

## MINI REVIEW

# Why Chronic Renal Failure Affects Males More often than Females? Review and Author's Perspective

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Hegazy AA. Why Chronic Renal Failure Affects Males More often than Females? Review and Author's Perspective. *Int J Cadaver Stud Ant Var.* 2021;2(1):24-27.

## Abstract

Renal failure is an increasing problem representing a great health challenge. It affects males more than females and blacks more than whites. Despite the anatomical gender differences in urethra might match with occurrence of urinary infection in

women more than in men, it has been stated that the reverse is the true. Renal infection and even failure are more encountered in men. The reason for such gender discrepancies regarding renal failure is not yet clearly understood. In this short article, we aimed to suggest a probable answer for the following confusing question: Why does chronic renal failure affect males more often than females?

**Key Words:** *Kidney; Failure; Infection; Gender differences; Anal intercourse*

## Introduction

Kidneys are vital organs for human life. They act in eliminating nitrogenous waste products from blood resulting from metabolism as well as excretions of the toxic end-products of medications. They also function in body regulation of fluid and electrolytes [1]. Any disease affecting kidneys could lead to disturbance in their functions. Prolonged kidney disease affection might lead to loss of its function, a condition called chronic renal failure. It is also called end-stage renal disease (ESRD) representing the last stage in kidney disease. Thereafter, dialysis or kidney transplant could be essential to keep the survival of human body [2]. It has been noticed that ESRD affects males more than females although the anatomy of urethra in males, in comparison with females gives some sort of more protection as it is

long and its external opening is situated away from the anus.

## Methods

In this review, we searched in the previous literature about an answer for the question "why chronic renal failure affects males more than females" using the keywords mentioned before in this article.

## Results and Discussion

Renal failure is an increasing health problem representing a great challenge as it frequently affects young ages. Chronic kidney disease associated with ESRD is rapidly increasing worldwide [3]. There are many documented causes for chronic renal failure. They include diabetes mellitus, hypertension,

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*Received: March 30, 2021, Accepted: March 30, 2021, Published: March 31, 2021*



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prolonged renal obstruction such as caused by ureter calculi, vascular diseases of kidneys and repeated renal infections [1]. Kidney function might stop suddenly, a condition called acute renal failure. This case might be caused by heart attack, major cardiovascular surgery, septic shock, overdosed-drug intake, drug abuse or insufficient renal blood flow such as in cases of severe hemorrhage and hypovolemic shock [4]. Regarding young ages, Neild excluded hypertension as a cause for renal failure. However, the author suggested some form of kidney tubular disease to be involved in ESRD [5].

Regarding the gender difference, it has been stated that chronic renal failure affects males more than females in all adult ages with more incidence in youths than in old ages [6]. Its prevalence is two times higher in males than females [7]. Its incidence is also higher in blacks three to four times more than found in white races [8]. Some authors attributed the gender difference in renal failure incidence to the influence of sex hormones. They stated that testosterone has a destructive effect on the kidney while estrogen has a renoprotective effect [7]. Estrogen has been claimed to contribute its protective role through its potent antioxidative effect in mesangial microenvironment of kidney [9]. However, it has been stated that menopausal women also have a lower incidence of chronic renal failure than men of the same ages; with incidence in women of 2.7 times lower than that in men. This means that the estrogen might be of no or little effect in such cases and other causes must be searched [7]. Therefore, we tried for searching the difference in habits of both genders. It has been found that some acts are prevalent among some males and could not occur for females. Abnormal sexual behavior such as unprotected anal intercourse adopted by some males might be implicated as a potential cause for urinary tract infections and perhaps ending in renal failure.

Clinical pictures suggesting urological infections such as urinary frequency, discomfort, renal pain, and dysuria are common manifestations in visits of urology clinics representing about 15% of patients' referrals [10]. Sexually active homosexual males are at an increased risk for developing acute urinary tract infections. *Escherichia coli* inhabiting

rectum and anal canal could be involved in causing the non-gonococcal urethritis in such group of patients [11]. Symptoms found in these patients are mostly chronic. The chronicity of infections is attributed to the repetitive nature of anal intercourse; and avoidance of this behavior might be essential in management of these cases [12].

Anatomically, females are more prone to urinary infections than males. This might be due to the short urethra in females and its external orifice being near to the anus. On contrary, the male urethra is longer with a total length of about 20 cm in comparison with about 4 cm in women [13]. This difference in urethral length in both sexes is due to development of penile urethra on the ventral aspect of penis, a developmental event not occurring in female clitoris [14]. Proximity of urethral orifice to anus in women makes it more prone to fecal matter contamination and hence infections; and this could increase the risk of urinary infections and perhaps subsequent renal infections and damage [15]. However as mentioned before, the chronic renal failure is more in males. Therefore, other factors might be engaged as causative agents for such gender discrepancies. This might be in the gender habits. In this context, we suggest that repeated unprotected anal intercourse adopted by some males to avoid the vaginal route in some communities could be ambiguous factors for renal failure. Some men might resort to abnormal anal intercourse in order to preserve the hymen integrity in virgins or to avoid occurrence of pregnancy [15,16]. Another form of abnormal use of anal canal in sexual intercourse could be the homosexuality prevalent among young males. It affects at least one third of the male population [17].

The rectum and anal canal are the reservoir and passage for fecal matter, respectively. Therefore, their lumens represent the most contaminated areas in the human body. The gastrointestinal tract (GIT) is in general contains more than 400 types of bacterial species particularly of anaerobe ones. These bacterial flora are sparse in the upper GIT but more abundant in the lower half down to rectum and anal canal. Such bacterial flora inhabit within the lumen and attach to gut wall without its penetration. These might penetrate the wall if it is breached for any cause and might lead to peritonitis. The microflora

includes a potentially pathogenic microorganisms such as *Clostridium difficile* [18].

On the other side, the urethra is a duct conveying urine from the urinary bladder to outside connecting it to potential infectious microbes such as *Escherichia coli*, coliforms and enterococci found on perineum. On the contrary of large numbers, small number of microbes could be effectively controlled by natural defense mechanisms of urethra and urinary bladder as well as by the continuous emptying of urine. Use of intermittent catheterizations or urethral manipulations carry a risk for urinary tract infections [19]. The urine is formed firstly in sterile functioning units of kidney (about 800,000 to 1,000,000) called nephrons through glomerular filtration, a process where the excess water and metabolic waste products from blood are filtered and eliminated out to renal collecting tubules. The number of nephrons decreases by age, renal disease and injury as no new nephrons are regenerated by kidney [20].

Males performing unprotected anal intercourse are prone to transmission of urethral infections with large numbers of microbes inhabiting the rectum. This could lead to subsequent extension of infection upwards to other parts of urinary system including the drainage units of kidneys. Most of cases (about 85%) of urinary infections are caused by *Escherichia coli*, bacteria commonly encountered in human gut [15,21]. Taking past history focusing on the sexual

activity particularly about anal intercourse should be taken in consideration in males with repeated unexplained genito-urinary tract infections [12]. Repetition of such abnormal act and subsequent infections might lead chronicity of disease and hence pyelonephritis. Recurring pyelonephritis is a common cause of ESRD and chronic renal failure [15].

Such relations between unprotected anal intercourse and chronic renal failure might be investigated in future studies among patients with chronic renal failure and attending the health care units. Moreover, unprotected anal intercourse is suggested to be obviated, not only for possibility of developing renal failure but also to avoid a potential invasion of spermatozoa through lacerated wall of female rectum that could develop immunity perhaps involved in idiopathic infertility of female partners [22, 23].

## Conclusion

It has been concluded that repeated anal intercourse might be a potential cause for increased incidence of chronic renal failure in males than females in some cases. Therefore, it is recommended to abstain unprotected anal intercourse.

## Conflicts of Interest

The author declares no conflict of interest.

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