

# Y-Chromosome Functional Decline and Contemporary Male Health: A Multidimensional Sociobiological Perspective

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## Abstract

The health and behavioural patterns of modern males are influenced by complex interactions between genetic, hormonal, psychological, and socio-environmental factors. Although complete "Y gene deactivation" is biologically inaccurate, partial functional decline in Y-chromosome-linked expression, reduced androgen activity, and environmental influences may contribute to altered male physiology and behavior. This review explores associations between modern lifestyle factors—stress, addiction, digital exposure, delayed marriage, and socio-cultural changes—and male reproductive health, including impotence, erectile dysfunction, psychological feminization patterns, and declining testosterone levels. The study highlights the role of stress, pornography, sleep deprivation, dietary habits, and societal transitions such as female workforce participation. A balanced, evidence-based perspective is emphasized to avoid sociological bias.

## Introduction

The Y chromosome plays a crucial role in male sexual differentiation and reproductive function. It regulates genes responsible for spermatogenesis, androgen signaling, and male phenotypic development. However, modern epidemiological trends suggest a decline in male reproductive health, characterized by decreased testosterone levels, reduced sperm counts, and increased erectile dysfunction.

While genetic deactivation is not the primary cause, environmental and behavioral factors influence *hypothalamic-pituitary-gonadal (HPG) axis suppression*, leading to functional impairment.

## Pathophysiology of Male Hormonal Decline

### *Role of Testosterone*

#### *Testosterone is essential for:*

- Libido and erectile function.
- Muscle mass and physical strength.
- Psychological stability and confidence.

#### *Reduced testosterone leads to:*

- Erectile dysfunction.
- Reduced fertility.
- Mood disturbances.

Testosterone directly regulates spermatogenesis and sexual function [1].

### *Effect of Stress on Male Reproductive System*

Chronic stress increases cortisol, which suppresses testosterone production and disrupts reproductive hormones.

- Psychological stress reduces testosterone levels.
- Impairs spermatogenesis.
- Alters sexual behavior.

Stress has been shown to interfere with male reproductive hormones and fertility [2].

### **Lifestyle Factors Contributing to Male Functional Decline: [3]**

#### *Fast Life and Chronic Stress*

##### *Modern lifestyle includes:*

- Job competition.
- Academic pressure.
- Financial instability.

#### *Effects*

- Sympathetic overactivation.
- Reduced parasympathetic (sexual response) activity.
- Erectile dysfunction.

#### *Digital Addiction (Mobile, Internet, Laptop Use)*

##### *Excessive screen exposure leads to:*

- Sedentary lifestyle.
- Sleep disturbance.
- Dopamine dysregulation.

##### *Indirect effects include:*

- Reduced testosterone.
- Decreased sexual interest.
- Social withdrawal.

### ***Pornography and Masturbation***

#### ***Recent studies show:***

- High pornography consumption linked with hormonal imbalance.
- Associated with reduced sperm count and altered hormone levels.
- Addiction patterns like substance abuse.

Frequent pornography uses correlates with altered reproductive hormones and semen quality [3].

### ***Substance Abuse (Alcohol, Drugs)***

#### ***Psychoactive drugs:***

- Damage testicular function.
- Reduce androgen levels.
- Impair sperm quality.

Drug abuse suppresses testosterone and affects sexual function [4].

### ***Junk Food and Poor Diet***

- High-fat processed food → obesity → low testosterone.
- Nutritional deficiency → impaired spermatogenesis.

### ***Sleep Deprivation***

- Testosterone production peaks during sleep.
- Reduced sleep → reduced testosterone.

### ***Delayed Marriages and Sexual Patterns***

- Increased age at marriage.
- Increased reliance on virtual sexual stimulation.
- Psychological dissatisfaction.

### ***Lack of Physical Activity***

- Sedentary lifestyle reduces testosterone.
- Poor vascular health → erectile dysfunction.

### **Psychological and Behavioural Changes: [4]**

#### ***Feminine Attitude and Behavioural Shift:***

##### ***Some researchers associate:***

- Reduced testosterone.
- Increased emotional sensitivity.
- Reduced aggression and dominance traits.

However, this should be interpreted cautiously as psychological traits are multifactorial and not solely hormone driven.

### ***Peer Pressure and Social Comparison***

- Social media creates unrealistic expectations.

- Leads to anxiety, depression, and sexual insecurity.

### ***Absence of Male Role Models***

- Lack of mentorship leads to:
  - Identity confusion.
  - Poor coping mechanisms.
  - Emotional instability.

### ***No Hobby or Stress Relievers***

- Increased mental load without relaxation outlets.
- Higher cortisol levels.

## **Sociological Factors and Gender Dynamics: [5]**

### ***Female Participation in Workforce***

#### ***Modern society shows:***

- Increased female employment.
- Gender equality movements.

#### ***Important clarification***

- Female participation does NOT biologically suppress male health
- However, increased competition may:
  - Increase stress in males.
  - Affect psychological self-perception.

#### ***Perceived Female Dominance***

- Sociocultural perception rather than biological reality
- Can influence:
  - Male self-esteem.
  - Stress levels.

#### ***Job Competition and Reduced Opportunities***

- Competitive environments increase:
  - Anxiety.
  - Performance pressure.
- Indirect effect on sexual health via stress pathways.

### ***Erectile Dysfunction and Impotence***

#### ***Mechanisms***

- Hormonal (low testosterone).
- Psychological (stress, anxiety).
- Neurological (dopamine imbalance).
- Vascular (lifestyle diseases).

### Modern Trend

Younger males increasingly report erectile dysfunction due to:

- Pornography exposure.
- Stress.
- Sedentary lifestyle.

### Future

If current trends of hormonal imbalance, chronic stress, unhealthy lifestyles, and excessive digital dependence continue to persist, the future of human health—particularly male reproductive and psychological well-being—may face significant challenges. A sustained decline in testosterone levels and increasing rates of functional hypogonadism could contribute to reduced fertility, delayed parenthood, and a gradual demographic shift toward lower birth rates. Additionally, rising mental health issues, social isolation, and weakened physical vitality may affect overall quality of life and productivity. However, it is important to recognize that these outcomes are not inevitable; with timely interventions such as lifestyle modification, stress management, balanced nutrition, responsible technology use, and supportive social structures, these negative trends can be reversed, ensuring a healthier and more resilient future population [6].

### Multidimensional Consequences of Persistent Lifestyle and Hormonal Imbalance in Males:

Domain	Specific Consequences
Biological/Reproductive	Decline in testosterone levels; Increased infertility; Reduced sperm count and quality; Erectile dysfunction and impotence at younger age; Reduced libido and sexual dissatisfaction
Physical Health	Increased obesity and metabolic syndrome; Higher risk of diabetes and cardiovascular diseases; Reduced muscle mass and strength; Chronic fatigue and low energy
Psychological	Increased stress, anxiety, and depression; Reduced confidence and assertiveness; Social withdrawal and loneliness; Digital and pornography addiction; Poor coping mechanisms
Behavioral / Lifestyle	Sedentary lifestyle; Lack of physical activity; Sleep deprivation; Circadian rhythm disturbances; Increased substance abuse (alcohol, drugs); Lack of hobbies and stress-relief activities
Social	Delayed marriages; Reduced family formation; Weakening of family structure; Increased dependence on virtual relationships; Peer pressure and identity confusion
Economic	Reduced productivity; Increased healthcare burden; Job stress and burnout; High competition affecting mental well-being
Societal / Demographic	Declining birth rates; Aging population; Changing gender roles; Increased psychological burden due to societal competition
Long-Term Impact	Reduced quality of life; Decreased human resilience; Intergenerational health effects; Potential risk to societal stability

### Discussion

The concept of “Y-chromosome deactivation” is not biologically accurate; however, the functional **expression of Y-linked traits** is strongly influenced by hormones, particularly testosterone and the hypothalamic–pituitary–gonadal (HPG) axis. Testosterone, regulated by luteinizing hormone (LH), is essential for maintaining male sexual characteristics, spermatogenesis, libido, and erectile function. When hormonal imbalance occurs—due to chronic stress (elevated cortisol), poor sleep, obesity, substance abuse, or excessive digital stimulation—there is suppression of gonadotropin-releasing hormone (GnRH), leading to reduced LH and testosterone levels. This creates a state of **functional hypogonadism**, which may mimic reduced Y-chromosome activity by impairing male physiological

and behavioral traits such as sexual performance, fertility, muscle mass, and psychological assertiveness. Thus, rather than true genetic deactivation, it is **hormonal dysregulation that modulates the phenotypic expression of Y-linked functions**.

The concept of “Y gene deactivation” is more accurately described as functional suppression of male reproductive physiology due to environmental and behavioral factors rather than genetic loss [7].

### Key interactions

- Stress → cortisol ↑ → testosterone ↓.
- Addiction → dopamine imbalance → sexual dysfunction.
- Lifestyle → metabolic syndrome → infertility.

### Conclusion

Male reproductive and psychological health is influenced by:

- Hormonal regulation.
- Lifestyle habits.
- Digital exposure.
- Sociocultural environment.

Rather than attributing changes to genetic deactivation alone, a **multifactorial model** should be adopted. Preventive strategies should focus on:

- Stress management.
- Healthy lifestyle.
- Digital moderation.
- Physical activity.
- Social and psychological support.

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