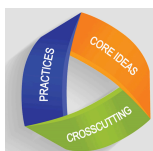


# Transhumanism: Biomedical Intervention and Biomedical Futures

## Human Enhancement and Transhumanism



### NGSS Instructional Outcomes

Next Generation Science Standards

#### Science and Engineering Practices

**Asking Questions and Defining Problems:** Students engage in questioning the ethical, moral, and scientific implications of human enhancement and transhumanism.

**Constructing Explanations and Designing Solutions:** The lesson encourages students to construct explanations about the impact of biomedical interventions on the human body and design ethical solutions or guidelines.

#### Crosscutting Concepts

**Systems and System Models:** Analyzing the human body as a system affected by biomedical technologies and societal norms.

**Cause and Effect:** Discussing how advancements in biomedical technology can lead to the identification or redefinition of diseases, such as high blood pressure or pre-diabetes.

**LS1: From Molecules to Organisms:** Exploring genetic engineering, biotechnology, and the impact of interventions on human biology.

**LS4: Biological Evolution:** Discussing the concept of human evolution and the idea that humans are an “unfinished product” in the context of transhumanism.

**ESS3: Earth and Human Activity:** Examining the ethical considerations of altering the human body through biomedical interventions and the societal impacts of these changes.



## CCSS Instructional Outcomes

Common Core State Standards

4:1

### Reading Standards for Informational Text

Analyzing informational texts such as religious scriptures, scientific articles, and ethical discussions allows students to build their comprehension skills.

### Speaking and Listening Standards

Engaging in discussions about complex and controversial topics like human enhancement fosters speaking and listening skills, requiring students to articulate and defend their viewpoints.

### Integration of Knowledge and Ideas

The lesson integrates religious perspectives (Islamic theology) with scientific viewpoints, promoting a holistic understanding of societal issues.

### Ethical Reasoning

Engaging in discussions about the moral implications of biotechnological advancements encourages students to reason ethically and consider diverse viewpoints.

### Content Learning Outcomes:

- Identify key components of transhumanist ideology.
- Distinguish between Islamic theological perspectives on human enhancement and its purposes and secular bio-scientific views.

### Materials

- Instruction/Teacher Facilitation: Slides 4.1–4.15
- Triple-Entry Vocabulary Journal (Student responsibility)
- YouTube Video: Transhumanism: Will humans evolve to something smarter? A–Z of ISMs Episode 20: BBC Ideas
- Lesson 4.1 Assessment

# 4:1

## Instruction/Teacher Facilitation: Slides for Lesson 4.1

- **Slide 4.1.** Five Big Questions about the Human Being
- **Slide 4.2.** The Context and What's at Stake
- **Slide 4.3.** Key Concepts
- **Slide 4.4.** Transhumanism
- **Slide 4.5.** An Islamic View of Illness, Disease, Curing, and Healing
- **Slide 4.6.** Curing and Healing
- **Slide 4.7.** Doctors, Diseases, and Definitions
- **Slide 4.8.** Defining Disease
- **Slide 4.9.** Average Adult Height by Year of Birth
- **Slide 4.10.** The Distribution of Male and Female Heights
- **Slide 4.11.** The Bio-Socio-Cultural Construction of Disease
- **Slide 4.12.** The Impact of Short Stature
- **Slide 4.13.** Let's Fix This = Biomedical Interventions
- **Slide 4.14.** Biomedical Construction of a Disease
- **Slide 4.15.** The Main Points

# Instruction/ Teacher Facilitation

In Unit 3, we discussed the pertinent question of “What does it mean to be human” in the context of various views. We determined that a human is not only a body, but also includes the soul, which has consciousness. It is pretty obvious that robots and AI cannot completely replace us, but what about using bioscience and technology to “improve” the human being itself?

## Slide 4.1: The Context and What’s at Stake

### The Context and What’s at Stake

- Based on our understanding of what we are (Unit 3), the following questions arise,
  - if biomedical interventions change our body:
    1. Are we slowly transforming ourselves into something beyond the human species? trans(sitional) human—> post human
    2. Are doctors (unwittingly) contributing to this future?
    3. Are there moral limits Muslims should be aware of?
    4. Are human beings unique in the universe?
- If our society validates changes to our being (body +/- soul)
  - What are our values around such change?
    1. Are we desiring/promoting a future that God warns us against?
    2. Is there a notion of changing our being that Islam validates?



In this unit, we will explore how notions of human enhancement and transhumanism impact how we think about the use of biotechnology and the practice of medicine; we will also consider whether, and to what extent, we can/should benefit/improve or “change” human bodies.

- We think that things like cyborgs and robotic parts for humans are science-fiction, but the reality is that it is science today. This is no longer the future of science, it is actually present-day practice.
- Bioscientists have devised ways for us humans to live longer and continue to live on this polluted, changing planet.
- We have to start by defining transhumanism and its key components.



If our society validates changes to our being (body and/or soul), then what are our values around such changes? What are our values, from an Islamic tradition, that help us think about whether these changes should be part and parcel of the role of a (future) Muslim physician?

Are we desiring a future that God warns us against?

■ There is a Quranic warning against the general idea of becoming “God-like” and that humans are trying to manipulate their bodies to remove mortality (which makes us human) and control our design (which is the purview of God).

■ This suggests that transhumanistic-like motivations can be linked to such characters in the Qurʾān as Pharoah (which provides a negative/warning-type connotation).

■ Is there a notion of changing our being that Islam validates?

As we delve into this topic, these are the questions I want you to be thinking about. Now let us look at the components of this ideology of transhumanism and how it manifests itself.

## Slide 4.2: Key Concepts

Key Concepts

**Bioscientific:**

- Transhumanism
- Human Enhancement
- Disease

**Islamic:**

- Changing Creation (of God)
  - *taghyir*
  - *tabdeel*
- Best of “forms”—ahsan taqweem
- Immortality



## Slide 4.3: Transhumanism

# Transhumanism

- o What is Transhumanism?
  
  - o Individual Reflection (3 people)
    - What thoughts come to mind?
  
  - o Essential elements of transhumanism:
    - Human beings are an “unfinished product” of evolution;
      - If we are “naturally” changing, why not induce changes?
    - Goal:
      - Extend ourselves, via **bioscience and technology**, beyond the limits of our frail bodies which are susceptible to decline and disease
  
  - Exemplar Activities:
    - Incorporate super-functioning body parts
    - Upload and preserve the mind
    - Genetically engineer bodies for better function
- 
- The diagram shows a stylized orange-colored human figure from the waist up, lying down. Various parts of the body are highlighted with labels indicating technological or biological enhancements:
- Neurotic skin storage**: Points to the head area.
  - Brain connecting fibers**: Points to the brain area, with sub-labels "brain-like reply and feedback" and "Network connections".
  - Mechanics**: Points to the shoulder joint.
  - Artificial muscles**: Points to the arm area.
  - Artificial hand**: Points to the hand area.
  - Artificial chest**: Points to the chest area.
  - Artificial abdomen**: Points to the abdominal area.
  - Artificial legs**: Points to the leg area.
  - Artificial feet**: Points to the foot area.
  - Artificial skin**: Points to the torso area.
  - Artificial hair**: Points to the head area.
  - Artificial nails**: Points to the fingers.
  - Artificial teeth**: Points to the mouth area.
  - Artificial tongue**: Points to the tongue area.
  - Artificial throat**: Points to the throat area.
  - Artificial vocal cords**: Points to the larynx area.
  - Artificial diaphragm**: Points to the diaphragm area.
  - Artificial lungs**: Points to the lung area.
  - Artificial heart**: Points to the heart area.
  - Artificial stomach**: Points to the stomach area.
  - Artificial intestines**: Points to the intestinal area.
  - Artificial bladder**: Points to the bladder area.
  - Artificial rectum**: Points to the rectum area.
  - Artificial anus**: Points to the anal area.
  - Artificial vagina**: Points to the vaginal area.
  - Artificial uterus**: Points to the uterine area.
  - Artificial ovaries**: Points to the ovarian area.
  - Artificial fallopian tubes**: Points to the fallopian tube area.
  - Artificial cervix**: Points to the cervical area.
  - Artificial penis**: Points to the penile area.
  - Artificial testicles**: Points to the testicular area.
  - Artificial prostate**: Points to the prostatic area.
  - Artificial vas deferens**: Points to the vas deferens area.
  - Artificial epididymis**: Points to the epididymal area.
  - Artificial scrotum**: Points to the scrotal area.
  - Artificial urethra**: Points to the urethral area.
  - Artificial meatus**: Points to the meatal area.
  - Artificial glans**: Points to the glans area.
  - Artificial foreskin**: Points to the preputial area.
  - Artificial clitoris**: Points to the clitoral area.
  - Artificial labia majora**: Points to the labial area.
  - Artificial labia minora**: Points to the labial area.
  - Artificial hymen**: Points to the hymenal area.
  - Artificial vagina**: Points to the vaginal area.
  - Artificial uterus**: Points to the uterine area.
  - Artificial ovaries**: Points to the ovarian area.
  - Artificial fallopian tubes**: Points to the fallopian tube area.
  - Artificial cervix**: Points to the cervical area.
  - Artificial penis**: Points to the penile area.
  - Artificial testicles**: Points to the testicular area.
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  - Artificial foreskin**: Points to the preputial area.
  - Artificial clitoris**: Points to the clitoral area.
  - Artificial labia majora**: Points to the labial area.
  - Artificial labia minora**: Points to the labial area.
  - Artificial hymen**: Points to the hymenal area.



## What is Transhumanism?

Watch the video: **"Transhumanism: Will Humans Evolve to Something Smarter? A-Z of ISMs: Episode 20,"** BBC Ideas, December 31, 2019.

**Ask the students:** “What are some of your initial thoughts on transhumanism and how it looks at our future as humans?”

Ask students to reflect on the idea (elicits moral intuition) and on how the idea relates to the previous units/lessons on human origin (evolution) and nature (body/mind dualism).

Outline what is being presented in this video.

## The essential elements of transhumanism:

Human beings are an “unfinished product” of evolution.

- As evolutionary biologists propose, we evolved from *homo erectus* to *homo sapiens* and are now considered the human race.
- Many believe that humans are the “final” or the end evolutionary product because of our advanced abilities compared to other animals/organisms, but transhumanists believe that we are an “unfinished product.”
- Evolution continues as time passes, so we are still evolving, and there might be a “better version” we can evolve into (though it will take a long time).

## Transhumanism



## Q&A



One may ask that if we are “naturally” changing, why not induce changes to speed up or better control that process?

- If we induce these changes, perhaps we can select changes that are beneficial and influence what will happen.

The goal of transhumanism is to extend ourselves, via bioscience and technology, beyond the limits of our frail bodies which are susceptible to decline and disease; to transform humans into a being that no longer has these frailties.

As evolutionary mechanisms were discussed, we see the process of evolution being one that weeds out weak aspects and replaces them with a better functioning version.

According to the transhumanistic worldview, some examples of what has been proposed as transhuman changes are:

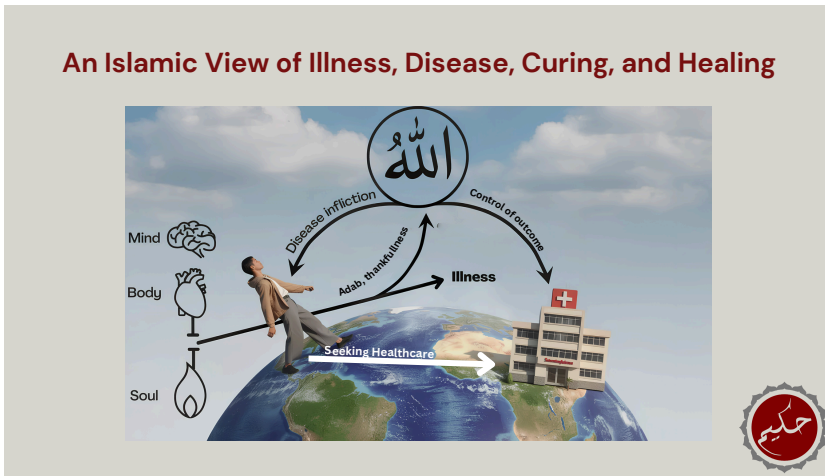
- Incorporating super-functioning body parts into a human being, like making your limbs stronger, perhaps faster.
- Uploading the “mind” to a computer or electronic device and by doing so the mind is preserved (where usually there would be a decline in brain function as one ages). This “mind” could perhaps then be transferred into another form/body, so that your “essence” or consciousness can be maintained outside of the biological body.

Would this mean that the soul will transferred also? (an interesting philosophical question). Genetically engineering bodies for better function: genetically altering disease-causing elements of the gene in a manner that eliminates that disease or dysfunction (this could also be catered to the environment one lives in).

### **Biomedical Interventions and Biomedical Futures**

Before going further, it would be productive to understand the overarching Islamic view of illness, disease, curing, and healing.

## Slide 4.4: An Islamic View of Illness, Disease, Curing, and Healing



## Slide 4.5: Curing and Healing

**Curing and Healing**

Prophet Muhammad's statements

مَا أَنْزَلَ اللَّهُ دَاءً إِلَّا أَنْزَلَ لَهُ شِفَاءً  
(Ṣaḥīḥ al-Bukhārī 5678)  
"There is no disease that Allah has sent down (created), except that He also has sent down (created) its healing"

تَدَاوُوا عِبَادَ اللَّهِ فَإِنَّ اللَّهَ سُبْحَانَهُ لَمْ يَضَعْ دَاءً إِلَّا وَضَعَ مَعَهُ شِفَاءً إِلَّا الْهَرَمَ  
(Ibn Majah 4(31):3436)  
"Seek treatment, O slaves of Allah! For Allah does not create any disease but He also creates with it the cure, except for old age"

خَرَجَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ فَقَالَ " هُمْ الَّذِينَ لَا يَكْتُمُونَ وَلَا يَسْتَرْفُونَ وَلَا يَتَطَلَّيُونَ وَعَلَى رَبِّهِمْ يَتَوَكَّلُونَ "  
(Jāmi' al-Tirmidhī 2446)  
"They have never allowed themselves to be treated by cauterization... rather, they have put their trust in God alone"

Let us look at what our scriptural text says about it.

In the Qur'an, when Prophet Ibrāhīm (pbuh) is describing Allah (swt) and His Power, he explains:

وَإِذَا مَرِضْتُ فَهُوَ يَشْفِينِ

"and when I fall ill, [He] cures me"  
(Sūrah al-Shu'arā': 80)

**It is Allah (swt) who actually cures.**



Our beloved Prophet (pbuh) mentioned:

بَابُ مَا أَنْزَلَ اللَّهُ دَاءً إِلَّا أَنْزَلَ لَهُ شِفَاءً

“There is no disease that Allah has sent down (created), except that He also has sent down (created) its healing.”

(Ṣaḥīḥ al-Bukhārī 5678)

This *ḥadīth* presents two things. One, that both illness/disease is from Allah (swt) and so is the cure. And, two, this *ḥadīth* tells us that the cures for illnesses/diseases do exist and we may be able to discover them.

تَدَاوُوا عِبَادَ اللَّهِ فَإِنَّ اللَّهَ سُبْحَانَهُ لَمْ يَصْعَدْ دَاءً إِلَّا وَصَّعَ مَعَهُ شِفَاءً إِلَّا الْهَرَمَ

“Seek treatment, O slaves of Allah! For Allah does not create any disease but He also creates with it the cure, except for old age.”

(Sunan Ibn Majah 3436)

In this *ḥadīth*, the Prophet (pbuh) is specifically telling us to seek treatment. This suggests that action is required of us to attain that cure. Interesting to note that the Prophet (pbuh) makes the exception for old age, which denotes that perhaps there is no cure for old age. (The question that arises is old age a disease? And what are the symptoms of old age that can be remedied?)

فَخَرَجَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ فَقَالَ " هُمْ الَّذِينَ لَا يَكْتَوُونَ وَلَا يَسْتَرْقُونَ وَلَا يَتَطَيَّرُونَ وَعَلَى رَبِّهِمْ يَتَوَكَّلُونَ "

“They have never allowed themselves to be treated by cauterization... rather, they have put their trust in God alone.”

(Jamī al-Tirmidhī 2446)

There is a discussion here of why these people left the available treatment, where the Prophet (pbuh) in the earlier *ḥadīth* commands to seek treatment. This gives us the notion that it is not necessary to apply treatment in all cases, there is a spectrum of utility in Islam. The second part of the equation, as seen here, is trusting in Allah (swt). Seeking treatment, but also trusting that the actual effect of that treatment is under Allah (swt)'s purview.

We as Muslims have a theistic view of illness/disease because we believe that Allah (swt) is in control of both sides of the situation, the illness aspect as well as the cure/treatment aspect. But we have been given a responsibility to do some action (whether it is internal or external) in reacting to a given disease; not only physically seeking cure/treatment, but also having a manner in which one conducts themselves, within the situation, toward Allah (swt).

That is, trusting in Allah (swt), a hoping from Allah (swt) for the cure, being grateful, understanding that sins are being removed, and the like. And understanding that this trial, which is coming from Allah (swt), has an independent relationship to the outcome.

It is not the physician that heals, but the normative association that the physician is the avenue that allows for healing to take place through the medicine or actions s/he provides. In reality, the control is with Allah (swt) of whether that medicine provides that healing or not.

## Slide 4.6: Doctors, Diseases, and Definitions

### Doctors, Diseases, and Definitions

- What is the relationship between doctors and diseases?
  - Cure/heal/ameliorate
  - Combat/fight/terminate
  - (help) define
- How do you define a disease?
  - Does a child who is born deaf have a disease?
  - Does a person who is not able to conceive a child have a disease?



Therefore, in a more general sense, let us look at doctors and diseases:



**Ask students:** What is the relationship between doctors and diseases?

**A:** Doctors participate in the process of curing/healing/ameliorating a disease; first diagnosing and then providing a course of treatment (a metaphor of assistance)—the connotation being that the physician is supporting/guiding a patient through this affliction.

Doctors research a disease, their symptoms, and results for the body, and plan a course of action to address these events.

A doctor's job is to combat/fight/terminate the disease; to get rid of the disease completely. The connotation here is that the physician is actively trying to eradicate the affliction, consistent with the book *Men Against Death* Paul de Kruif authors.

## Doctors “Help” People

**Ask students:** How would we define the help that a doctor would provide?

In the transhumanist ideology, there is a particular connotation embedded in their views, which in turn, alludes to what the role of a physician is.

## How Do You Define a Disease?

How we define disease matters because the way we define disease will also determine what is the job of a doctor or what we view a doctor as. What are the professional responsibilities of a doctor.

**Ask students:**

1. Does a child who is born deaf have a disease? And Why?
2. Does a person who is not able to conceive a child have a disease? Why?
3. Did the disease exist before it was researched and defined?

## Group Discussion

Many students understand disease as a disorder/dysfunction, yet many students will say that a deaf child does not have a “disease.” Have students think through this and ask them to give their explanation as to why they do not consider this a “disease.”

## Slide 4.8: Defining Disease

### Defining Disease

- Related yet non-overlapping terms
  - Dis-ease → defined by subject
  - Dis-ability → defined by subject and society (tied to flourishing)
  - Dis-order → defined by society (tied to function)
  - Dys-function → abnormality or impairment or deviation from **norms** of physiology or social behavior
    - defined by professionals and society



## Defining Disease, Disability, Disorder, and Dysfunction

These are related yet non-overlapping terms. There is no singular notion of what disease is, which directly implies that there is no singular notion of what a doctor is/should be aiming to do.

■ *Dis-ease* is defined by subject, that is, when a person is not at ease.

A physician's role then would be to remove that dis-ease and make them at ease; therefore, it is defined by the subject/person experiencing the dis-ease.

■ *Disability* is defined by subject and society; it is tied to flourishing. It is when one does not have the ability to function in society or do something that is considered "normal" in society and carry out daily tasks.

A physician's role then would be to make them "able" again (if capacity was lost) or to help create tools to augment their abilities to reach a specific norm of ability.

■ *Disorder* is defined by society. The "order" is dictated by society, when order in society is disrupted due to a person's condition, or can be defined by a professional society (i.e., structural order within the body). The body works in a certain way, we know what eyes are supposed to do—see, the ears are supposed to hear, and so on.

This then means that a physician should work on restoring that order or maintaining that order as defined by society.

■ *Dys-function* is an abnormality or impairment or deviation from norms of physiology or social behavior. This is closely related to the above, but instead of order we ask "Who defines 'normal' physiology and how?" It is defined by professionals and society.

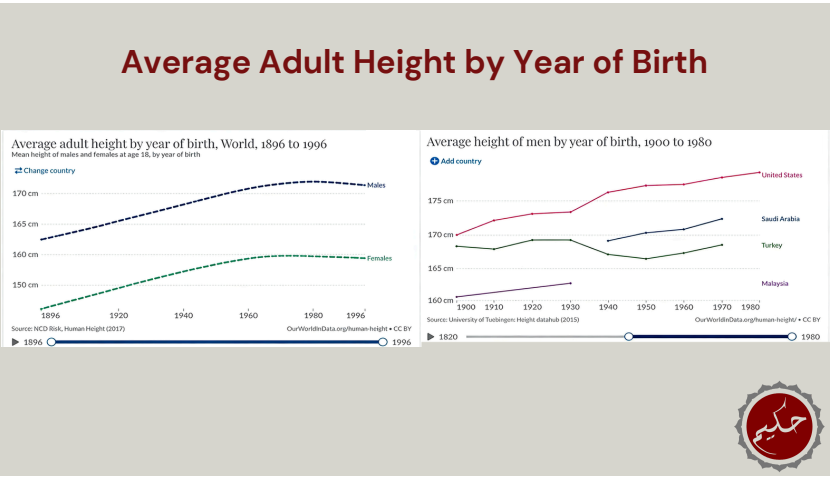
Should all bodies be able to hear and conceive? This is where the discussion comes in of who defines norms, and how they are defined; most norms are defined by certain ideologies of what the function of the person/body as a whole, or part of the person/body, should be.

Defining norms also from a theological perspective.

**NOTE:** One's notion of disease or how one defines disease has clear implications as to what a physician believes s/he should or should not be doing.



## Slide 4.9: Average Adult Height by Year of Birth



To understand this concept further, let us take the example of height.

### Data Analysis: Charts/Graphs

The first chart in Slide 4.9 shows the average adult height by year of birth, over a century (1896– 1996).

**Ask students:** What trend do you see here?

**A:** The average height is increasing, then plateaus, and also there seems to be a slight dip at the end. Comparing males versus females, males are taller. Height is seen to change over the course of time, it has not been static; still changing.

**Key point:** Normal distribution of human attributes and capacities can change over time.

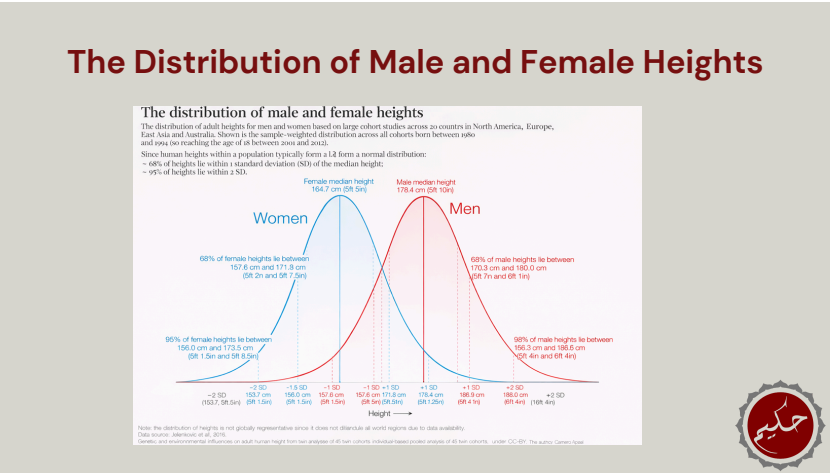
The second chart in Slide 4.9 shows the average adult height specified by region, in the United States, Saudi Arabia, Turkey, and Malaysia, over an 80-year period (1900–1980). There is a lot more variability seen here, specifically for males.

**Ask students:** Based on this graph, looking at this data, what do you see happening here?

**A:** The average height of males is different based on the region. In around 1930, we see a stark difference. In America, the great depression is happening; in Turkey, there is a lot of political/economic disorder and turbulence; Saudi Arabia was formally established by King Abdulaziz Al Saud in 1932 (recording starts after that); and in Malaysia, the economic depression and Chinese immigration impact the curves.

Due to the environment or conditions in which these males live, their heights seem to be affected. The chart represents that variability

Slide 4.10: The Distribution of Male and Female Heights

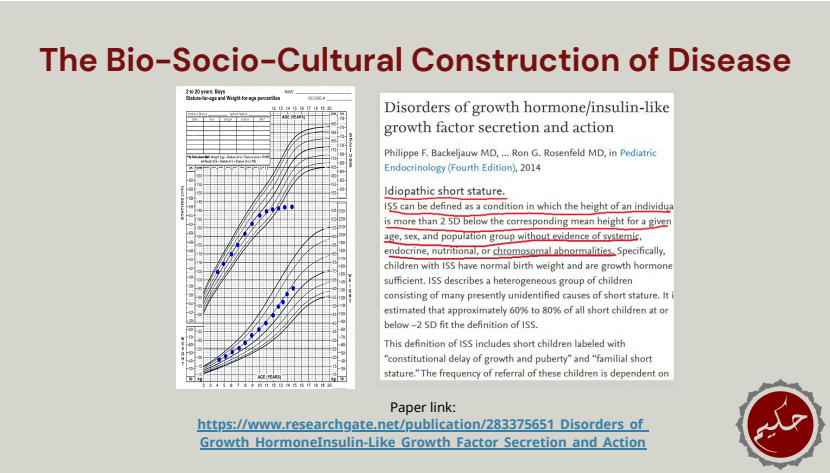


Distribution Curves of Male and Female Height (Bell Curves)

The bell curve is usually called a “normal” distribution curve, but it should be referred to as an “average” instead. We discussed earlier about the understanding of “normal” and what that implies.

If we use the term “normal” and you are two standard deviations away from the average, you would be considered abnormal.

Slide 4.11: The Bio-Socio-Cultural Construction of Disease



The Bio-Socio-Cultural Construction of Disease

In medicine, we use notions of “normality” regularly. Let us look at the example of individual height curves.

When your parents took you to the paediatrician’s office, they were shown these curves. Your height and weight at each visit are recorded, and over time, this curve is plotted to see your growth pattern. This is plotted on a curve that contains the average distribution of other children.

As we see here (on the graph with the stature/height), the plotted points are no longer following the curve, this child is falling off the curve and going below the average distribution curve. The doctor would tell the parents that this is abnormal.

Idiopathic short stature (ISS) is defined as a disease and quantified by being at least 2 standard deviations off the curve. Idiopathic means that we have no known cause for the person’s lower-than-average height; so short stature is considered a disease. Therefore, that means doctors should address this issue, and treat/cure/ameliorate this problem.

Why has this been considered a problem? Because according to society, or others in your region, this is not “normal” and there are harms that may fall upon the person if they are too short (see impacts below).

So this is an example of the sociocultural construction of disease.

Physiologically, this has been identified by the doctor, but are there any social harms of this? Especially because we are saying that this is an example of society and culture establishing or defining what a disease is.

Slide 4.12: The Impact of Short Stature

### The Impact of Short Stature

**Height, body mass index, and socioeconomic status: mendelian randomisation study in UK Biobank**

Jessica Tyrrell,<sup>1,2</sup> Samuel E Jones,<sup>3</sup> Robin Beaumont,<sup>4</sup> Christina M Astley,<sup>3,4</sup> Rebecca Lovell,<sup>2</sup> Haniyel Yaghoobkar,<sup>5</sup> Marcus Tuke,<sup>6</sup> Katherine S Ruth,<sup>7</sup> Rachel M Freathy,<sup>8</sup> Joel N Hirschhorn,<sup>2,9,10</sup> Andrew R Wood,<sup>1</sup> Anna Murray,<sup>1</sup> Michael N Weedon,<sup>1</sup> Timothy M Frayling<sup>1</sup>

**ABSTRACT**  
To determine whether height and body mass index (BMI) have a causal role in five measures of socioeconomic status.

**DESIGN**  
Mendelian randomisation study to test for causal effects of differences in stature and BMI on five measures of socioeconomic status. Mendelian randomisation explains the fact that genotypes are randomly assigned at conception and thus not confounded by non-genetic factors.

**SETTING**  
UK Biobank.

**PARTICIPANTS**  
119 669 men and women of British ancestry, aged between 42 and 73 years.

**MAIN OUTCOME MEASURES**  
Age completed full time education, degree level education, job class, annual household income, and Townsend deprivation index.

**RESULTS**  
In the UK Biobank study, shorter stature and higher BMI were observationally associated with several measures of lower socioeconomic status. The associations between shorter stature and lower socioeconomic status tended to be stronger in men, and the associations between higher BMI and lower socioeconomic status tended to be stronger in women. For example, a 1 standard deviation (SD) higher BMI was associated with a £216 (£20, \$295, 95% confidence interval £6 to £420, P=4e-10) lower annual household income in men and a £185 (£160 to £210, P=4e-10) lower annual household income in women. Genetic analysis provided evidence that these associations were mostly causal. A genetically determined 1 SD (0.3 cm) taller stature caused a 0.06 (0.02 to 0.09) per older age of completing full time education (P<0.01), a 1.12 (1.07 to 1.18) times higher odds of working in a skilled profession (P<e-10), and a £130 (£48 to £210) higher annual household income (£480 to £590) higher annual household income (£290 to £420, P=1e-10). Taller annual household income and a 0.10 (0.04 to 0.16) SD (P<0.001) higher level of deprivation in women only.

**CONCLUSIONS**  
These data suggest evidence that height and BMI play an important partial role in determining several aspects of a person's socioeconomic status, especially women's BMI for income and deprivation and men's height for education, income, and job class. These findings have important social and health implications, supporting evidence that overweight people, especially women, are at a disadvantage and that taller people, especially men, are at an advantage.

- Taller men
  - Higher level of mean education
  - Higher incomes
  - Other sociological data
  - Shorter kids
    - Prone to bullying → psychological impacts
  - Shorter men & Taller women
    - Fewer romantic prospects

Paper link:  
<https://pubmed.ncbi.nlm.nih.gov/26956984/>



Impact of Short Stature

A study of the harms of short stature using varied metrics, was made in the UK with a biobank of almost 200,000 people.

The results were:

- Taller men are associated with a higher level of mean education, which in turn is associated with higher incomes.
- Other sociological data:
  - Shorter kids: prone to bullying due to their size, which leads to psychological impacts (lack of confidence, inferiority complex, and the like).
  - Shorter men and taller women: have fewer romantic prospects because it goes against norms of society; the norm is to have taller men and women who are shorter than those men.

Slide 4.13: Let’s Fix This = Biomedical Interventions

Let’s Fix This = Biomedical Interventions

| Treatment                                                                      | Estimated Adult Height in Inches (±1.3 in.) | Psychological Benefit or Harm | Estimated Treatment Cost                                                                                                                            |
|--------------------------------------------------------------------------------|---------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| No medication                                                                  | 65                                          | Uncertain                     | No cost for drug with or without cost for counseling                                                                                                |
| Low-dose androgen (i.e., oxandrolone)                                          | 65                                          | Uncertain                     | Oxandrolone, 2.5 mg/day, \$2,920/yr × 2.5 yr = \$7,300                                                                                              |
| Human growth hormone until onset of puberty                                    | 66                                          | Uncertain                     | Human growth hormone at dose for idiopathic short stature (0.375 mg/kg/wk) × 2.5 yr = \$76,050                                                      |
| Human growth hormone until normal range (e.g., 5th percentile) of adult height | 66                                          | Uncertain                     | Human growth hormone × 4 yr = \$133,087                                                                                                             |
| Human growth hormone until completion of growth                                | 66–67                                       | Uncertain                     | Human growth hormone × 5 yr = \$176,962                                                                                                             |
| Human growth hormone until maximum attainable height                           | 68                                          | Uncertain                     | Human growth hormone at dose for idiopathic short stature × 2.5 yr plus “pubertal” dose of human growth hormone (0.7 mg/kg/wk) × 2.5 yr = \$264,420 |

<sup>a</sup> To convert the values for inches to centimeters, multiply by 2.54. Costs of therapy were based on estimates of weight derived from the 3rd percentile for age: a mean of 28 kg from 11 up to 13 years of age, 36 kg from 13 up to 15 years, and 45 kg from 15 to 16 years. Medication costs, obtained from Epocrates Online, were \$50 per milligram of human growth hormone (the lowest current available per-milligram cost listed was \$50 to \$75 per milligram) and \$8 per 2.5-mg tablet of oxandrolone.

A doctor’s job is now presumed to be to fix this “problem.”

According to a physiological perspective, as seen on the growth curves, and from a sociocultural perspective, this is an issue, and we should use biotechnology to fix that.

Data on giving growth hormones: there are no long-term studies/ data that this addresses all the potential harms. There is still a lot of uncertainty but doctors have seen benefit in some cases.

This is treating a “disease” without any known causes.

Some adults have gone to more invasive procedures, where leg bones are broken, then adjustments are made to then lengthen them, for that height increase.

## Slide 4.14: Biomedical Construction of a Disease

**Biomedical Construction of a Disease**

- Is high blood pressure a disease?
  - What if we had no sphygmomanometer?
- Is being childless a disease?
  - What if there were no artificial reproductive biotechnologies?





Biomedical technology allows us to see “diseases” that were not considered diseases before.

Q&A

**Ask students:** Would there be such a thing as high blood pressure as a disease if we did not have the blood pressure cuff/sphygmomanometer? Did high blood pressure actually exist?

A: Yes, because we saw the symptoms, effects, or outcomes of it. BUT, the tool for measuring the cause of this disease did not exist earlier, therefore, the labeling and the association of cause and effect of this particular disease was not present. Now that we have the tool, the blood pressure cuff, there is an identification of this disease, an association of symptoms to it is results/ effects, which is now known as high blood pressure.

**Ask students:** Would being childless be considered a disease? What if there were no artificial reproductive biotechnologies?

A: No, childlessness is not a disease; see verses (Q.42:49–50); some people are created “barren” by Allah (swt). Having children is a gift, not a right, and the lack of children does not diminish one’s humanity.

So infertility is a condition/state but not a disease demanding remedy from a theological standpoint.

Yet, not having children could be seen as abnormal in some cultures/societies and thus could be grounds for the label of disease.



**Ask students:** Can you think of an example of a disease that “came into existence” due to biomedical technologies?

Note: Student answers will vary:

For example, onset of diabetes: Before the advent of accurate blood glucose measurement tools, the spectrum of blood sugar levels between normal and diabetic wasn't as well-defined. With improved glucose monitoring, medical professionals can now identify individuals with blood sugar levels higher than normal but not high enough to be classified as diabetes. This recognition has led to interventions and lifestyle changes aimed at preventing or delaying the onset of full-blown diabetes, potentially averting complications.

## Slide 4.15: The Main Points

### Main Points

- Diseases are variably defined (4 Ds).
- Bioscience can define a disease based on idea of the “normal” spectrum of physical or social attributes and assess harms of abnormality.
- Biomedicine can then develop treatments to address that dysfunction.
- Human bodies are changing → Normality changes over time and across space

(Claim = empirical proposition based on probabilistic knowledge)



### In Summary

- Diseases are variably defined (4 Ds).
- Bioscience can define a disease based on the idea of the “normal” spectrum of physical or social attributes and assess the harms of those abnormalities.
- Biomedicine can then develop treatments to address that condition/malady.
- Human bodies are changing.
  - Normality changes over time and across space.
  - Claim = empirical proposition based on probabilistic/ẓanni knowledge