1025-1032) tested 673 symptom-free at baseline female participants for UI and conducted a follow-up after 4 years. They had described that women with all forms of UI had increasingly worsening Short Physical Performance Battery test (SPPB), particularly standing balance score. They had reported decreasing skeletal muscle mass and strength, which are the most significant predictors of sarcopenia.

Debes et al. (2025, pp. 27288) also informed that UI and sarcopenia concurrently because sarcopenia was more prevalent in subjects with the incidence of UI compared to those which remained continent over the four years. The Sixth International Consultation on Incontinence and the European Association of Urology cite some established risk factors known to put men at risk for UI, although age groups were not identified. They are aging, lower urinary tract symptoms, urinary tract infection, diabetes, alcohol consumption, neurological disease, prostatectomy, and cognitive and functional impairment.

The UI pathogenesis is multifactorial, and there are risk factors present and interacting to keep the disorder functional, especially with advanced age. Resnick described an 80-year-old male patient with urinary incontinence with whom he elicited a history that was demonstrated to have a number of causative factors, including congestive heart failure, Parkinson's disease with limited mobility, and anticholinergic medication (haloperidol) causing urinary retention, fecal impaction, discomfort, and confusion (Olagundoye et al. 2023, p. 534).

Atrophy of the pelvic muscles following extended menopause can further weaken bladder control. Gender-specific continence management is also required, particularly in those who have previously undergone abdominal surgery or given birth many times (Molina-Torres et al. 2023, pp. 500-509). The pelvic floor muscle weakening and urinary incontinence did reveal diminished but still significant correlation within the model when it involved male participants. This would indicate that although pelvic floor dysfunction continues to be troublesome in men to maintain them continent, there might also be other risk factors that are more prevalent in this group of people. The comparatively lesser predictive ability in men could maybe be due to prostate problems, which were not investigated in the present study (Zhang et al. 2023, pp. 6196-6211).

The findings of the research showed that both men and women experienced remarkable improvements in urinary distress and disease-specific quality of life, as assessed using the Incontinence Impact Questionnaire and the Urogenital Distress Inventory, respectively. Kegel exercises are a treatment that works by enhancing the quality of life, incontinence, and consequently self-esteem of older male and female populations, as indicated in earlier researches (Jahromi et al. 2014, p. 71).

The efficacy of Kegel exercises among women has been researched in a number of past studies, yet according to the findings of the current study, they are just as effective in men (Siegel 2015, pp. 1-7). A study was conducted by (Jepisa et al. 2022, p. 614) in Pakistan where the results obtained were Kegel exercises was proved to be an effective intervention for geriatric male and female patients with urinary incontinence. From the gender point of view, considering this study, the researchers also noted that age elderly individuals both male and female also had a noteworthy role.

Mostafaei et al. (2020, p. 1086) noted that a systematic review has approximated the global prevalence of urge urinary incontinence (UI), evaluating 54 papers (50 studies) containing 22 large population-based studies. Rates of urge UI prevalence ranged from 1.8% to 30.5% in Europe, 1.7% to 36.4% in the USA, and 1.5% to 15.2% in Asian countries. Prevalence was significantly influenced by gender and age. Because global life expectancy continues to rise and approximately 25% of those already 65 or older in most countries, the prevalence of UI can be expected to increase and hence more women will undergo treatment in the future. Types of UI in studies have significant effects on work and occupational function. Both urgency and mixed UI are more abrupt and are aggravated by abrupt, irresistible need to void. These events tend to lead to accidents and additional embarrassment.

Increased utilization of health care, psychological morbidity, and compromised capacity to sustain stable work performance are a few adverse effects that can occur because of such unpredictability. These female subgroups have much higher short-term disability and sickness absence rates, higher rates of work-loss days due to medical absence, and higher costs of payroll absence (Yoo et al. 2023, pp. 288-296). There is rigorous evidence to suggest that the most important risk factor for incontinence among institutionalized older adults is pelvic floor muscle weakness, and that such an observation may be made among male as well as female subgroups. In long-term care facilities, gender-sensitive approaches and early diagnosis have evidence (Dumoulin et al. 2020, pp. 1284-1293).

Individualized continence plans, pelvic muscle training, and regular high-risk group screening are some of the interventions that reduce the incontinence burden. In China, almost 30.9% of women have been exposed to UI. The most important risk factors include obesity, age, hysterectomy, pregnancy, childbirth, and family history. Postpartum women and control non-postpartum groups included 60 and 80 participants in a prospective consecutive cohort study. Vaginal contraction pressure (VCP), 1-hour pad weight test, and the IIQ-7 questionnaire were used. For baseline group similarity to be addressed, the $\chi 2$ test and t-test were employed. Intra-group was examined by Wilcoxon signed-rank test (Sun et al. 2018, pp. 352-354.).

Due to variations in treatment modalities (sessions, type of contraction, and duration of contraction) between studies, evidence supporting BF therapy in the cure of SUI is not

strong (Nunes et al. 2019, pp. 10-23). Other treatments of SUI include electrical stimulation, which involves tibial, sacral, transvaginal, and suprapubic nerve stimulation (Ghaderi et al. 2023, pp. 293). Kegel exercises are beneficial for the function of Pubococcygeal muscles. It can be very helpful for both men and women. A study has been conducted by (Bo & Nygaard 2020, pp. 471-484). In one study, Kegel exercises reduced significantly incontinence among diabetic female patients (Ishtiaq et al. 2016, pp. 351-354).

One of the most common disorders often poorly managed is urinary incontinence. Prevalence estimation can differ depending on the population sampled, the duration for which it is to be estimated (day or week), and how seriousness is estimated. During estimation, it occurs in more than half of adult females and 3% to 11% of adult males but only 25% to 61% of similar female patients are treated (Hallock, Jennifer and Victoria 2016, p. 1).

Women suffering from the side effects of both types of incontinence are said to have mixed urinary incontinence. Incontinence of women's urine is about 10% to 40% of the population. Age, sex, race, and nursing home residence are the conditions that are most frequently found to affect the incidence of incontinence of urine. Advanced age has been speculated to be correlated with an increased incidence of urinary incontinence. An epidemiologic study of 27,936 Norwegian women controlled for the prevalence as continuing to grow with age until highest age early in the mid-50s and then decrease a little or then reflection.to some age around 70, after which it should grow steadily once again (Haylen et al. 2016, pp. 165-194).

Bangladeshi women are already at higher risk of postpartum complications. 118 married women were randomly sampled & data were gathered with both qualitative and quantitative method. A woman's health depends upon age at marriage, childbearing age, occupation, economic condition, resistance area, awareness of the spouse, and educational level. 86% of rural women receive health care from untrained health workers. In the parents' home, 74.8% women gave birth, followed by parents' home (18.6%), government hospital (0.8%), and private clinics (6.6%). There is no training of the birth attendants in Bangladesh's rural sector. The doctors delivered 0.8% women, trained birth attendants delivered 5.1%, and untrained birth attendants delivered 88.1%. Postpartum complication such as bowel issue, postpartum psychiatric disorders, urinary

incontinence & pelvic pain are seen among untrained birth attendants (Akhter 2015, pp. 1-363). Men can achieve firmer erections, have delayed ejaculation, and enjoy better sex life at orgasm with this therapy. The benefit of Kegel exercises to women is that orgasm is facilitated and they are enhanced as the muscles being exercised are the same muscles being contracted during orgasm. (Butcher et al. 2020, pp. 92-99).

The study also found that 72.7% of women with UI symptoms were not undergoing any treatment, and 60% of them said that they had not discussed their symptoms with their doctor. These results agree with the vast majority of existing research that states women who are suffering from UI symptoms most frequently do not phone their doctors about the same, indicating the need for increased awareness and intervention activities (Rashidi et al. 2021, p. 60).

Lifestyle changes, bladder training, biofeedback, exercise training, relaxation, and urgency suppression training, electrical stimulation, pessaries, and urethral plugs, etc., are all addressed. A period of at least six weeks should pass before other treatments are considered. Weight reduction (if BMI is 30 or more), coffee consumption reduction, fluid management, effort reduction (including occupation and exercise), reduction of smoking, and chronic constipation treatment are all lifestyle changes (Kenton and Smilen 2015, pp. 66-81). Urinary incontinence (UI) is an annoying condition frequently underreported and with drastic impact on the quality of life of the affected women. A cross-sectional survey was conducted to identify risk factors, pattern of seeking treatment, and quality of life of the affected women. Structured schedule was employed to interview 177 women visiting a rural health center and aged 50 years and more. Data were entered into SPSS (version 16) and analyzed with bivariate analysis to determine the associations between socioeconomic, demographic, and established risk factor variables and UI. UI was detected in 49 women (27.7%) of the participants. The most common was stress UI (51.0%), then mixed UI (32.7%), and urge UI (16.3%). The prevalence of severe UI increased with age: 7% in women aged 20-39, 17% in those 40-59, 23% in the group 60-79 years, and 32% in women aged 80 years and older (Biswas et al. 2017, p. 130).

Quality of life for patients with post-stroke urinary incontinence can be enhanced through enhanced independence of patients, and that is by overall heightened patient, family, and peers' participation in patient care (Heltty 2022, p. 6). Kegel exercises on

pelvic muscles strengthen voluntary paravaginal and periurethral muscles. The patients should be taught to squeeze their pelvic floor muscles as hard as they can for 30 repetitions daily (3 sets of 10) and then rest again for 5 counts. While squeezing your pelvic floor muscles, your leg, buttock, and stomach muscles must remain relaxed. Biofeedback or bladder training may be added to these (Jain et al. 2025, pp. 51-57).

Stress urinary incontinence (SUI) is brought about by pelvic floor muscle weakness and impairment of the complex musculo-ligamentous and fascio-cutaneous support mechanisms. Childbirth, trauma, endocrine disorders, disorders of the reproductive organs, and related surgical procedures are frequent causes. Urge urinary incontinence (UUI), on the other hand, is brought about by an abnormality of the balance between inhibitory and excitatory afferent impulses that control contraction of detrusor muscle, leading to impairment of micturition. Major causes include central nervous system injury above the pontine micturition center, leading to detrusor overactivity and reducing bladder capacity. Stroke, dementia, and Parkinson's disease are frequent perpetrators. The micturition center is in the spinal cord at the S2-S4 level; damage at this site jeopardizes reflex bladder emptying. The bladder becomes neurologically autonomous in these situations and can no longer contract completely, leaving residual urine behind. Reflex urination, which is regulated by the parasympathetic nervous system, may occur suddenly and involuntarily (Kolodynska et al. 2019, pp. 46-50). Muscle strengthening of the pelvic floor reduces involuntary leakage of urine (Brito et al. 2017, pp. 205-213).

Despite evidence of the efficacy of the approach, no standardized application of PFMT has been accepted internationally due to the very high heterogeneity of studies. But it is more or less concluded that exercises like these are most effective when they are more difficult, supplemented with interventions that will promote their continuation, and followed by a healthcare practitioner (Todhunter-Brown et al. 2022, pp. 1-34). Note that home-based PFMT of the study was guided by physiotherapy specialists, and it reinforces literature findings that supervised exercises are more effective. In addition, when PFMT was conducted at home, the quality of patients' lives increased (Moroni et al. 2016, pp. 97-111).

Another technique that most find preferable is biofeedback therapy, which gives visual and/or auditory feedback to inform the patient about the contraction and relaxation of

the pelvic floor muscles. It is effective for patients whose muscles do not contract or relax independently (Barnes et al. 2021, pp. 587-594). Electrostimulation is another adjunct treatment. Transcutaneous tibial nerve electrostimulation was most effective in this review combined with PFMT (Sahin et al. pp. 1781-1792). Duloxetine is the only medication for stress urinary incontinence that strengthens urethral sphincter function. During treatment, it can reduce the frequency of incontinence up to 50% and finally enhance the quality of life in patients (Evangelista et al., 2021, pp. 1588-1602).

Mirzaei et al. (2021, pp. 543-548) conducted a randomized controlled trial comparing the efficacy and side effects of duloxetine and solifenacin in managing urgency urinary incontinence (UUI) and suggested that duloxetine can act as a good alternative to manage overactive bladder. However, Hagovska et al. (2021, pp. 193-201) to achieve optimal outcomes in both types of UI, pharmacotherapy remains to be combined with pelvic floor muscle training (PFMT).

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CHAPTER- III METHODOLOGY

3.1: Study design:

It was analytical type of case-control study design used for identifying the risk factors associated with urinary incontinence in elderly people.

3.2: Study area:

The relevant data for the present study were collected from Probin Nibash (Agargaon), OGSB Hospital and IRCH (Mirpur-13), Ibn Sina Diagnostic and Consultation Center (Uttara), National Institute of Traumatology and Orthopedic Rehabilitation (Agargaon), Women's and Children's General Hospital (Dhanmondi), and BIHS General Hospital (Darus Salam Road), Dhaka, Bangladesh.

3.3: Study place:

The study was carried out at SAIC College of Medical Science and Technology, Mirpur, Dhaka.

3.4: Duration of the study:

The duration of the study was June 2024 to July 2025.

3.5: Study Population:

Elderly people residing at one retirement home (Probin Nibash) and attending five selected hospitals in Dhaka, Bangladesh: OGSB Hospital and IRCH (Mirpur-13), Ibn Sina Diagnostic and Consultation Center (Uttara), National Institute of Traumatology and Orthopedic Rehabilitation (Agargaon), Women's and Children's General Hospital (Dhanmondi), and BIHS General Hospital (Darus Salam Road).

3.6: Sample Size Calculation

The sample size for this case-control study was calculated using the following formula for comparing two means:

$$n = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 \times [p_1(1-p_1) + p_2(1-p_2)]}{(p_1 - p_2)^2}$$

$$n = \frac{(1.96 + 0.84)^2 \times [0.5(1-0.5) + 0.3(1-0.3)]}{(0.5 - 0.3)^2}$$

$$n = \frac{7.84 \times [0.25 + 0.21]}{0.04} = \frac{7.84 \times 0.46}{0.04} = \frac{3.6064}{0.04} = 90.16$$

Where:

- n = required sample size per group (case/control)
- Z1−α/2 = Z-score for 95% confidence level = 1.96
- Z1−β = Z-score for 80% power = 0.84
- p1 = estimated proportion of exposure among cases
- p2 = estimated proportion of exposure among controls

Value:

- Proportion of exposure among cases (p1) = 0.50
- Proportion of exposure among controls (p2) = 0.30
- Confidence level = 95%
- Power = 80%

(Alaish et al. 2024, pp. 779-791)

Thus, the required sample size is approximately 91 cases and 91 controls, totaling 182 participants. But due to time and funding limitation, I could not took the estimated sample. I just add 63 sample in each group.

3.7: Sampling technique

Convenient sampling technique was adopted to select the participants for case and control group from the study population.

3.8 Eligibility Criteria of the Participants

3.8.1: Inclusion Criteria for Case Group

- Elderly persons with urinary incontinence residing in one retirement home (Probin Nibash) and attending five selected hospitals in Dhaka, Bangladesh: OGSB Hospital and IRCH (Mirpur-13), Ibn Sina Diagnostic and Consultation Center (Uttara), National Institute of Traumatology and Orthopedic Rehabilitation (Agargaon), Women's and Children's General Hospital (Dhanmondi), and BIHS General Hospital (Darus Salam Road).
- Age: 60 years and above (Barikdar et al. 2016, pp. 27-32).
- Sex: Male, female and 3rd gender.
- Patient who had not diagnosed from any mental or emotional illnesses or conditions that hamper communication (Kasikci et al. 2015, pp. 217-223).

3.8.2: Inclusion Criteria for Control Group

- Elderly persons without urinary incontinence residing in one retirement home (Probin Nibash) and attending five selected hospitals in Dhaka, Bangladesh: OGSB Hospital and IRCH (Mirpur-13), Ibn Sina Diagnostic and Consultation Center (Uttara), National Institute of Traumatology and Orthopedic Rehabilitation (Agargaon), Women's and Children's General Hospital (Dhanmondi), and BIHS General Hospital (Darus Salam Road).
- Age: 60 years and above (Barikdar et al. 2016, pp. 27-32).
- Sex: Male, female and 3rd gender.
- Patient who had not diagnosed from any mental or emotional illnesses or conditions that hamper communication (Kasikci et al. 2015, pp. 217-223).

3.8.3: Exclusion Criteria for Case Group

- Subjects who were not willing to participate in the study (Reigota et al. 2016, pp. 62-68).
- Subjects who were medically unstable.
- Individuals below 60 years of age (Jerez-Roig et al. 2016, p. 102).
- Non-co-operative patients and lack of interest to participate in research activities (Shupti 2023, p. 16).

3.8.4: Exclusion Criteria for Control Group

- Subjects who were not willing to participate in the study (Reigota et al. 2016, pp. 62-68).
- Subjects who were medically unstable.
- Individuals below 60 years of age (Jerez-Roig et al. 2016, p. 102).
- Non-co-operative patients and lack of interest to participate in research activities (Shupti 2023, p. 16).

3.9: Method of data collection

3.9.1: Technique of data collection:

Face to face formal interview was applied to collect data from the participants (case and control group).

3.9.2: Instrument of data collection:

A pretested, structured questionnaire was the data collection tool in the present study. The questionnaire contained six sections. First section contained the socio demographic characteristics questions, second section included the Anthropometric Measurements questions, third section included the Urinary Incontinence Related Question, forth section included the Health and Risk Indicator Related Questions question, fifth section included the Revised Urinary Incontinence Scale (RUIS) question and last section included the International Consultation on Incontinence Questionnaire Short Form (ICIQ-SF) questions.

3.9.3: Tools of data collection:

Measuring tape was used to measure the height of the participants. Weighing machine was also used to measure weight of the participants.

3.9.4: Procedure of data collection:

This study was case control study. Risk factors of urinary incontinence among elderly people were determined by the researcher. Urinary incontinence individual was the research case. Individual chosen by the researcher did not experience urinary incontinence. They were research control group. Groups were matched before data collection. The researcher collected written informed consent from the respondents before interview. The interview took place in an informal environment. The information from both groups was gathered using a pretested questionnaire. The participants were thanked by the researcher upon completion of the interview.

3.10: Presentation of the data of a case control study

	Cases	Controls	Total
Exposed	a	b	a + b
Unexposed	c	d	c + d
	a + c	b + d	a + b + c + d

3.11: Interpreting ODDs ratio

OR = 1: The odds of exposure were the same in cases and controls, indicating no association between the exposure and the disease.

OR > 1: The odds of exposure were higher among cases than controls, suggesting a positive association between the exposure and the disease.

OR < 1: The odds of exposure were lower among cases than controls, indicating a negative association between the exposure and the disease.

3.12: Data management

3.12.1: Data editing:

The questionnaires were reviewed after data collection to identify any error or inconsistencies. Necessary corrections were done as needed. All responses were adequately coded for analysis.

3.12.2: Data entry:

Coded data were entered into a computer based on the study's variables.

3.12.3: Analysis of data:

Statistical Package for the Social Sciences (SPSS, Version 2023) was applied in data analysis. Descriptive statistics like frequency, distribution, range, mean, percentage, and Chi-square tests were calculated. Inferential statistical methods were applied to examine the association between independent and dependent variables.

3.13: Ethical consideration:

The researcher was provided with written consent by the Institutional Review Board of SAIC College of Medical Science and Technology to ensure the study adhered to ethical standards. Informed written consent was also obtained from all participants, ensuring they fully understood the purpose of the study, the processes, and their right to withdraw. Confidentiality of information was ensured during research at all times, ensuring privacy of the participants and secure storage of sensitive information.

CHAPTER- IV RESULTS

The objective of this study to identify the risk factors for urinary incontinence among elderly. Pertinent of data this study collected from both case and control group with the help of pretested questionnaire. Data were analyzed by SPSS program. The result of the study has been added with tables and discussion in the following section.

Table No. 1. Frequency distribution of the participants by age:

Age Group in Years	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
60 - 64	32	50.8	42	66.7	74	58.7
65 - 69	9	14.3	12	19.0	21	16.7
70 - 74	15	23.8	6	9.5	21	16.7
75 - 79	2	3.2	1	1.6	3	2.4
80 - 84	2	3.2	2	3.2	4	3.2
85 & above	3	4.8	0	0	3	2.4
Total	63	100	63	100	126	100
Mean ± SD	66.57 ± 7.315		63.81 ± 4.819		65.19 ± 6.323	

Age distribution analysis of the respondents revealed that, in case group (mean age 66.57 ± 7.32 years), 32 patients (50.8%) were between 60-64 years, 9 (14.3%) between 65-69 years, 15 (23.8%) between 70-74 years, 2 (3.2%) between 75-79 years, 2 (3.2%) between 80-84 years, and 3 (4.8%) between 65-69 years. In the control group (mean age 63.81 ± 4.82 years), 66.7% of the 42 were 60-64 years, 19% of the 12 were 65-69 years, 9.5% of the 6 were 70-74 years, 1.6% of the 1 was 75-79 years, and 3.2% of the 2 were 80-84 years. The age distribution in the two groups was near statistical significance. Overall, exposure was inversely related to the disease ($\chi^2 = 8.97$, $df = 5$, $p = 0.055$) (Table no.1).

Table No. 2. Frequency distribution of the participants by gender:

Gender	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Male	32	50.8	30	47.6	62	49.2
Female	27	42.9	32	50.8	59	46.8
Third Gender	4	6.3	1	1.6	5	4.0
Total	63	100	63	100	126	100

About gender of the participants, it was found that in the case group, 32 (50.8%) participants were male, 27 (42.9%) participants were female, 4 (6.3%) participants were third gender.

In the control group, 30 (47.6%) participants were male, 32 (50.8%) participants were female, 1 (1.6%) participants were third gender. The gender distribution was statistically not significant ($\chi^2 = 2.288$, $df = 2$, $p = 0.159$) (Table no.2).

Table No. 3. Frequency distribution of the participants by marital status:

Marital status	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Married	52	82.5	58	92.1	110	87.3
Unmarried	4	6.3	1	1.6	5	4.0
Widowed	7	11.1	4	6.3	11	8.7
Divorced	0	0	0	0	0	0
Total	63	100	63	100	126	100

About marital status, found that in case group, 52 (82.5%) participants were married, 4 (6.3%) participants were unmarried, 7 (11.1%) participants were widowed.

In the control group, 58 (92.1%) participants were married, 1 (1.6%) participants were unmarried, 4 (6.3%) participants were widowed. The marital status distribution was statistically not significant ($\chi^2 = 2.945$, $df = 2$, $p = 0.114$) (Table no.3).

Table No. 4. Frequency distribution of the participants by educational qualification:

Education Level	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Illiterate	10	15.9	6	9.5	16	12.7
PSC	12	19.0	12	19.0	24	19.0
JSC	10	15.9	9	14.3	19	15.1
SSC	8	12.7	6	9.5	14	11.1
HSC	7	11.1	9	14.3	16	12.7
Graduate	7	11.1	10	15.9	17	13.5
Post graduate	9	14.3	11	17.5	20	15.9
Total	63	100	63	100	126	100

In the Case group, 10 (15.9%) participants were illiterate, 12 (19%) participants had completed primary education, 10 (15.9%) participants had completed JSC, 8 (12.7%) participants had completed SSC, 7 (11.1%) participants had completed HSC, 7 (11.1%) participants had completed Graduation and 9 (14.3%) participants had completed Post graduation.

In the Control group, 6 (9.5%) participants were illiterate, 12 (19%) participants had completed primary education, 9 (14.3%) participants had completed JSC, 6 (9.5%) participants had completed SSC, 9 (14.3%) participants had completed HSC, 10 (15.9%) participants had completed Graduation and 11 (17.5%) participants had completed Post graduation. The educational qualification distribution was statistically not significant ($\chi^2 = 2.318$, $df = 6$, $p = 0.444$) (Table no.4).

Table No. 5. Frequency distribution of the participants by family types:

Family Types	Frequency				Total		*p* value	*df*	Odds Ratio
	Case		Control						
	N	%	N	%	N	%			
Nuclear	24	38.1	34	54.0	58	46.0	0.037	1	0.525
Extended	39	61.9	29	46.0	68	54.0			
Total	63	100	63	100	126	100			

Regarding the types of families of the participants, it was found that in the case group, 24 (38.1%) participants belonged to nuclear families, while 39 (61.9%) belonged to extended families.

In the control group, 34 (54%) of the subjects were from nuclear families and 29 (46%) from extended families. Statistical significance of the difference was extremely high ($\chi^2 = 3.195$, $df = 1$, $p = 0.037$), with an odds ratio of 0.525, showing that older individuals in nuclear families had lower odds of urinary incontinence compared to individuals in extended families (Table 5).

Table No. 6. Frequency distribution of the participants by monthly income:

Monthly income	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Low income	9	14.3	9	14.3	18	14.3
Middle income	36	57.1	37	58.7	73	57.9
High income	18	28.6	17	27.0	35	27.8
Total	63	100	63	100	126	100

About monthly income, it was found that in the case group, 9 (14.3%) participants reported low income (below 5000 BDT), 36 (57.1%) participants reported middle income (5001-15000 BDT) and 18 (28.6%) participants reported high income (above 15000 BDT). In the control group, 9 (14.3%) participants reported low income (below 5000 BDT), 37 (58.7%) participants reported middle income (5001-15000 BDT) and 17 (27%) participants reported high income (above 15000 BDT). The distribution of monthly income between the two groups was statistically not significant ($\chi^2 = 0.042$, $df = 2$, $p = 0.489$) (Table no.6).

Table No. 7. Frequency distribution of the participants by Body Mass Index:

Body Mass Index	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Severely Underweight	0	0	1	1.6	1	0.8
Under weight	2	3.2	1	1.6	3	2.4
Normal weight	29	46	24	38.1	53	42.1
Overweight	28	44.4	31	49.2	59	46.8
Moderately Obese	2	3.2	4	6.3	6	4.8
Severely Obese	2	3.2	2	3.2	4	3.2
Morbidly Obese	0	0	0	0	0	0
Total	63	100	63	100	126	100
Mean ± SD	25.307±3.671		25.214±3.883		25.26±3.763	

As for the BMI of the participants, it was shown that in the case group (25.307±3.671), 29 (46%) of the participants were normal weight (18.5-24.9 BMI), 2 (3.2%) participants were underweight (16-18.4 BMI), 28 (44.4%) participants were overweight (25-29.9 BMI), 2 (3.2%) participants were moderately obese (30-34.9 BMI), and 2 (3.2%) participants were severely obese (35-39.9 BMI).

In the control group (25.214±3.883), 24 (38.1%) of the subjects had normal weight (BMI 18.5-24.9), 1 (1.6%) was severely underweight (BMI < 16), 1 (1.6%) was underweight (BMI 16-18.4), 31 (49.2%) were overweight (BMI 25-29.9), 4 (6.3%) were moderately obese (BMI 30-34.9), and 2 (3.2%) were severely obese (BMI 35-39.9). The similarity in the distribution of BMI between the two groups was found to be statistically not significant ($\chi^2 = 2.624$, $df = 5$, $p = 0.379$) (Table no.7).

Table No. 8. Frequency distribution of the participants by has urinary incontinence

Has Urinary Incontinence			
		Frequency	**Percent (%)**
Valid	Yes	63	50.0
	No	63	50.0
	Total	126	100.0

Among 126 participants, 63 (50%) of the elderly had urinary incontinence and 63 (50%) did not have it. Among those with urinary incontinence, half of them were allocated in the case group and the other half without urinary incontinence in the control group (Table no.8).

Table No. 9. Mean and Standard Deviation duration of urinary incontinence (months) and hold urine (Minutes) in case group.

	Duration of Urinary Incontinence (months)	**Hold Urine (Minutes)**
Mean	17.79	36.349
Standard Deviation	34.347	53.0562

In the case group (n = 63), the average urine-holding time was 36.349 minutes (SD = 53.0562), with a minimum of 15 minutes and a maximum of 180 minutes. This indicates wide variability in bladder control among participants. The average duration of urinary incontinence was 17.79 months (SD = 34.347), ranging from 1 month to 180 months. The findings suggest that some participants had recently developed symptoms, while others had been living with incontinence for several years. Both variables showed a large standard deviation, reflecting considerable differences in symptom severity and chronicity among the cases.

Table No. 10. Frequency distribution of the participants by received treatment

Received Treatment	Frequency				Total		*p* value	*df*
	Case		Control					
	N	%	N	%	N	%		
Yes	59	93.7	0	0	59	46.8	0.001	1
No	4	6.3	63	100	67	53.2		
Total	63	100	63	100	126	100		

The study found that 59 (93.7%) of case group participants had reported treatment provided and 4 (6.3%) case group participants had not received treatment. None of the participants from the control group had received treatment. The difference in treatment received between case group and control group was highly statistically significant (χ^2 = 110.955, *df* = 1, *p* = 0.001) (Table no. 10).

Table No. 11. Frequency distribution of the participants by types of treatment

Types of Treatment	Frequency				Total		*p* value	*df*
	Case		Control					
	N	%	N	%	N	%		
Medication	40	63.5	0	0	40	31.7	0.001	3
Physiotherapy	17	27	0	0	17	13.5		
Surgery	4	6.3	0	0	4	3.2		
Others	2	3.2	63	100	65	51.6		
Total	63	100	63	100	126	100		

The study illustrates the distribution of the subjects based on the type of treatment received by them. Among the case group, 40 (63.5%) received medicine, 17 (27%) received physiotherapy, 4 (6.3%) received surgery, and 2 (3.2%) received other forms of treatment. In the control group, however, all 63 (100%) reported receiving other forms of treatment. Variation of treatment types in the case and control groups was statistically highly significant ($\chi^2 = 118.246$, $df = 3$, $p = 0.001$) (Table No. 11).

Table No. 12. Frequency distribution of the participants by using absorbent products

Using Absorbent Products	Frequency				Total		*p* value	df
	Case		Control					
	N	%	N	%	N	%		
Yes	15	23.8	0	0	15	11.9	0.001	1
No	48	76.2	63	100	111	88.1		
Total	63	100	63	100	126	100		

The study showed that 15 (23.8%) of the case group respondents used absorbent products and 48 (76.2%) did not use them. None of the control group respondents mentioned the use of absorbent products. The variation between the use of absorbent products by the case and control groups was extremely statistically significant (χ^2 = 17.027, *df* = 1, *p* = 0.001) (Table no. 12).

Table No. 13. Frequency distribution of the participants by smoking status.

Smoker	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Yes	13	20.6	16	25.4	29	23
No	50	79.4	47	74.6	97	77
Total	63	100	63	100	126	100

The majority of the case group participants (13 or 20.6%) and control group participants (16 or 25.4%) were smokers. The majority of both groups were non-smokers 50 (79.4%) case group and 47 (74.6%) control group. Between case and control group participants was not statistically different based on smoking status ($\chi^2 = 0.403$, $df = 1$, $p = 0.262$) (Table no.13).

Table No. 14. Frequency distribution of the participants by diabetes

Diabetes	Frequency				Total		*p* value	*df*	Odds Ratio
	Case		Control						
	N	%	N	%	N	%			
Yes	55	87.3	35	55.6	90	71.4	0.001	1	5.5
No	8	12.7	28	44.4	36	28.6			
Total	63	100	63	100	126	100			

The study identified that 55 (87.3%) of the case group subjects and 35 (55.6%) of the control group subjects had diabetes. There were 8 (12.7%) case group subjects and 28 (44.4%) control group subjects without diabetes. The difference between the groups was extremely significant ($\chi^2 = 15.556$, $df = 1$, $p = 0.001$) and the odds ratio was 5.5. This indicates that diabetic older persons were 5.5 times more likely to experience urinary incontinence compared to non-diabetic persons (Table no.14).

Table No. 15. Frequency distribution of the participants by hypertension

Hypertension	Frequency				Total		*p* value	*df*	Odds Ratio
	Case		Control						
	N	%	N	%	N	%			
Yes	52	82.5	36	57.1	88	69.8	0.001	1	3.545
No	11	17.5	27	42.9	38	30.2			
Total	63	100	63	100	126	100			

The study found that 52 (82.5%) case group respondents were hypertensive, while 36 (57.1%) control group respondents were hypertensive. 11 (17.5%) respondents in the case group and 27 (42.9%) respondents in the control group were non-hypertensive. Two groups were statistically different ($\chi^2 = 9.646$, $df = 1$, $p = 0.001$) with an odds ratio of 3.545. This suggests that hypertensive elderly people were approximately 3.5 times more likely to have urinary incontinence than non-hypertensive people (Table no.15).

Table No. 16. Frequency distribution of the participants by kidney disease

Kidney Disease	Frequency				Total		*p* value	*df*
	Case		Control					
	N	%	N	%	N	%		
Yes	19	30.2	0	0	19	15.1	0.001	1
No	44	69.8	63	100	107	84.9		
Total	63	100	63	100	126	100		

The study identified that 19 (30.2%) of the case group participants had kidney disease and not any of the control participants had kidney disease. 44 (69.8%) case group participants and all 63 (100%) of the control participants did not have kidney disease. The difference was statistically highly significant ($\chi^2 = 22.374$, $df = 1$, $p = 0.001$) (Table no.16).

Table No. 17. Frequency distribution of the participants by comorbidity factors

Comorbidity Factors	Frequency	Percent
Diabetes	Yes	90
	No	36
	Total	126
Hypertension	Yes	88
	No	38
	Total	126
Kidney Disease	Yes	19
	No	107
	Total	126

Out of the 126 participants included in the study, 90 (71.4%) participants had diabetes, while 36 (28.6%) participants did not. 88 (69.8%) participants had hypertension, and 38 (30.2%) participants were not hypertensive, 19 (15.1%) participants had kidney disease, whereas 107 (84.9%) participants did not report any kidney-related condition (Table no.17).

Table No. 18. Frequency distribution of the participants by any neurological disorder

Any Neurological Disorder	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Stroke	6	9.5	1	1.6	7	5.6
GBS	1	1.6	0	0	1	0.8
Parkinson	1	1.6	1	1.6	2	1.6
Others	55	87.3	61	96.8	116	92.1
Total	63	100	63	100	126	100

Among the total 126 participants, various neurological disorders were reported, among which stroke was reported by 6 (9.5%) participants of the case group and 1 (1.6%) participants of the control group. Guillain-Barre Syndrome (GBS) was reported by 1 (1.6%) participants of the case group and none of the control group. Parkinson's disease was reported by 1 (1.6%) participants of both case and control groups. The remaining 116 (92.1%) of the participants did not have any known neurological disorders. There was no statistical difference regarding the neurological disorders between the cases and the controls ($\chi^2 = 4.882$, $p = 0.09$, $df = 3$) (Table no.18).

Table No. 19. Frequency distribution of the participants by lower abdominal surgery

Lower Abdominal Surgery	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Yes	29	46	26	41.3	55	43.7
No	34	54	37	58.7	71	56.3
Total	63	100	63	100	126	100

Among the participants, 46% (29) in case group and 41.3% (26) in control group had history of lower abdominal surgery. 54% (34) in case group and 58.7% (37) in control group had no history of lower abdominal surgery. The two groups were not different statistically ($\chi^2 = 0.29$, $p = 0.295$, $df = 1$) (Table no.19).

Table No. 20. Frequency distribution of the participants by exercise

Exercise	Frequency				Total		*p* value	*df*	Odds Ratio
	Case		Control						
	N	%	N	%	N	%			
Yes	17	27	41	65.1	58	46	0.001	1	0.198
No	46	73	22	34.9	68	54			
Total	63	100	63	100	126	100			

The study showed that 17 (27%) participants in the case group reported doing exercise, while 46 (73%) did not. In contrast, 41 (65.1%) participants in the control group did exercise, and 22 (34.9%) did not. This difference was highly statistically significant (χ^2 = 18.402, *df* = 1, *p* = 0.001), with an odds ratio of 0.198, indicating that those who exercised were significantly less likely to be in the urinary incontinence (Table no. 20).

Table No. 21. Frequency distribution of the participants by RUIS Scale Interpretation

RUIS Scale Interpretation	Frequency				Total		*p* value	*df*
	Case		Control					
	N	%	N	%	N	%		
No Urinary Incontinence	0	0	63	100	63	50	0.001	3
Mild Urinary Incontinence	42	66.7	0	0	42	33.3		
Moderate Urinary Incontinence	18	28.6	0	0	18	14.3		
Severe Urinary Incontinence	3	4.8	0	0	3	2.4		
Total	63	100	63	100	126	100		

Severity of urinary incontinence was measured in the study with the Revised Urinary Incontinence Scale (RUIS). Within the case group, 42 (66.7%) reported mild urinary incontinence, 18 (28.6%) reported moderate urinary incontinence, and 3 (4.8%) reported severe urinary incontinence. Compared to that, all 63 (100%) control group participants had no urinary incontinence. There was a very statistically significant difference in the severity of urinary incontinence between the case and control groups ($\chi^2 = 126$, $df = 3$, $p = 0.001$), and all types of urinary incontinence were present only in the case group (Table no. 21). Internal consistency of Revised Urinary Incontinence Scale (RUIS) used in the present study was found to be strong with Cronbach's Alpha 0.886, indicating good reliability. According to reliability standards:

- ≥ 0.9 = Excellent
- 0.8 - 0.9 = Good
- 0.7 - 0.8 = Acceptable
- 0.6 - 0.7 = Questionable
- < 0.6 = Poor

Table No. 22. Frequency distribution of the participants by ICIQ-UI SF Scale Interpretation

ICIQ-UI SF Scale Interpretation	Frequency				Total		*p* value	*df*
	Case		Control					
	N	%	N	%	N	%		
No Urinary Incontinence	0	0	63	100	63	50	0.001	4
Mild Urinary Incontinence	6	9.5	0	0	6	4.8		
Moderate Urinary Incontinence	37	58.7	0	0	37	29.4		
Severe Urinary Incontinence	17	27.0	0	0	17	13.5		
Very Severe Urinary Incontinenc	3	4.8	0	0	3	2.4		
Total	63	100	63	100	126	100		

Severity of urinary incontinence was also measured using the International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form (ICIQ-UI SF). The respondents were classified into five levels of severity: No urinary incontinence, Mild, Moderate, Severe, and Very Severe. Of the case group, 6 (9.5%) respondents had mild urinary incontinence, 37 (58.7%) respondents had moderate, 17 (27.0%) respondents had severe and 3 (4.8%) respondents had very severe urinary incontinence. 63 (100%) of the control group had no urinary incontinence.

There was an extremely statistically significant difference between control and case groups based on ICIQ-UI SF scores (chi-square value $\chi^2 = 126$, $df = 4$, $p = 0.001$), indicating that the severity of urinary incontinence was significantly higher in the case group. Cronbach's Alpha was applied for reliability estimation of the ICIQ-UI SF questionnaire, and it was 0.926, indicating excellent internal consistency of the scale (Table no. 22).

Table No. 23. Frequency distribution of the participants by leaks before reaching toilet.

Leaks before reaching toilet	**Frequency**				**Total**		***p* value**	***df***
	Case		**Control**					
	N	%	N	%	N	%		
Yes	53	84.1	0	0	53	42.1	0.001	1
No	10	15.9	63	100	73	57.9		
Total	63	100	63	100	126	100		

The findings showed that 53 (84.1%) of the case group participants complained of leakage of urine before they could make it to the toilet, while none (0%) of the control group participants complained about leakage. 10 (15.9%) of the case group participants had no complaint in this regard compared to all 63 (100%) in the control group. The difference was statistically highly significant ($\chi^2 = 91.479$, $p = 0.001$, $df = 1$). This symptom is predominantly encountered in urge urinary incontinence, where there is a sudden and intense urge to urinate that results in leakage before reaching the toilet (Table no. 23).

Table No. 24. Frequency distribution of the participants by leaks when coughing or sneezing

Leaks when coughing or sneezing	Frequency				Total		*p* value	*df*
	Case		Control					
	N	%	N	%	N	%		
Yes	34	54	0	0	34	27	0.001	1
No	29	46	63	100	92	73		
Total	63	100	63	100	126	100		

34 (54%) of the case group participants had complained of leakage while coughing or sneezing, while none (0%) of the control group had this symptom. On the other hand, 29 (46%) of case group participants and all 63 (100%) control group participants did not experience this type of leakage. This was highly statistically significant (χ^2 = 46.565, p = 0.001, df = 1). This symptom is classically described in Stress Urinary Incontinence (SUI), which occurs on physical stress like coughing, sneezing, or lifting (Table no. 24).

Table No. 25. Frequency distribution of the participants by leaks during sleep

Leaks during sleep	Frequency				Total		*p* value	*df*
	Case		Control					
	N	%	N	%	N	%		
Yes	6	9.5	0	0	6	4.8	0.006	1
No	57	90.5	63	100	120	95.2		
Total	63	100	63	100	126	100		

The results indicated that 6 (9.5%) of the case group participants showed experiencing leakage of urine at night, whereas none (0%) of the control group did. On the contrary, 57 (90.5%) of the case group participants and all 63 (100%) control group participants did not experience this symptom. The difference was statistically significant ($\chi^2 = 6.3$, $p = 0.006$, $df = 1$). This symptom is most commonly associated with nocturnal enuresis (Table no. 25).

Table No. 26. Frequency distribution of the participants by leaks during physical activity or exercise

Leaks during physical activity or exercise	Frequency				Total		*p* value	*df*
	Case		Control					
	N	%	N	%	N	%		
Yes	20	31.7	0	0	20	15.9	0.001	1
No	43	68.3	63	100	106	84.1		
Total	63	100	63	100	126	100		

The study found that 20 (31.7%) of the members of the case group had urine leakage on effort or exercise, while none (0%) belonged to the control group. 43 (68.3%) in the case and all 63 (100%) in the control group experienced no such leakage. This was statistically significantly higher ($\chi^2 = 23.774$, $p = 0.001$, $df = 1$). This is most commonly observed in Stress Urinary Incontinence (SUI) due to increased abdominal pressure from exercises like running, lifting, or exercise (Table no. 26).

Table No. 27. Frequency distribution of the participants by leaks when finished urinating and dressing

Leaks when finished urinating and dressing	Frequency				Total		*p* value	*df*
	Case		Control					
	N	%	N	%	N	%		
Yes	19	30.2	0	0	19	15.1	0.001	1
No	44	69.8	63	100	107	84.9		
Total	63	100	63	100	126	100		

About 19 (30.2%) of the case group participants had urine leakage upon finishing urinating and dressing, whereas none (0%) of the control group participants had this symptom, whereas 44 (69.8%) of the case group participants and all 63 (100%) of the control group participants didn't have this symptom. This difference was statistically significantly high ($\chi^2 = 22.374$, $p = 0.001$, $df = 1$). This type of leakage can frequently be observed in Mixed Urinary Incontinence (Table no. 27).

Table No. 28. Frequency distribution of the participants by leaks without obvious reason

Leaks without obvious reason	Frequency				Total		*p* value	*df*
	Case		Control					
	N	%	N	%	N	%		
Yes	20	31.7	0	0	20	15.9	0.001	1
No	43	68.3	63	100	107	84.1		
Total	63	100	63	100	126	100		

It was noted in the study that 20 (31.7%) of the case group respondents reported leakage of urine without any noticeable reason, while none (0%) of the control group respondents reported this symptom. Compared to this, 43 (68.3%) of the case group and all 63 (100%) of the control group respondents did not have such leakage. This difference was statistically highly significant ($\chi^2 = 23.774$, $p = 0.001$, $df = 1$). Such leakage can be associated with urge urinary incontinence or mixed urinary incontinence (Table no. 28).

Table No. 29. Frequency distribution of the participants by leaks all the time

Leaks all the time	Frequency				Total		*p* value	*df*
	Case		Control					
	N	%	N	%	N	%		
Yes	3	4.8	0	0	3	2.4	0.04	1
No	60	35.2	63	100	126	97.6		
Total	63	100	63	100	126	100		

Through the study, it was found that 3 (4.8%) case group respondents had leaking urine all the time and none (0%) control group respondents had the same. On the other hand, 60 (95.2%) case group participants and all 63 (100%) control participants did not experience constant leakage. This difference was statistically significant ($\chi^2 = 3.073$, $p = 0.04$, $df = 1$). It is generally reported that neurological disorders, fistulas, or bladder dysfunction (Table no. 29).

Table No. 30. Case group participants into symptom type of incontinence

Symptom Type	Number of Participants	Percent (%)
Leaks before reaching toilet	53	84.1
Leaks when coughing or sneezing	34	54
Leaks during sleep	8	12.7
Leaks during physical activity	20	31.7
Leaks after urinating	19	30.2
Leaks without reason	20	31.7
Leaks all the time	3	4.8

Among the 63 case group participants, different types of urinary incontinence symptoms were reported. Leakage before reaching the toilet was the most common symptom, reported by 53 participants (84.1%). Leakage when coughing or sneezing was reported by 34 participants (54.0%), indicating stress urinary incontinence. Leakage during physical activity occurred in 20 participants (31.7%). Leakage during sleep was reported by 8 participants (12.7%). Additionally, leakage after urinating was noted by 19 participants (30.2%), and leakage without any obvious reason was reported by 20 participants (31.7%). Continuous leakage all the time was the least common symptom, reported by 3 participants (4.8%) (Table No. 30).

Table no. 31: Association between RUIS Scale and has UI, exercise, smoker, family types and comorbidity factors

Variable		RUIS Scale Interpretation				Total	*p* value	*df*
		No	Mild	Moderate	Severe			
Has UI	Yes	41(32.5%)	13(10.3%)	4(3.2%)	0	58(46%)	0.0001	3
	No	22(17.5%)	29(23%)	14(11.1%)	3(2.4%	68(54%)		
	Total	63(50%)	42(33.3)	18(14.3%)	3(2.4%)	126(100%)		
Exercise	Yes	41(32.5%)	13(10.3)	4(3.2%)	0	58(46%)	0.0001	4
	No	22(17.5%)	29(23%)	14(11.1%)	3(2.4%)	68(54%)		
	Total	63(50%)	42(14.3%)	18(14.3)	3(2.4%)	126(100%)		
Smoker	Yes	16(12.7)	9(7.1)	4(3.2%)	0	23(23%)	0.381	3
	No	47(37.3%)	33(26.2%)	14(11.1%)	3(2.4)	97(77%)		
	Total	63(50%)	42(14.3%)	18(14.3)	3(2.4%)	126(100%)		

Family types	Nuclear	34(27%)	17(13.5%)	7(5.6%)	0	58(46%)	0.084	3
	Extended	29(23%)	25(19.8%)	11(8.7%)	3(2.4%)	68(54%)		
	Total	63(50%)	42(33.3%)	18(14.3%)	3(2.4%)	126(100%)		
Diabetes	Yes	35(27.8%)	35(27.8%)	17(13.5%)	3(2.4)	90(71.4%)	0.0005	3
	No	28(22.2%)	7(5.6%)	1(0.8%)	0	36(28.6%)		
	Total	63(50%)	42(33.3%)	18(14.3%)	3(2.4%)	126(100%)		
Hypertension	Yes	36(28.6%)	32(25.4%)	18(14.3%)	2(1.6%)	88(69.8)	0.002	3
	No	27(21.4%)	10(7.9%)	0	1(0.8%)	38(30.2)		
	Total	63(50%)	42(33.3%)	18(14.3%)	3(2.4%)	126(100%)		
Kidney Disease	Yes	0	10(7.9%)	6(4.8%)	3(2.4%)	19(15.1%)	0.0001	3
	No	63	32(25.4%)	12(9.5%)	0	107(84.9%)		

	Total	63(50%)	42(33.3%)	18(14.3%)	3(2.4%)	126 (100%)		

Among 126 participants, 50% reported no urinary incontinence, 33.3% had mild, 14.3% moderate, and 2.4% severe. Significant associations with higher RUIS severity were found for exercise ($p = 0.0001$), diabetes ($p = 0.0005$), hypertension ($p = 0.002$), kidney disease ($p = 0.0001$), and presence of UI ($p = 0.0001$). No significant relationship was observed with smoking ($p = 0.381$) or family type ($p= 0.084$) (Table No. 31).

Table no. 32: Association between ICIQ-UI SF Scale and has UI, exercise, smoker, family types and comorbidity factors

Variable		ICIQ-UI SF Scale Interpretation					Total	*P* value	df
		No	Mild	Moderate	Severe	Very Sever			
Has UI	Yes	0	6(4.8%)	37(29.4%)	17(13.5%)	3(2.4%)	63(50%)	0.0001	4
	No	63(50%)	0	0	0	0	63(50%)		
	Total	63(50%)	6(4.8%)	37(29.4)	17(13.5%)	3(2.4%)	126(100%)		
Exercise	Yes	41(32.5%)	3(2.4%)	11(8.7%)	3(2.4%)	0	58(46%)	0.0001	4
	No	22(17.5)	3(2.4%)	26(20.6%)	14(11.1%)	3(2.4%)	68(54%)		
	Total	63(50%)	6(4.8%)	37(29.4)	17(13.5%)	3(2.4%)	126(100%)		
Smoker	Yes	16(12.7%)	0	8(6.3%)	5(4%)	0	29(23%)	0.252	4
	No	47(37.3%)	6(4.8%)	29(23%)	12(9.5%)	3(2.4%)	97(77%)		
	Total	63(50%)	6(4.8%)	37(29.4)	17(13.5%)	3(2.4%)	126(100%)		
Family types	Nuclear	34(27%)	2(1.6%)	18(14.3%)	4(3.2%)	0	58(46%)	0.044	4
	Extended	29(23%)	4(3.2%)	19(15.1%)	13(10.3%)	3(2.4%)	68(54%)		
	Total	63(50%)	6(4.8%)	37(29.4)	17(13.5%)	3(2.4%)	126(100%)		
Diabetes	Yes	35(27.8%)	6(4.8%)	31(24.6%)	15(11.9%)	3(2.4%)	90(71.4%)	0.001	4

	No	28(22.2%)	0	6(4.8%)	2(1.6%)	0	36(28.6%)		
	Total	63(50%)	6(4.8%)	37(29.4)	17(13.5%)	3(2.4%)	126(100%)		
Hypertension	Yes	36(28.6%)	4(3.2%)	29(23%)	17(13.5%)	2(1.6%)	88(69.8%)	0.0045	4
	No	27(21.4%)	2(1.6%)	8(6.3%)	0	1(0.8%)	38(30.2%)		
	Total	63(50%)	6(4.8%)	37(29.4)	17(13.5%)	3(2.4%)	126(100%)		
Kidney Disease	Yes	0	1(0.8%)	10(7.9%)	5(4%)	3(2.4%)	19(15.1%)	0.0001	4
	No	63(50%)	5	27(21.4%)	12(9.5%)	0	107(84.9%)		
	Total	63(50%)	6(4.8%)	37(29.4)	17(13.5%)	3(2.4%)	126(100%)		

Among 126 participants, 50% had no urinary incontinence, while 4.8% reported mild, 29.4% moderate, 13.5% severe, and 2.4% very severe incontinence. Significant associations with ICIQ-UI SF severity were observed for the presence of UI (p = 0.0001), exercise (p =0.0001), family type (p = 0.044), diabetes (p = 0.001), hypertension (p = 0.0045), and kidney disease (p = 0.0001). Smoking was not significantly associated (p = 0.252) (Table No. 32).

Presence of urinary incontinence:

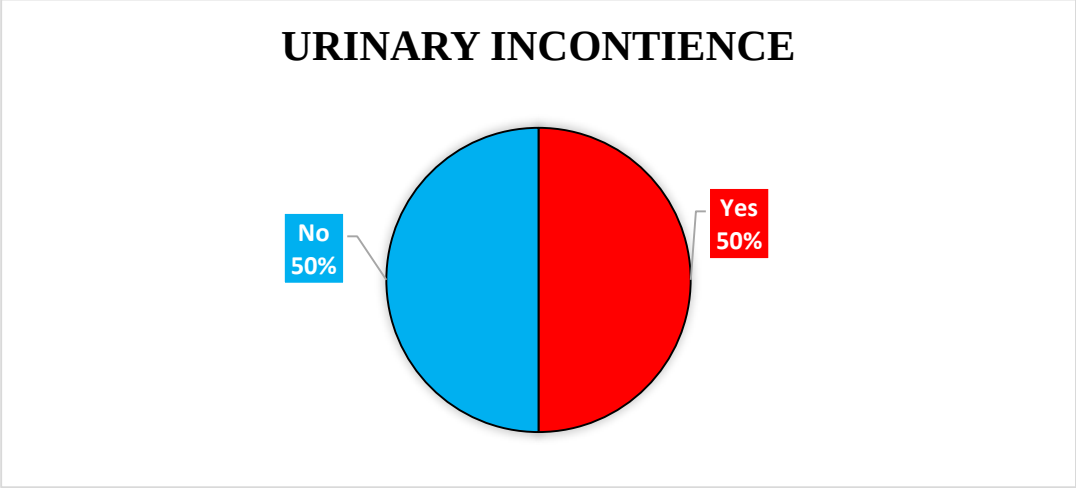

Figure no. 1: Has Urinary Incontinence

So, a random half of those who experienced urinary incontinence were classified as case group, and an equivalent half who did not experience urinary incontinence were included in the control group (Figure no. 1).

Total Participants by Smoker:

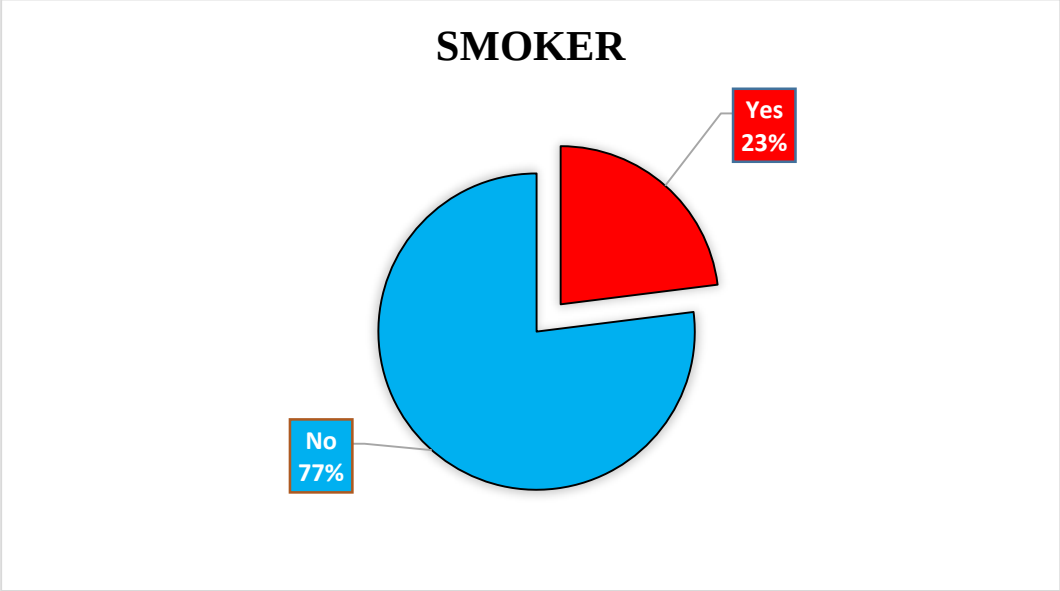

Figure no. 2: Total Participants by Smoker

The graph shows that the majority (77%) of the study population were non-smokers and 23% were smokers (Figure no. 2).

Participants by Comorbidity Factors:

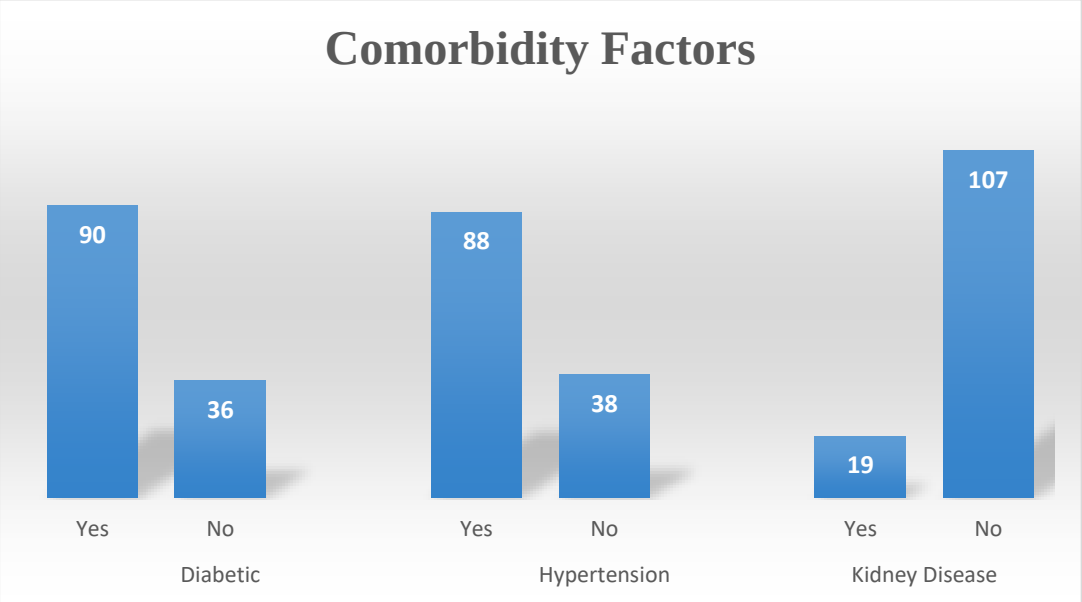

Figure no. 3: Participants by Comorbidity Factors.

The bar chart presents the distribution of comorbid conditions in the study population. About 71.4% participants had diabetes, while 28.6% participants did not. 69.8% participants had hypertension, and 30.2% participants were not hypertensive, 15.1% participants had kidney disease, whereas 84.9% participants did not report any kidney-related condition. The findings indicate that diabetes and hypertension were highly prevalent among the participants, whereas kidney disease was comparatively less common (Figure no. 3).

Participants by Neurological Disorder:

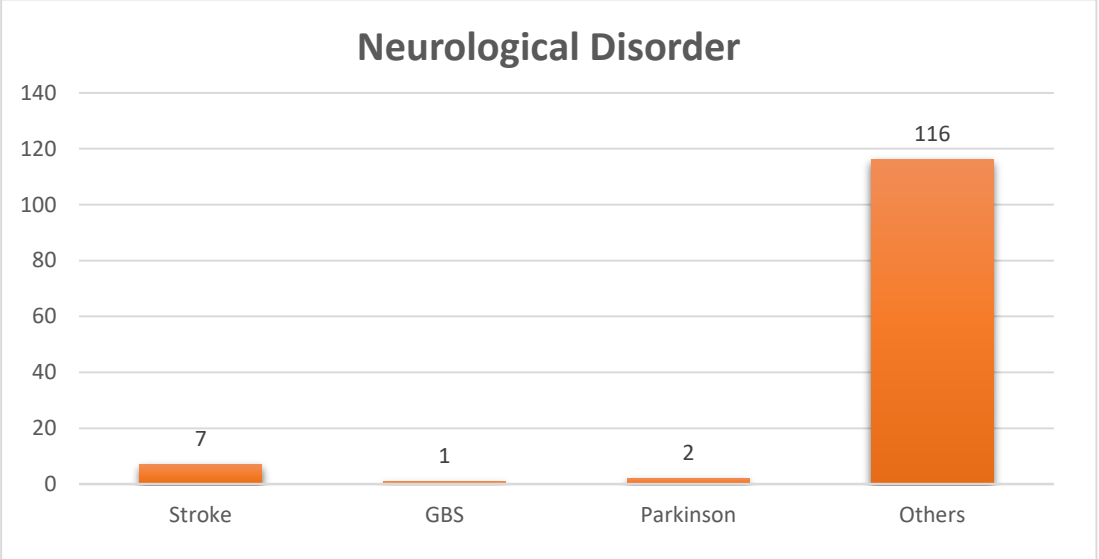

Figure no. 4: Participants by Neurological Disorder.

The chart shows that most patients (116) had neurological disorders classified as others, while stroke (7), Parkinson's disease (2), and GBS (1) were less common. This indicates that a wide range of other neurological conditions were more prevalent compared to the specific disorders listed (Figure no. 4).

Participants by Lower Abdominal Surgery:

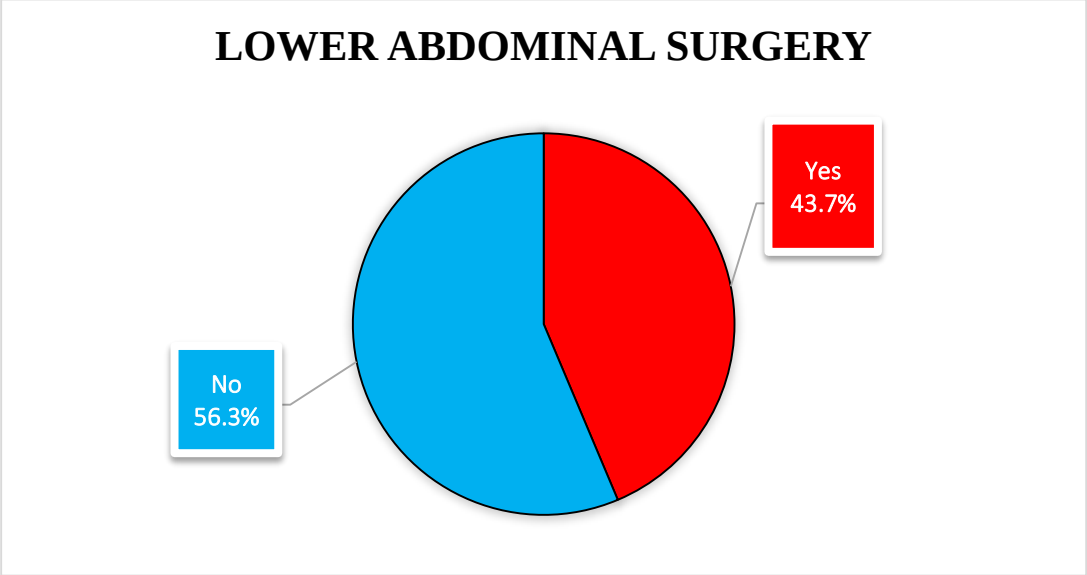

Figure no. 5: Participants by Lower Abdominal Surgery

The pie chart shows the results of a survey on lower abdominal surgery. About 56.3% of the participants responded "No," meaning they haven't undergone this surgery. Conversely, 43.7% of the participants responded "Yes," meaning they have undergone a lower abdominal surgery (Figure no. 5).

Symptom types:

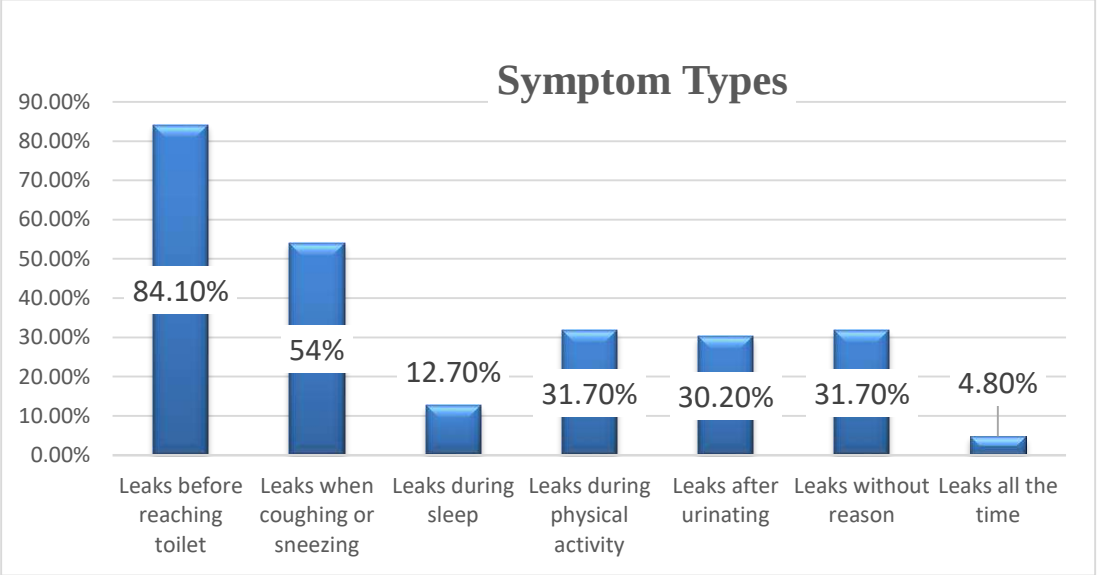

Figure no. 6: Symptom Type

The bar chart presents the distribution number of participants among the 63 case group participants, different types of urinary incontinence symptoms were reported. Leakage before reaching the toilet was the most common symptom, reported by 53 participants. Leakage when coughing or sneezing was reported by 34 participants, indicating stress urinary incontinence. Leakage during physical activity occurred in 20 participants. Leakage during sleep was reported by 8 participants. Additionally, leakage after urinating was noted by 19 participants, and leakage without any obvious reason was reported by 20 participants. Continuous leakage all the time was the least common symptom, reported by 3 participants (Figure no. 6).

RUIS Scale Interpretation:

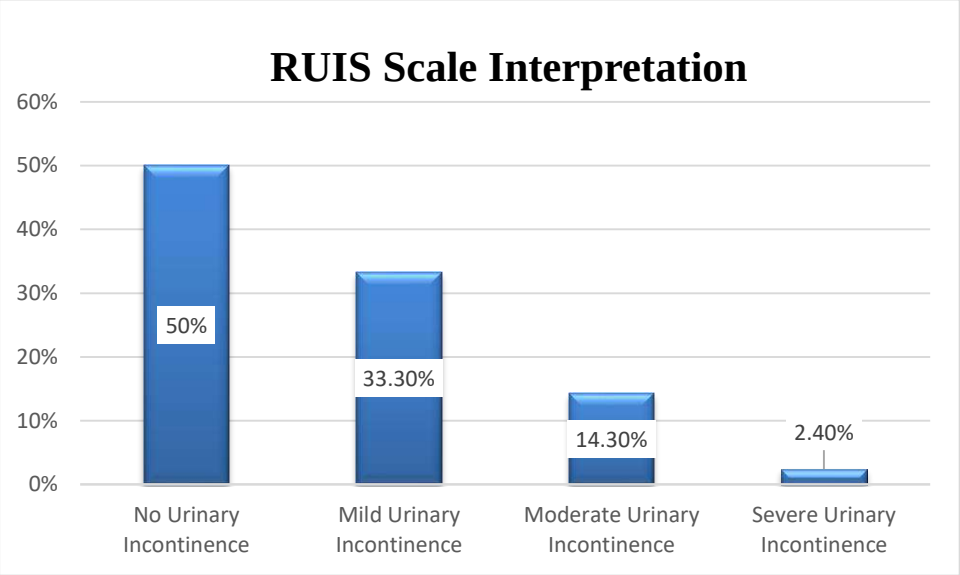

Figure no. 7: RUIS Scale Interpretation

The bar graph reveal that severity of urinary incontinence was assessed on the Revised Urinary Incontinence Scale (RUIS); no urinary incontinence (50%), mild (33.3%), moderate in 14.3%, and severe urinary incontinence in 2.4%, demonstrate most of the participants experienced mild urinary incontinence (Figure no. 7).

ICIQ-UI SF Scale Interpretation:

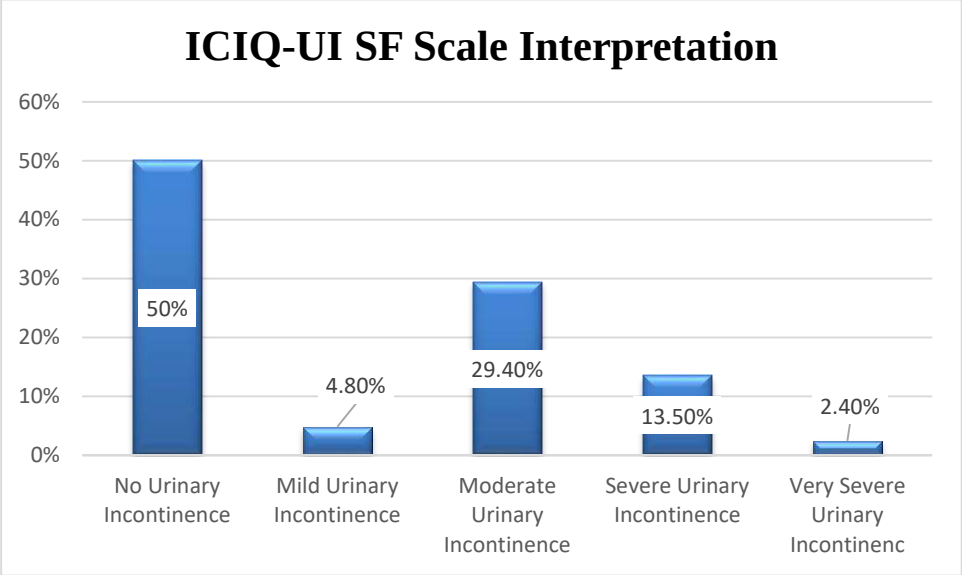

Figure no. 8: ICIQ-UI SF Scale Interpretation

The bar chart show that half of the participants reported no urinary incontinence. Moderate incontinence was most common (29.4%), followed by severe (13.5%), mild (4.8%), and very severe incontinence (2.4%) (Figure no. 8).

CHAPTER- V DISCUSSION AND LIMITATION

5.1 Discussion:

The study was a case control study carried out with the aim of the study is to identify the risk factors of urinary incontinence in elderly. Data was collected by the researcher from the participants via face to face interview using questionnaire. In terms of participants, it was found that 63 participants were both case and control group.

The distribution of the age of the respondents to the study was relatively even, with participants in the different age groups not reflecting any extreme skew in either the Case or Control groups. Percentage of height in cases 50.8% of the participants were in the age group of 60 - 64 years, where second 23.8% participants were in the age group of 70- 74 years. In control group, 66.7%% of the subjects were in the age group 60 - 64 years, wherein second 19% of the subjects were in the age group 65 - 69 years. The age distribution was near to statistically significant between groups ($\chi^2 = 8.97$, $df = 5$, $p = 0.055$) (Table no.1). In a Dutch study (Lind et al. 2017, pp. 1519-1528), advancing age was among the most significant contributors to urinary incontinence, whereas in another study (Souza et al. 2016, p. 1) conducted in Brazil, ageing was linked to urinary incontinence; however, in older Iranian women, no connection was found between urinary incontinence and age (Moudi et al. 2017, pp. 14-19).

In additional analysis they found that UI significantly with increasing age ($p = 0.01$) (AlQuaiz et al. 2023, p. 8). As for the gender of the subjects, it was found that in the case group, 50.8% subjects were male, 42.9% subjects were female and 6.3% subjects were third gender. Similarly, in the control group, 47.6% subjects were male, 50.8% subjects were female and 1.6% subjects were third gender (Table no. 2). Tsui et al. (2018, pp. 118-125) in Brazil, aging was linked with urinary incontinence; however, in postmenopausal Iranian women, no correlation between age and urinary incontinence was present.

Educational level of the participants in case group, 15.9% of the participants were illiterate. Contrarily in control group about 9.5% participants was illiterate. About 19% participants had completed primary education in case and control group, 15.9%

participants had completed JSC in case and 14.3% in control group, 12.7% participants had completed SSC in case and 9.5% in control group, 11.1% participants had completed HSC in case and 14.3% in control group, 11.1% participants had completed Graduation in case and 15.9% in control group, 14.3% participants had completed Post graduation in case and 17.5% in control group (Table no. 4). Education level was a determining aspect of UI (Biswas et al. 2017, p. 130). In Marques et al. (2015, pp. 595-606) study in Brazil, education level was established as a determining factor in reducing the incidence of urinary incontinence. There was no urinary incontinence observed across education levels (Park et al. 2018, p. 99).

About monthly income in case group, 14.3% of the participants mentioned earning less than 5,000 BDT, 57.1% mentioned earning 5,001-15,000 BDT, and 28.6% mentioned more than 15,000 BDT. (Table no. 6). Regarding the marital status of the participants, 82.5% of the participants were married, 6.3% of the participants were unmarried, 11.1% of the participants were widowed in the case group. Conversely in control group around 92.1% participants were married, 1.6% participants were unmarried, 6.3% participants were widowed (Table no.3). Widowed or divorced status can increase the risk of urinary incontinence, which can be because of the fact that women in these groups are generally older. (AlQuaiz et al. 2023, pp. 1-17).

Regarding the family types of the subjects, it was found that in the case group, (38.1%) subjects had nuclear families, while 61.9% had extended families. In the control group, 54% subjects had nuclear families, while 46% had extended families. This distributional difference was statistically significant ($\chi^2 = 3.195$, $df = 1$, $p = 0.037$) with an odds ratio of 0.525, indicating that older individuals living in nuclear families were less likely to suffer from urinary incontinence compared to those living in extended families (Table 5). Akin et al. (2015, p.5) found that urinary incontinence is a problem that should be tackled in consideration of family environments and social welfare.

It was seen that 46.0% participants were of normal weight (BMI 18.5 - 24.9) in the case group; 38.1% participants were of normal weight (BMI 18.5 - 24.9) in the control group. In the case group 3.2% were underweight (BMI 16-18.4), 44.4% were overweight (BMI 25-29.9), 3.2% were moderately obese (BMI 30-34.9), and 3.2% were severely obese (BMI 35-39.9). Within the control group, 1.6% were severely underweight (BMI below

16), 1.6% underweight (BMI 16-18.4), 49.2% overweight (BMI 25-29.9), 6.3% moderately obese (BMI 30-34.9), and 3.2% severely obese (BMI 35-39.9) (Table no.7). Several studies have found an association between obesity and increased urinary incontinence. There was a significant association between weight gain and increased prevalence of urinary incontinence in a study in Japan by Ninomia et al. (2018, pp. 308-314) and in a study in the United States (Hong et al. 2018, p. 502). Half of the participants who had urinary incontinence were placed in the case group, and the other half who did not have urinary incontinence in the control group (Table no.8).

Urinary incontinence in the elderly was generally chronic (mean 35 months) with variable urine retention capacity (mean 54 minutes), indicating heterogeneous severity and the need for individualized management (Table no.9). The test detected a highly significant difference in the treatment received by the case and control groups (χ^2 = 110.955, *df* = 1, *p* = 0.001), 93.7% of the case group participants reported receiving treatment, while only 6.3% in the case group received no treatment at all (Table no. 10). A patient's physical, psychological, and social well-being alter significantly in different ways as UI progresses develop to severe (Zhang et al. 2022, pp. 1-13).

Between the case and control groups, there was a highly significant difference in the types of treatment received (χ^2 = 118.246, *p* = 0.001). Of the case group, the majority were treated with medication 63.5%, followed by physiotherapy 27%, surgery 6.3%, and other types of treatment 3.2%. On the other hand, all the controls did report receiving other treatments. These findings suggest that individuals with urinary incontinence are more likely to have received medical or rehabilitative treatment specifically, whereas controls are more likely to rely on general or non-specific treatment (Table no. 11). 23.8% of the participants in the case group made use of absorbent products in the study, whereas none in the control group reported their usage. This deviation was highly significant (χ^2 = 17.027, *df* = 1, *p* = 0.001) (Table no. 12). Ummul (2019, p. 26) discloses that about 95% women do not use any protection, 1.7% use pads only if have cold or going out, 3.3% use big pads.

Among the case group, 20.6% of the subjects were smokers and 79.4% were non-smokers. Among the control group, 25.4% of the subjects were smokers and 74.6% were non-smokers (Table no.13). Aly et al. (2020, p. 6) finding that the relationship

between smoking and UI is unclear. Heavy current or former smokers have been reported to have an increased risk of UI. Among 22 smokers included in their study, 19 had UI.

Diabetes was considerably more common in the case group (87.3%) than in the control group (55.6%), and diabetic elders were 5.5 times more likely to have urinary incontinence (p = 0.001) (Table no.14). Hypertension was also higher in the case group (82.5%) than in controls (57.1%), and the risk of urinary incontinence was about 3.5 times greater (p = 0.001) (Table no.15). Islam et al. (2018, pp. 558-564) showed that diabetes was associated with mixed UI (P < 0.0001). Kidney disease was present in 30.2% of cases but none in controls (p = 0.001) (Table no.16). Certain diseases are related to kidney functions. As a result, urge urinary incontinence would happen (Irwin et al. 2016, p. 1306-1315). These results recognize diabetes, hypertension, and kidney disease as very significant risk factors for urinary incontinence among the elderly group (Table no.17).

Neurological disorder was observed in both groups in 126 subjects but showed no significant difference ($\chi^2 = 4.882$, $p = 0.09$, $df = 3$). Stroke occurred in 9.5% of cases and 1.6% of controls, Guillain-Barre Syndrome in 1.6% of cases alone, and Parkinson's disease in 1.6% of both groups. Most of the subjects (92.1%) did not have any neurological diseases (Table no.18). Shaw and Wagg (2017, pp.23-27) have established that UI is prevalent in neurological disorders like stroke, dementia, and Parkinson's disease.

Lower abdominal surgery was observed in 46% of the case group and 41.3% of the control group. The difference was not significant (p = 0.295) (Table no.19 and Figure no. 5). Santos et al. (2019, p. 103) finding that the number of pregnancies, deliveries, previous gynaecological surgery and abdominal surgery are known to be common risk factors for UI.

The case group had 27% practicing exercise, while the control group had 65.1%. The difference was highly significant (p = 0.001) with an odds ratio of 0.198, which means that individuals who practiced exercise were much less likely to have urinary incontinence (Table no. 20). Peinado-Molina et al. (2023, p. 53) ascertained that a total

of around 1446 women were analyzed, 55.8% (807) of whom had UI and 25.7% (371) low physical activity. Mixed incontinence (OR: 1.53; 95% CI: 1.09-2.15) overall and increased severity of urinary symptoms (OR: 1.014; 95% CI: 1.01-1.02) among the incontinent women were statistically associated with more frequent low physical activity.

RUIS analysis indicated that all types of urinary incontinence were present only in the case group, with 66.7% mild, 28.6% moderate, and 4.8% severe incontinence. There was no incontinence in all control subjects. The difference was highly significant (p = 0.001). The RUIS instrument was found to have good reliability with a Cronbach's Alpha of 0.886 (Table no. 21). Sansoni et al. (2012, p. 370) reported that the RUIS had adequate internal consistency reliability ($r > 0.70$) whereas all the other tools would be considered to have marginal or poor reliability. However, it is critical that tools have adequate reliability in clinical practice if they are to be used for assessment and outcomes measurement.

The severity of urinary incontinence (UI) was assessed using the ICIQ-UI Short Form questionnaire. It has three main questions about the frequency of UI, amount of urine leakage, and overall effect. Scores from 0 to 21 are used, and severity is graded as: 0 = no leakage, 1-5 = slight leakage, 6-12 = moderate leakage, 13-15 = severe leakage, 16-18 = very severe leakage, and 19-21 = extremely severe leakage. Also further items at the conclusion of the questionnaire for the participants to report single episodes of incontinence. The respondents were asked to bear in mind the experiences of the last four weeks when completing the form. The Arabic version of the ICIQ-UI Short Form is a straightforward questionnaire that has been found to possess excellent reliability and internal consistency (OR = 0.97; 95% CI, 0.88-0.98). (Al-Shaikh et al. 2023, pp. 34-38). On the ICIQ-UI SF, all types of urinary incontinence were seen only in the case group- 9.5% mild, 58.7% moderate, 27% severe, and 4.8% very severe. All the controls had no incontinence. The difference was highly significant ($p < 0.001$). The ICIQ-UI SF was shown to be excellent in reliability with a Cronbach's Alpha of 0.926 (Table no. 22).

Leakage of urine while going to the toilet was seen in 84.1% of the case group and none in the control group. The difference was highly significant ($p = 0.001$) with an odds

ratio of 6.471, indicating a strong association with urinary incontinence. This symptom is generally associated with urge urinary incontinence (Table no. 23). Morse et al. (2020, p. 7) explained that mobility problems, such as being unable to get to the bathroom on time before urine leaks, can be the cause UI happens high prevalence. Urine does leak first before they can even get to the toilet, 50% of the individuals with UI report.

Urinary leaks on sneezing or coughing occurred in 54% of the case group and none in the control group. The difference was highly significant (p = 0.001). This symptom is characteristically related to Stress Urinary Incontinence (SUI) (Table no. 24). 80 chronic cough female patients were included in the study, out of whom 55% (95% CI = 40-70%) were found to have stress urinary incontinence (Ghaly et al. 2025, p.15). 9.5% of the case group and none in the control group mentioned leakage during sleep. The difference was significant (p = 0.006). The symptom is typically associated with nocturnal enuresis (Table no. 25). Ng, Chueh, and Chang (2025, p.235) quoted 203 refractory overactive bladder syndrome-wet (OAB-wet) patients (average age 64.45) who participated in study, 89 (46.4%) women reported NE. The most common LUTS symptoms reported by the patient were urinary incontinence (33.5%) and daytime frequency (29.5%).

The leakage of urine on physical activity was noticed by 31.7% of the case group and none of the control group. This difference was highly significant (p = 0.001). The symptom is most commonly linked with Stress Urinary Incontinence (SUI). (Table no. 26). Physical inactivity can indirectly contribute indirectly to pelvic weakness and poor bladder control through poor mobility and disuse of muscles ((Bagiartana and Huriah, 2023, pp.58-63). Post-urination and dressing leakage was seen in 30.2% of the case group and none in the control group. This distinction was highly significant (p = 0.001). This symptom is often related to Mixed Urinary Incontinence (Table no. 27).

Unexplained urine leakage was present in 31.7% of the case group and none in the control group. The distinction was highly significant (p = 0.001). This symptom may be caused by urge or mixed urinary incontinence (Table no. 28). Additionally, results of an Indian community-based study also stated the prevalence of UI among older women was found to be 63.9%. The most prevalent type reported was urge

incontinence, which was seen in 38.3% of the participants, followed by mixed incontinence at 32.3%, and stress incontinence at 29.3% (Mainu et al. 2023, pp.15-20).

Reported constant leakage of urine in 4.8% of the cases, while in the control group, nobody reported this. The difference was significant (p = 0.04), with those reporting constant leakage being over seven times more likely to suffer from urinary incontinence. This symptom most often indicates neurological or bladder issues (Table 29). Neurogenic lower urinary tract dysfunction (NLUTD) is the definition of abnormal bladder function due to neurological disorders (Steltzner 2025, p.25).

Among the 63 cases, the most common symptom was leakage before reaching the toilet (84.1%). Stress urinary incontinence, as evidenced by leakage on coughing or sneezing, was felt by 54%. The remaining symptoms were leakage on physical activity (31.7%), leakage without apparent cause (31.7%), leakage after urinating (30.2%), leakage during sleeping (12.7%), and continuous leakage (4.8%). It disclose that Urge UI (34.9%), Stress UI (15.9%), Mixed UI (49.2%) (Table 30). The most prevalent type of UI was stress UI (51.0%), followed by mixed UI (32.7%) and urge UI (16.3%) (Biswas et al. 2017, p. 130).

5.2 Limitation of the study:

1. Convenience sampling technique was applied to select case and control groups from the population.
2. Some of the participants should lack of co-operation and did not answer some question.
3. It was first work of thesis. The student's knowledge of techniques and strategies in the research team was inadequate. Therefore, the thesis has several shortcomings.
4. By expanding the study to include a wider range of groups, larger sample sizes, and more thorough objectives, the validity and applicability of any follow-up findings will be enhanced.

CHAPTER- VI CONCLUSION AND RECOMMENDATION

6.1 Conclusion:

This case-control study was conducted to identify the risk factors associated with urinary incontinence (UI) among the elderly people. Urinary incontinence among the elderly in Bangladesh is significantly associated with various medical, lifestyle, and demographic risk factors. Participants with diabetes were 5.5 times more likely, those with hypertension 3.5 times more likely, and those with kidney disease more likely to suffer from urinary incontinence compared to those without these conditions. These results indicate a strong association between chronic health conditions with UI. Lifestyle-related variables also played a significant role. Family type was another important social factor, extended families were more likely to develop UI than nuclear families. Identified the percentence of types of UI such as Urge UI, Stress UI and Mixed UI. And also indicate severe or neurological types of incontinence. Severity levels, as measured by the RUIS and ICIQ-UI SF scales, indicated that mild to moderate levels of incontinence, with a few experiencing severe or very severe symptoms.

Addressing both medical and lifestyle contributors through awareness, intervention, and proper management can help improve the quality of life in this population.

6.2 Recommendations:

1. Implement Routine Screening Programs

Routine screening for urinary incontinence should be introduced for elderly individuals, especially those with chronic conditions like diabetes, hypertension, and kidney disease. Early detection will allow timely intervention and reduce complications.

2. Promote Physical Activity

Elderly individuals should be encouraged to engage in regular physical activity. Exercise, especially pelvic floor muscle training, can significantly reduce the risk and severity of urinary incontinence.

3. Raise Awareness

Educational programs and community-based campaigns should be conducted to raise awareness among elderly individuals and caregivers about UI symptoms, causes, prevention strategies, and available treatments.

4. Train Healthcare Providers

Physiotherapists, nurses, and general practitioners should receive adequate training to identify, assess, and manage UI using both medical and conservative approaches, including pelvic floor rehabilitation and behavioral therapy.

5. Develop Geriatric-Friendly Services

Health facilities should introduce geriatric-friendly services that address age-related problems such as UI. These services should include privacy, proper counseling, and easy access to physiotherapy.

6. Support Further Research

Additional studies with larger and more diverse populations should be carried out to validate the findings and explore other possible risk factors, including psychological and environmental components.

7. Policy-Level Action

Health policymakers should incorporate UI management strategies into national health programs targeting elderly care. Budget allocation and support for preventive strategies should be prioritized.

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APPENDIX: 01

Verbal Consent Form

Assalamuaalaikum/ Namashkar,

I am Arnab Charles Desai, a student of B.Sc. in Physiotherapy, SAIC College of Medical Science and Technology (SCMST), affiliated with Faculty of Medicine, University of Dhaka. For the partial fulfillment of my bachelor degree, I have to conduct a research project and it is a part of my study. My Research title is "Risk Factors Associated with Urinary Incontinence in Elderly People: A Case Control Study"

I do expect that the interview will take 20-30 minutes. I also offer you to ask any sort of questions when you fell it is necessary to get insight.

I would like to inform you that this is a purely academic study and will not be used for any other purposes. I assure you that all the data will be kept confidential. Your participation will be voluntary. You may have the rights to withdraw your consent and discontinue from the study at any point of time. You also have the right not to answer any other question that you don't like of this questionnaire.

If you have any query about the study, you may contact with me (01797271115) or my supervisor Shahid Afridi (01780006441), lecturer (Physiotherapy) of SCMST.

So, may I have your consent to proceed with the interview? Yes……., No……

Signature of the participant & Date…….

Signature of the researcher & Date……..

Signature of the witness & Date……..

Questionnaire (English)

Risk Factors Associated with Urinary Incontinence in Elderly People: A Case Control Study.

Date:…./…./…. Respondent ID:

Name of respondent :……

Address :……

Mobile number:…….

SECTION-A: Socio-demographic Information

Q:No.	Questions	Response	Code
1.	Age:	Years:…….	
2.	Gender:	1. Male 2. Female 3. Others	
3.	What kind of family do you live in?	1. Nuclear 2. Extended	
4.	What is your educational qualification?	1. PSC 2. JSC 3. SSC 4. HSC 5. Graduate 6. Post graduate 7. Illiterate	
5.	What is your marital status?	1. Married 2. Unmarried 3. Widowed 4. Divorced	

6.	How would you classify your monthly income?	1. Low-income 2. Middle-income 3. High-income	

SECTION-B Anthropometric Measurements

Q:No.	Questions	Response	Code
7.	Weight of the participant?	…….	
8.	Height of the participant?	…….	

SECTION-C: Urinary Incontinence Related Question

Q:No.	Questions	Response	Code
9.	Do you have urinary incontinence?	1. Yes 2. No	
10.	How long have you had this problem?	…… Month	
11.	Can you hold urine after having urge?	1. Yes 2. No	
12.	Did you take treatment before for this problem?	3. Yes 4. No	
13.	What type of treatment you have taken?	1. Medication 2. Physiotherapy 3. Surgery 4. Others…	
14.	Do you use any absorbent products (e.g., adult diapers, pads)	1. Yes 2. No	

SECTION-D: Health and Risk Indicator Related Questions

Q:No.	Questions	Response	Code
15.	Do you smoker?	1. Yes 2. No	
16.	Do you have any of these following co-morbidities	1. Diabetes 2. HTN 3. Kidney Disease	
17.	Do you have any of these following neurological conditions?	1. Stroke 2. GBS 3. Parkinson 4. Others	
18.	Did you have any surgery on your lower abdomen?	1. Yes **2.** No	
19.	Do you participate in physical activity?	1. Yes 2. No	

Section-F: Revised Urinary Incontinence Scale (RUIS)

Q:No:	Questions	Responce	Code
20.	Is urine leakage related to the feeling of urgency?	1. Not at all (0) 2. Slightly (1) 3. Moderately (2) 4. Greatly (3)	
21.	Is the urine leakage related to physical activity, coughing or sneezing?	1. Not at all (0) 2. Slightly (1) 3. Moderately (2) 4. Greatly (3)	
22.	Do you experience small amounts of urine leakage, such as drops?	1. Not at all (0) 2. Slightly (1) 3. Moderately (2) 4. Greatly (3)	

23.	How often do you experience urine leakage?	1. Never (0) 2. Less than once a month (1) 3. A few times a month (2) 4. A few times a week (3) 5. Every day and/or night (4)	
24.	How much urine do you lose each time?	1. None (0) 2. Drops (1) 3. Small splashes (2) 4. More (3)	

Section-E: International Consultation on Incontinence Questionnaire (ICIQ-UI) SF has been designed to give us information of frequency, quantity, types. Each section consists of lowest 0 score = Never and other several score.

Q:No:	Questions	Responce	Code
25.	How often do you leak urine?	1. Never (0) 2. About once a week or less often (1) 3. Two or three times a week (2) 4. About once a day (3) 5. Several times a day (4) 6. All the time (5)	
26.	How much urine do you usually leak?	1. None (0) 2. A small amount (2) 3. A moderate amount (4) 4. A large amount (6)	

27.	How much does leaking urine interfere with your everyday life? (Please circle a number between 0 to 10) 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 Not at all A great deal		
28.	When does urine leak? (Please tick all that apply to you)	○ Never – urine does not leak ○ Leaks before you can get to the toilet ○ Leaks when you cough or sneeze ○ Leaks when you are asleep ○ Leaks when you are physically active/exercising ○ Leaks when you have finished urinating and are dressed ○ Leaks for no obvious reason ○ Leaks all the time	

সম্মতি পত্র

আসসালামুয়ালাইকুম/নমস্কার,

আমি অর্ণব চার্লস দেশাই সাইক কলেজ অভ মেডিকেল সায়েন্স অ্যান্ড টেকনোলজি (এসসিএমএসটি) এর বি.এস সি. ইন ফিজিওথেরাপিতে এর শিক্ষার্থী। যা, ঢাকা বিশ্ববিদ্যালয়ের মেডিসিন অনুষদের অধিভুক্ত একটি ইনস্টিটিউট। আমার ব্যাচেল ডিগ্রী সম্পূর্ণ করার জন্য একটি গবেষণা প্রকল্প পরিচালনা করতে হবে, এবং এটি আমার পড়াশুনার একটি অংশ। গবেষণার শিরোনামঃ "বয়স্কদের প্রস্রাব ধরে রাখতে না পারার সাথে সম্পর্কিত ঝুঁকি বিষয়ক একটি কেস কন্ট্রোল গবেষণা"।

আমি আশা করি সাক্ষাৎকারটি ২০-৩০ মিনিট সময় নেবে। আপনার মনে কোন কিছু জানা দরকার মনে হলে, যেকোন প্রশ্ন করতে পারেন।

আপনার অবগতির জানাচ্ছি যে, এটি সম্পূর্ণ একাডেমিক গবেষণা এবং অন্য কোন উদ্দেশ্যে ব্যবহার করা হবে না। আমি আপনাকে আশ্বাস দিচ্ছি যে, সকল তথ্য গোপনীয় রাখা হবে। এটি একটি স্বেচ্ছাসেবী অংশগ্রহণ। আপনি যেকোন সময় আপনার সম্মতি প্রত্যাহার করে গবেষণা থেকে চলে যেতে পারেন। এছাড়াও, এই প্রশ্নাবলীতে যেকোন প্রশ্নের উত্তর না দেওয়ার অধিকার আপনার আছে।

গবেষণা সম্পর্কে কোন প্রশ্ন থাকলে, আমার সাথে (০১৭৯৭২৭১১১৫) অথবা আমার সুপারভাইজার শহিদ আফ্রিদি (০১৭৮০০০৬৪৪১), লেকচারার অভফিজিওথেরাপি, (এসসিএমএসটি) সাথে যোগাযোগ করতে পারেন।

সাক্ষাৎকার এগিয়ে নেওয়ার জন্য কি আমি আপনার সম্মতি পেতে পারি?

হ্যাঁ..... না..

অংশগ্রহণকারীর স্বাক্ষর ও তারিখ.....

গবেষকের স্বাক্ষর ও তারিখ.....

সাক্ষীর স্বাক্ষর ও তারিখ.....

Questionnaire (Bangla)

Risk Factors Associated with Urinary Incontinence in Elderly People: A Case Control Study.

তারিখ:…./…./….

উত্তরদাতার আইডি:

উত্তরদাতার নাম:……

ঠিকানা:……

মোবাইল নম্বর:……

সেকশন-এ: সামাজিক বিষয়ক তথ্যাবলী

প্রশ্ন নং	প্রশ্ন	উত্তর	কোড
1.	আপনার বয়স কত?	বছর:……..	
2.	আপনার লিঙ্গ কী?	১. পুরুষ ২. মহিলা ৩. তৃতীয় লিঙ্গ	
3.	আপনি কোন ধরনের পরিবারে বসবাস করেন?	১. একক পরিবার ২. যৌথ পরিবার	
4.	আপনার শিক্ষাগত যোগ্যতা কী?	১. পিএসসি ২. জেএসসি ৩. এসএসসি ৪. এইচএসসি ৫. স্নাতক ৬. স্নাতকোত্তর ৭. নিরক্ষর	
5.	আপনার বৈবাহিক অবস্থা কী?	১. বিবাহিত ২. অবিবাহিত ৩. বিধবা ৪. তালাকপ্রাপ্ত	
6.	আপনার মাসিক আয় কত?	১. নিম্ন আয় ২. মধ্যম আয় ৩. উচ্চ আয়	

সেকশন-বি: মানবদেহের পরিমাপ

প্রশ্ন নং	প্রশ্ন	উত্তর	কোড
7.	আপনার ওজন কত?	……..কেজি	
8.	আপনার উচ্চতা কত?	.....ফুট	

সেকশন-সি: প্রস্রাব ধরে রাখতে না পারার সাথে সম্পর্কিত প্রশ্নসমূহ

প্রশ্ন নং	প্রশ্ন	উত্তর	কোড
9.	আপনার কি প্রস্রাব ধরে রাখতে সমস্যা হয়?	১. হ্যাঁ ২. না	
10.	কতদিন ধরে এই সমস্যা?	….… মাস	
11.	আপনি কতক্ষণ প্রস্রাব ধরে রাখতে পারেন?	……..মিনিট	
12.	আপনি কি আগে এই সমস্যার জন্য কোনো চিকিৎসা নিয়েছেন?	১. হ্যাঁ ২. না	
13.	আপনি কি ধরনের চিকিৎসা নিয়েছেন?	১. ওষুধ ২. ফিজিওথেরাপি ৩. অস্ত্রোপচার ৪. অন্যান্য	
14.	আপনি কি প্রস্রাব ধরে রাখতে না পারার জন্য কোনো শোষক সামগ্রী (যেমন, প্রাপ্তবয়স্ক ডায়াপার, প্যাড) ব্যবহার করেন?	১. হ্যাঁ ২. না	

সেকশন-ডি: স্বাস্থ্য ও ঝুঁকি নির্দেশক সম্পর্কিত প্রশ্নসমূহ

প্রশ্ন নং	প্রশ্ন	উত্তর	কোড
15.	আপনি কি ধূমপান করেন?	১. হ্যাঁ ২. না	
16.	আপনার নিম্নলিখিত রোগগুলোর মধ্যে কোনটি আছে?	১. ডায়াবেটিস ২. উচ্চ রক্তচাপ ৩. কিডনিতে সমস্যা	

17.	আপনার নিম্নলিখিত স্নায়বিক সমস্যাগুলোর মধ্যে কোনটি আছে?	১. স্ট্রোক ২. গুইলেন-বারে সিন্ড্রোম (জিবিএস) ৩. পারকিনসন ৪. অন্যান্য	
18.	আপনার কি কখনো তলপেটে অস্ত্রোপচার হয়েছে?	১. হ্যাঁ ২. না	
19.	আপনি কি ব্যায়াম করেন?	১. হ্যাঁ ২. না	

সেকশন- ই: সংশোধিত ইউরিনারি ইনকন্টিনেন্স স্কেল (আরইউআইএস)

প্রশ্ন নং	প্রশ্ন	উত্তর	কোড
20.	জরুরী প্রয়োজনে কি আপনার প্রস্রাব বের হয়?	১. একদমই না (০) ২. সামান্য (১) ৩. পরিমিতভাবে (২) ৪. ব্যাপকভাবে (৩)	
21.	কোন কাজ করলে কিংবা হাঁচি-কাশিতে প্রস্রাব বের হয়ে যায়?	১. একদমই না (০) ২. সামান্য (১) ৩. পরিমিতভাবে (২) ৪. ব্যাপকভাবে (৩)	
22.	আপনার অল্প পরিমাণে কি ফোঁটা ফোঁটা প্রস্রাব বের হয়?	১. একদমই না (০) ২. সামান্য (১) ৩. পরিমিতভাবে (২) ৪. ব্যাপকভাবে (৩)	
23.	আপনি কি প্রায়ই প্রস্রাবের ফোঁটা অনুভব করেন?	১. কখনোই না (০) ২. মাসে একবারেরও কম (১) ৩. মাসে কয়েকবার (২) ৪. সপ্তাহে কয়েকবার (৩) ৫. প্রতিদিন এবং/অথবা রাতে (৪)	
24.	আপনার প্রতিবার কি পরিমান প্রস্রাব বেড়িয়ে যায়?	১. কিছুই না (০) ২. ফোঁটা ফোঁটা (১)	

		৩. ছোট ছিটা (২) ৪. আরও বেশী (৩)	

সেকশন-এফ: ICIQ-UI SF প্রশ্নাবলী আমাদের অনিয়ন্ত্রণ মূত্র বের হয়ে যাওয়ার পুনরাবৃত্তি, পরিমাণ, প্রকারের তথ্য দেওয়ার জন্য সাজানো হয়েছে। প্রতিটি বিভাগে সবনিম্ন ০ নম্বর = কখনও নয় এবং অন্যান্য বেশ কয়েকটি নাম্বার আছে।

প্রশ্ন নং	প্রশ্ন	উত্তর	কোড
25.	আপনি কতবার প্রস্রাব ধরে রাখতে না পারার সমস্যা অনুভব করেন?	১. কখনও না (০) ২. সপ্তাহে একবার বা তার চেয়ে কম (১) ৩. সপ্তাহে দুই-তিনবার (২) ৪. প্রতিদিন একবার (৩) ৫. দিনে কয়েকবার (৪) ৬. সব সময় (৫)	
26.	আপনার সাধারণত কি পরিমান নিয়ন্ত্রণহীন প্রস্রাব বের হয়?	১. কিছুই না (০) ২. অল্প পরিমাণ (২) ৩. মাঝারি পরিমাণ (৪) ৪. অনেক বেশি (৬)	
27.	প্রস্রাব ধরে রাখতে না পারার কারণে আপনার দৈনন্দিন জীবনে কতটুকু সমস্যা হয়? (০ থেকে ১০ এর মধ্যে একটি সংখ্যা চিহ্নিত করুন) ০ – ১ – ২ – ৩ – ৪ – ৫ – ৬ – ৭ – ৮ – ৯ – ১০ একদমই নয় অনেক বেশি		
28.	কখন প্রস্রাব বের হয়? (যেগুলো আপনার ক্ষেত্রে প্রযোজ্য সেগুলোতে টিক দিন)	○ কখনও নয় - প্রস্রাব বের হয় না ○ টয়লেটে পৌঁছানোর আগেই বের হয় ○ কাশি বা হাঁচির সময় বের হয় ○ ঘুমানোর সময় বের হয় ○ শারীরিক ক্রিয়াকলাপ বা ব্যায়ামের সময় বের হয় ○ প্রস্রাব শেষ করার পর এবং পোশাক পরার পর বের হয় ○ কোনো সুস্পষ্ট কারণ ছাড়াই বের হয় ○ সব সময় বের হয়	

APPENDIX: 02

IRB Application Form

Date: 03-09-2024

To

The Chairman,

Institutional Review Board (IRB)

SAIC College of Medical Science & Technology (SCMST)

Mirpur-14, Dhaka-1216.

Subject: **Application for review and ethical approval.**

Dear Sir,

With due respect, I am Arnab Charles Desai, student of 4th year B.Sc. in Physiotherapy Program at SAIC College of Medical Science & Technology (SCMST), affiliated by the University of Dhaka. As per the course curriculum, I have to conduct a research project that entitled **"Risk Factors Associated with Urinary Incontinence in Elderly People: A Case Control Study"** under the supervisor Mr Shahid Afridi Lecturer (Physiotherapy) of SCMST.

The purpose of the study is to identify the risk factors associated with urinary incontinence in elderly people. The study involves face to face interview by using structured questionnaire to identify the risk factors associated with urinary incontinence in elderly people that may take 30 to 40 minutes to fill the questionnaire and there is no likelihood of any harm to the participants. Related information will be collected from the patient's guidebook. Data collectors will receive informed consent from all participants: any data collected will be kept confidential.

Therefore, I look forward to having your kind approval for the thesis proposal and to start data collection. I can also assure you that I will maintain all the requirements for study.

Sincerely,

Arnab Desai

Arnab Charles Desai

Student of 4th Year B.Sc. in Physiotherapy

Session:2019-20 Reg: 8796

SCMST, Mirpur-14, Dhaka-1216, Bangladesh.

IRB Permission Letter

SCMST-BPT/IRB/09-10/25/01

To
Arnab Charles Desai
4th Year Student of B.Sc. in Physiotherapy
Session: 2019-20, Reg No: 8796
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh

Subject: Approval of the thesis proposal **"Risk Factors Associated with Urinary Incontinence in Elderly People: A Case Control Study"** by ethics committee.

Dear Arnab Charles Desai
Congratulations.
The Institutional Review Board (IRB) of SCMST has reviewed and discussed your application to conduct the above-mentioned dissertation, with yourself, as the principal investigator. The Following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Research proposal.
2	Structured Questionnaire (English & Bangla version)
3	Information sheet & consent form.

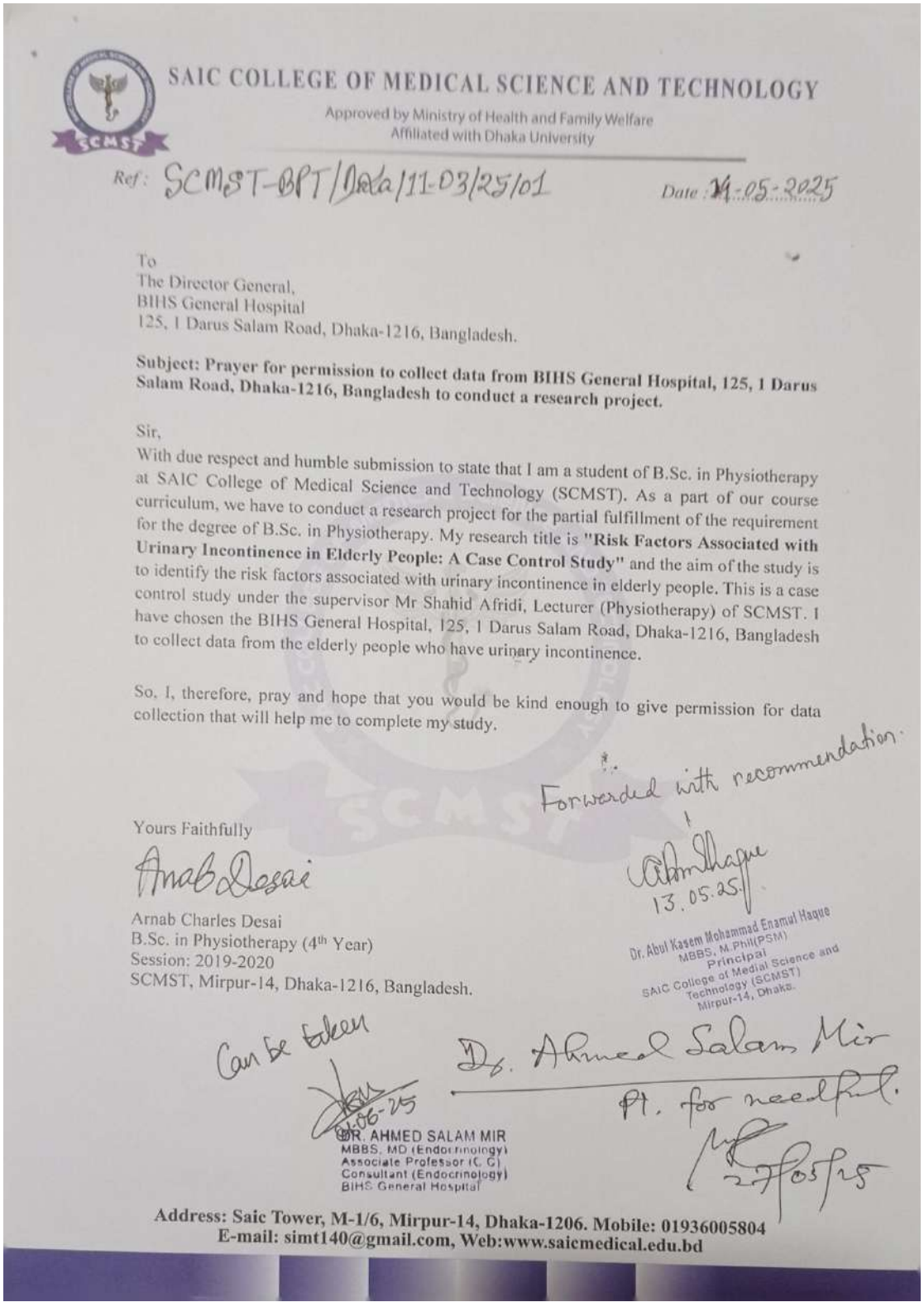
The purpose of the study is to identify the risk factors associated with urinary incontinence in elderly people. The study involves face to face interview by using structured questionnaire to identify the risk factors associated with urinary incontinence in elderly people that may take 30 to 40 minutes to fill in the questionnaire and there is no likelihood of any harm to the participants. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 09.00 AM on 4th September 2024 at SCMST.

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring during the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,
04.09.24
Dr. Abul Kasem Mohammad Enamul Haque
Principal, SCMST &Chairman, Institutional Review Board (IRB)
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh.

Data Collection Permission Letter

1)



SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref: SCMST-BPT/Dkla/11-03/25/01 Date: 11-05-2025

To
The Director General,
BIHS General Hospital
125, 1 Darus Salam Road, Dhaka-1216, Bangladesh.

Subject: Prayer for permission to collect data from BIHS General Hospital, 125, 1 Darus Salam Road, Dhaka-1216, Bangladesh to conduct a research project.

Sir,
With due respect and humble submission to state that I am a student of B.Sc. in Physiotherapy at SAIC College of Medical Science and Technology (SCMST). As a part of our course curriculum, we have to conduct a research project for the partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. My research title is **"Risk Factors Associated with Urinary Incontinence in Elderly People: A Case Control Study"** and the aim of the study is to identify the risk factors associated with urinary incontinence in elderly people. This is a case control study under the supervisor Mr Shahid Afridi, Lecturer (Physiotherapy) of SCMST. I have chosen the BIHS General Hospital, 125, 1 Darus Salam Road, Dhaka-1216, Bangladesh to collect data from the elderly people who have urinary incontinence.

So, I, therefore, pray and hope that you would be kind enough to give permission for data collection that will help me to complete my study.

Forwarded with recommendation.

13.05.25.

Dr. Abul Kasem Mohammad Enamul Haque
MBBS, M.Phil(PSM)
Principal
SAIC College of Medial Science and Technology (SCMST)
Mirpur-14, Dhaka.

Yours Faithfully

Arnab Desai

Arnab Charles Desai
B.Sc. in Physiotherapy (4th Year)
Session: 2019-2020
SCMST, Mirpur-14, Dhaka-1216, Bangladesh.

Can be taken

13-05-25

DR. AHMED SALAM MIR
MBBS, MD (Endocrinology)
Associate Professor (C. C)
Consultant (Endocrinology)
BIHS General Hospital

Dr. Ahmed Salam Mir
Pl. for needful.
27/05/25

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1206. Mobile: 01936005804
E-mail: simt140@gmail.com, Web:www.saicmedical.edu.bd

2)

SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref: SCMST-BPT/Dhk/11-03/25/01 Date: 25-05-25

To
The Director General,
Ibn Sina Diagnostic & Consultation Center, Uttara
House no. 52, Garib-E-Newaz Avenue, Sector no. 13, Uttara, Dhaka-1230.

Subject: **Prayer for permission to collect data from Ibn Sina Diagnostic & Consultation Center, Uttara, Dhaka-1230, Bangladesh to conduct a research project.**

Sir,

With due respect and humble submission to state that I am a student of B.Sc. in Physiotherapy at SAIC College of Medical Science and Technology (SCMST). As a part of our course curriculum, we have to conduct a research project for the partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. My research title is **"Risk Factors Associated with Urinary Incontinence in Elderly People: A Case Control Study"** and the aim of the study is to identify the risk factors associated with urinary incontinence in elderly people. This is a case control study under the supervisor Mr Shahid Afridi, Lecturer (Physiotherapy) of SCMST. I have chosen the Ibn Sina Diagnostic & Consultation Center, Uttara, Dhaka-1230, Bangladesh to collect data from the elderly people who have urinary incontinence.

So, I, therefore, pray and hope that you would be kind enough to give permission for data collection that will help me to complete my study.

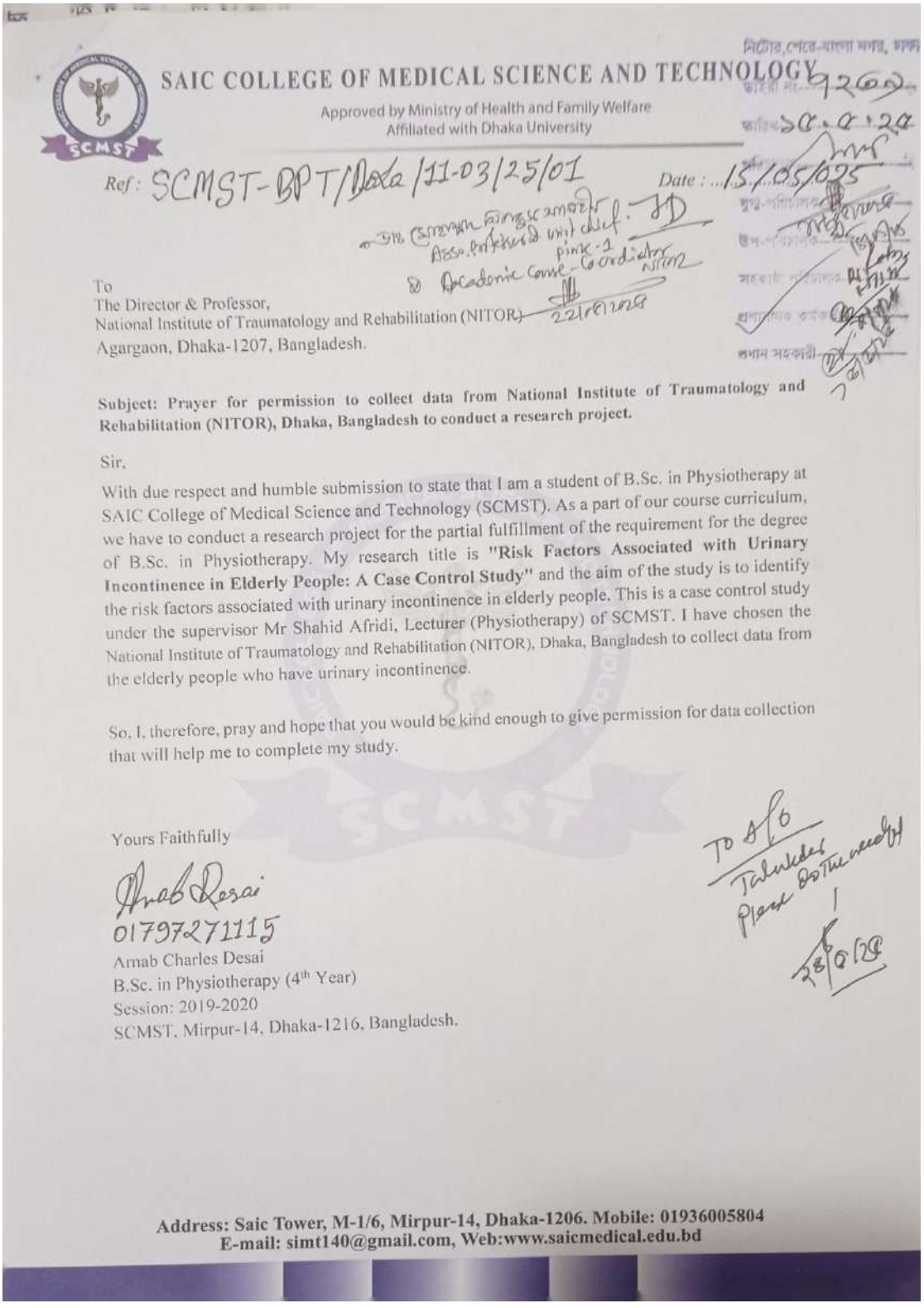
Yours Faithfully
Arnab Desai

Arnab Charles Desai
B.Sc. in Physiotherapy (4th Year)
Session: 2019-2020
SCMST, Mirpur-14, Dhaka-1216, Bangladesh.

25-05-25
MD. Omar Faruq
Senior Physiotherapist
Departmental Incharge
IBN SINA Diagnostic
And Consultation Center
Uttara, Dhaka-1230.

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1206. Mobile: 01936005804
E-mail: simt140@gmail.com, Web:www.saicmedical.edu.bd

3)



SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref: SCMST-BPT/Dhaka/11-03/25/01 Date : 15/05/2025

To
The Director & Professor,
National Institute of Traumatology and Rehabilitation (NITOR)
Agargaon, Dhaka-1207, Bangladesh.

Subject: Prayer for permission to collect data from National Institute of Traumatology and Rehabilitation (NITOR), Dhaka, Bangladesh to conduct a research project.

Sir,

With due respect and humble submission to state that I am a student of B.Sc. in Physiotherapy at SAIC College of Medical Science and Technology (SCMST). As a part of our course curriculum, we have to conduct a research project for the partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. My research title is **"Risk Factors Associated with Urinary Incontinence in Elderly People: A Case Control Study"** and the aim of the study is to identify the risk factors associated with urinary incontinence in elderly people. This is a case control study under the supervisor Mr Shahid Afridi, Lecturer (Physiotherapy) of SCMST. I have chosen the National Institute of Traumatology and Rehabilitation (NITOR), Dhaka, Bangladesh to collect data from the elderly people who have urinary incontinence.

So, I, therefore, pray and hope that you would be kind enough to give permission for data collection that will help me to complete my study.

Yours Faithfully

Arnab Desai
01797271115
Arnab Charles Desai
B.Sc. in Physiotherapy (4th Year)
Session: 2019-2020
SCMST, Mirpur-14, Dhaka-1216, Bangladesh.

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1206. Mobile: 01936005804
E-mail: simt140@gmail.com, Web:www.saicmedical.edu.bd

4)

SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref : *Date :* .....

To
The Human Resources,
Women's Children's and General Hospital
Satmasjid Road, Dhanmondi, Dhaka-1209, Bangladesh.

Subject: **Prayer for permission to collect data from Women's Children's and General Hospital, Dhanmondi, Dhaka, Bangladesh to conduct a research project.**

Sir,

With due respect and humble submission to state that I am a student of B.Sc. in Physiotherapy at SAIC College of medical science and technology (SCMST). As a part of our course curriculum, we have to conduct a research project for the partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. My research title is "Risk Factors Associated with Urinary Incontinence in Elderly People: A Case Control Study" and the aim of the study is to identify the risk factors associated with urinary incontinence in elderly people. This is a case control study under the supervisor Mr Shahid Afridi, Lecturer (Physiotherapy) of SCMST. I have chosen the Women's Children's and General Hospital, Dhanmondi, Dhaka, Bangladesh to collect data from the elderly people who have urinary incontinence.

So, I, therefore, pray and hope that you would be kind enough to give permission for data collection that will help me to complete my study.

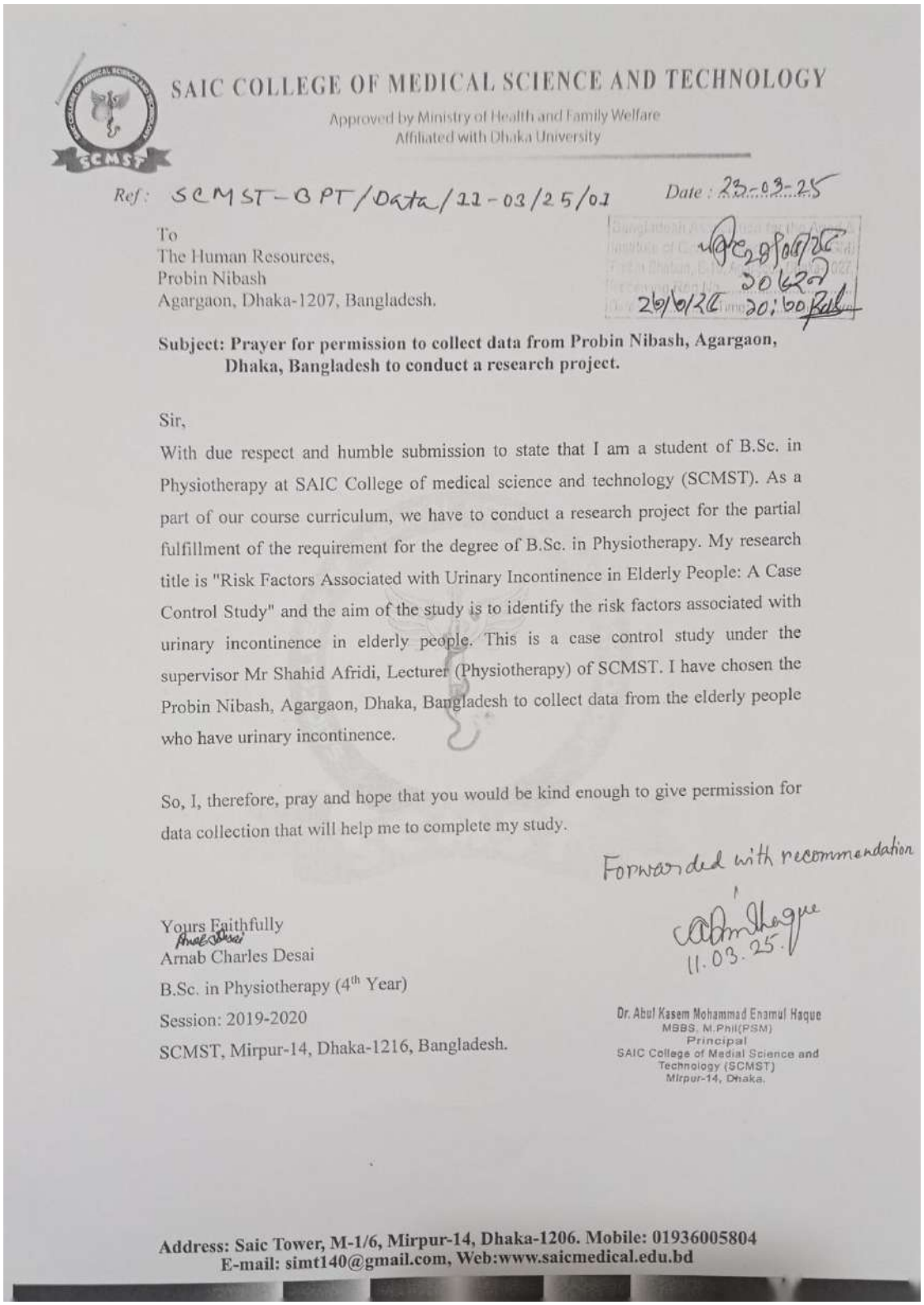
Yours Faithfully

Arnab Charles Desai
(01797271115)
B.Sc. in Physiotherapy (4th Year)
Session: 2019-2020
SCMST, Mirpur-14, Dhaka-1216, Bangladesh.

Permitted.
16.05.25.

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1206. Mobile: 01936005804
E-mail: simt140@gmail.com, Web:www.saicmedical.edu.bd

5)



SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref: SCMST-BPT/Data/22-03/25/01 Date: 23-03-25

To
The Human Resources,
Probin Nibash
Agargaon, Dhaka-1207, Bangladesh.

Subject: Prayer for permission to collect data from Probin Nibash, Agargaon, Dhaka, Bangladesh to conduct a research project.

Sir,

With due respect and humble submission to state that I am a student of B.Sc. in Physiotherapy at SAIC College of medical science and technology (SCMST). As a part of our course curriculum, we have to conduct a research project for the partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. My research title is "Risk Factors Associated with Urinary Incontinence in Elderly People: A Case Control Study" and the aim of the study is to identify the risk factors associated with urinary incontinence in elderly people. This is a case control study under the supervisor Mr Shahid Afridi, Lecturer (Physiotherapy) of SCMST. I have chosen the Probin Nibash, Agargaon, Dhaka, Bangladesh to collect data from the elderly people who have urinary incontinence.

So, I, therefore, pray and hope that you would be kind enough to give permission for data collection that will help me to complete my study.

Forwarded with recommendation

11.03.25.

Yours Faithfully
Arnab Charles Desai
B.Sc. in Physiotherapy (4th Year)
Session: 2019-2020
SCMST, Mirpur-14, Dhaka-1216, Bangladesh.

Dr. Abul Kasem Mohammad Enamul Haque
MBBS, M.Phil(PSM)
Principal
SAIC College of Medial Science and Technology (SCMST)
Mirpur-14, Dhaka.

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1206. Mobile: 01936005804
E-mail: simt140@gmail.com, Web:www.saicmedical.edu.bd

6)

SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref: SCMST-BPT/Data 111-03/25/01 Date : .....

To
The Human Resources,
OGSB Hospital & IRCH
Mirpur, Dhaka-1216, Bangladesh.

permitted
28.4.23

Subject: Prayer for permission to collect data from OGSB Hospital & IRCH Mirpur, Dhaka to conduct a research project.

Sir,

With due respect and humble submission to state that I am a student of B.Sc. in Physiotherapy at SAIC College of medical science and technology (SCMST). As a part of our course curriculum, we have to conduct a research project for the partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. My research title is "Risk Factors Associated with Urinary Incontinence in Elderly People: A Case Control Study" and the aim of the study is to identify the risk factors associated with urinary incontinence in elderly people. This is a case control study under the supervisor Mr Shahid Afridi, Lecturer (Physiotherapy) of SCMST. I have chosen the OGSB Hospital & IRCH, Mirpur, Dhaka to collect data from the elderly people who have urinary incontinence.

So, I, therefore, pray and hope that you would be kind enough to give permission for data collection that will help me to complete my study.

Forwarded with recommendation
21.03.25.

Yours Faithfully
Arnab Charles Desai
B.Sc. in Physiotherapy (4th Year)
Session: 2019-2020
SCMST, Mirpur-14, Dhaka-1216, Bangladesh.

Dr. Abul Kasem Mohammad Enamul Haque
MBBS, M.Phil(PSM)
Principal
SAIC College of Medial Science and Technology (SCMST)
Mirpur-14, Dhaka.

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1206. Mobile: 01936005804
E-mail: simt140@gmail.com, Web:www.saicmedical.edu.bd

APPENDIX: 03

BANGLADESH ASSOCIATION FOR THE AGED
প্রবীণ হিতৈষী সংঘ
1960
প্রবীণ হাসপাতাল
জরুরী বিভাগ ২৪ ঘন্টা খোলা