

12/4/2022

# Metabolic Syndrome

## & Its Related Diseases

محمد كمال السيد محمد محمد  
FCI-CU



# METABOLIC SYNDROME

Prepared for:

Dr. Ammar Mohammed

Prepared by:

No.	Name	ID
1	Diaa El Din Essam	20200270
2	Karim Walid Ali	20200397
3	Mohammed Kamal Alsud	20200468
4	Youssef Talaat Sobhy	20200657

27th December

Winter 2022

# EXPERTISE INFO

Dr. Maisa Abd Elkawy Abu Hellal

## Job Title

Vascular surgery Registrar

## Education

- M.Sc. in general surgery, faculty of medicine – Al-Azhar university, at April 2015 degree: Good.
- M.B., B.Ch faculty of medicine – Al-Azhar university in December 2008, degree: very good. Surgery degree: very good.

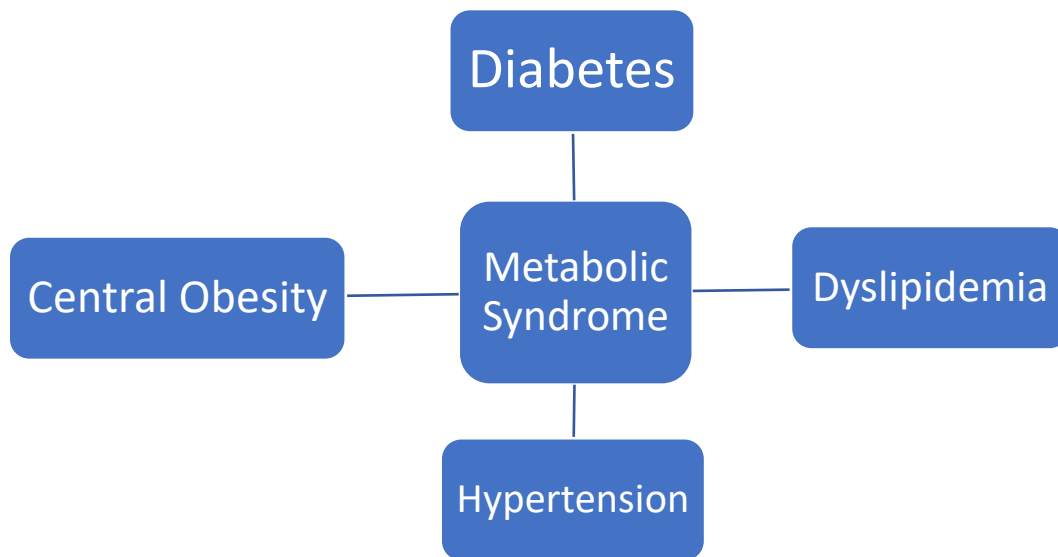
## Work experience

- Mar. 2009 – Mar.2010: house officer at AL Tanta hospital, Tanta university, Egypt.
- Mar.2010- Dec. 2011: assistant in private clinic with prof. of vascular surgery at Tanta University Egypt.
- Jan. 2012- August 2012: vascular surgery resident at Mabaret El-Maadi, Cairo– Egypt.
- August 2012-March 2016: resident of vascular surgery at National Institute of Diabetes & Endocrinology.
- April 2016-August 2017: vascular surgery specialist at El-Menshawey General Hospital.
- August 2017- July 2018: vascular surgery specialist at national institute of Diabetes & Endocrinology
- July 2018 – now: vascular surgery specialist at El-Menshawey General Hospital.

## Courses & conferences

- Egyptian Venous Forum 2<sup>nd</sup> Annual congress at 6<sup>th</sup>-7<sup>th</sup> of November 2014, Alexandria, Egypt.
- workshop (wound care management – Advanced course) on 6<sup>th</sup> November 2014, Alexandria, Egypt.
- Diabetic foot and vascular diseases in diabetics, the 2<sup>nd</sup> annual meeting, National Institute of Diabetes in collaboration with Kasr El-Aini at 12<sup>th</sup> -13<sup>th</sup> December 2013 ,6 October, Egypt.
- Diabetic foot and limb salvage challenge and solutions 3rd annual meeting at 10<sup>th</sup>-12<sup>th</sup> December 2015, Egypt.
- Workshop (Duplex Assessment of Tibial Arteries in Diabetics) on 11<sup>th</sup> December 2015, Egypt.
- 11<sup>th</sup> Annual meeting of the EVC Meet the world Leader at 1<sup>st</sup>-3<sup>rd</sup> October 2015, Egypt.

# METABOLIC SYNDROME



- High blood pressure (hypertension) often occurs alongside with diabetes and obesity. Together, these conditions fall under umbrella of metabolic syndrome. People with metabolic syndrome are at increased risk for cardiovascular diseases.

-Diabetes (type 2), atherosclerosis, central obesity, dyslipidemia, non-hereditary high cholesterol, and hypertension are part of the metabolic syndrome.

## DIABETES (TYPE 2)

Symptoms of the disease:

- Craving to eat (Persons become hungry fast) (Polyphagia)
- Drink Large Quantity of water along (Polydipsia) with Urinating a lot (Polyurea)
- Unintentional Weight Loss
- Weak immunity and recurrence of infection

Complications of the disease:

- Peripheral neuropathy
- Recurrence of infections (skin, urinary tract infection, chest infections, diabetic foot infection.....)
- Eye (retinopathy, cataract)
- Arterial insufficiency (the arteries of the legs, heart, neck, and brain)

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# CARDIOVASCULAR DISEASES

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Symptoms of the disease:

- Chest pain called also “Angina Pectoris” (Can be used also as complication of disease)
- Shortness of breath & exhaustion
- Fatigue

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## HYPERTENSION

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Symptoms of the disease is hard to detected but some people with hypertension suffer from:

- Headache
- Shortness of breath
- Nose bleeds
- Buzzing in the ears

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## DYSLIPIDEMIA

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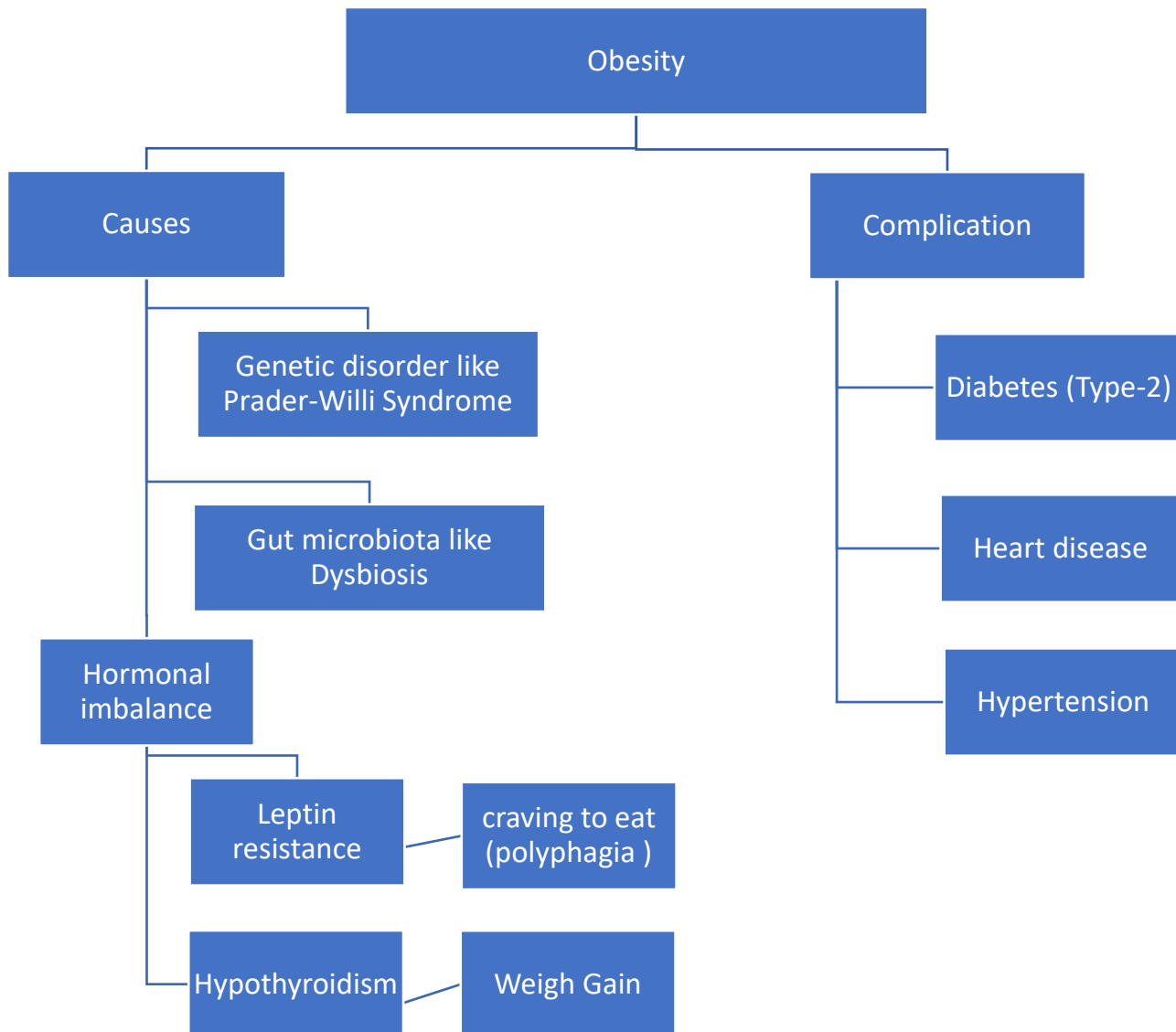
Symptoms of the disease:

- Leg Pain
- Shortness of breath
- Chest pain called also “Angina Pectoris”

Dyslipidemia can lead to cardiovascular disease at risk levels

# CENTRAL OBESITY

Obese patient is the individuals with a body mass index (BMI) of more than 30.0 kg/m<sup>2</sup>. It is affected by complex interaction between environment, diet, genetics, lifestyle, endocrine disorders, medication, and psychological factors



**Q: is obesity associated with other diseases?**

Expertise Answer: Obesity is associated with other disease like diabetes, hypertension, hyperlipidemia, cancer, sleep apnea, ischemic heart diseases and increased risk of several cancers, including colon, endometrial, kidney, esophageal, liver, pancreatic and breast

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# PERIPHERAL NEUROPATHY

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## Symptoms of the disease:

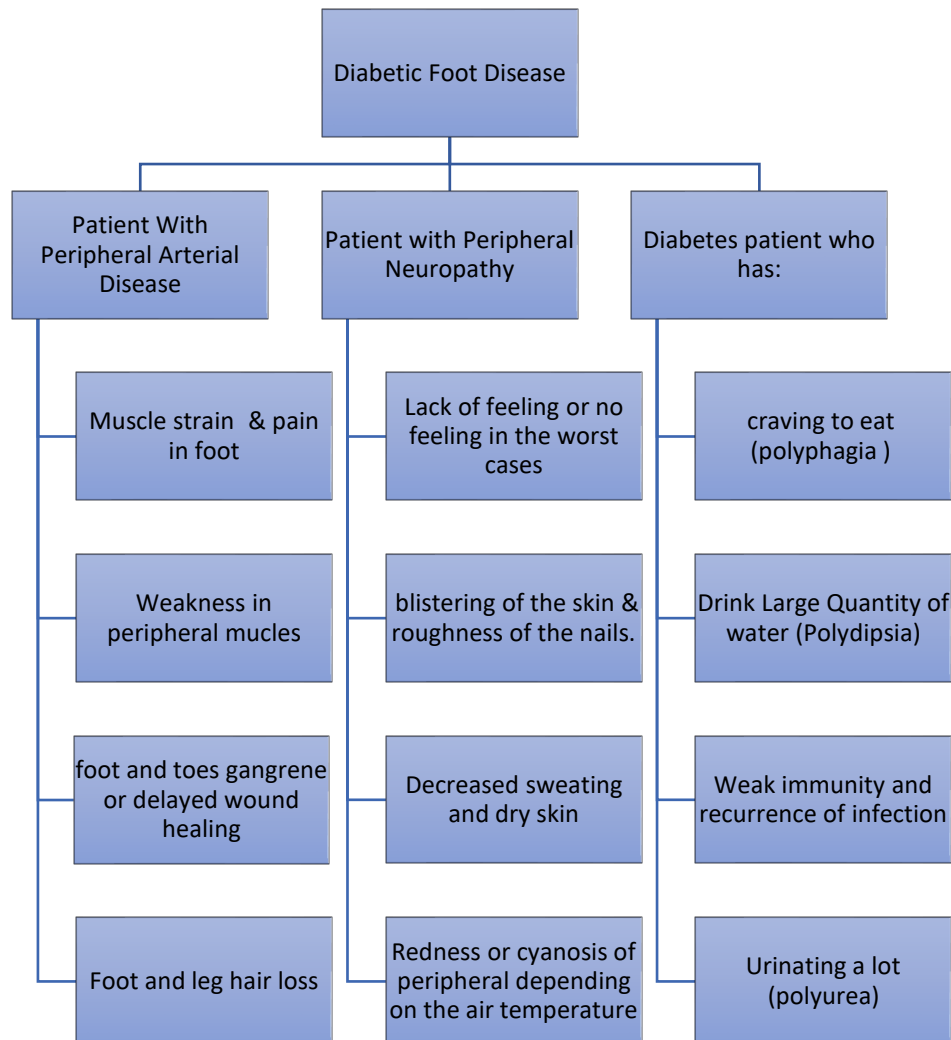
- Gradual onset of numbness, prickling or tingling in your feet or hands, which can spread upward into your legs and arms
- Sharp, jabbing, throbbing, or burning pain
- Extreme sensitivity to touch
- Pain during activities that shouldn't cause pain, such as pain in your feet when putting weight on them or when they're under a blanket
- Lack of coordination and falling
- Muscle weakness
- Feeling as if you're wearing gloves or socks when you're not
- Paralysis if motor nerves are affected

## Complications of the disease:

- **Burns and skin injuries.** You might not feel temperature changes or pain on parts of your body that are numb.
- **Infection.** Your feet and other areas lacking sensation can become injured without your knowing. Check these areas regularly and treat minor injuries before they become infected, especially if you have diabetes.
- **Falls.** Weakness and loss of sensation may be associated with lack of balance and falling.

# DIABETIC FOOT DISEASE

Symptoms of the disease:



Q: is there a relation between peripheral neuropathy and diabetes?

Expertise Answer: if patient has peripheral arterial disease due to diabetes, then it must have peripheral neuropathy but not vice versa (Arterial Disease leads to a lack of blood nourishing the nerves, which leads to nerve ischemia). Also, Diabetes leads to neuropathy, not the other way around

Q: what are the causes of peripheral neuropathy in diabetes mellitus?

Expertise Answer: diabetes is often accompanied by vitamin B deficiency because of frequent urination, diabetes medications, malnutrition and malabsorption associated with the disease a long with peripheral arterial disease caused by diabetes mellitus.



Q: Is there a relationship between dry skin and diabetes?

Expertise Answer: Malnutrition associated with diabetes, vitamin deficiencies, peripheral neuropathy, and dehydration resulting from the disease leads to dry skin (not the other way around).

Q: can dry skin as single sign to diagnose diabetes mellitus or peripheral neuropathy??

No as dry skin has many causes and can be found with a lot of diseases

*Thank  
you*



12/13/2022

# Metabolic Syndrome

Related Diseases

محمد كمال السيد محمد محمد  
FCI-CU

# WARMING

Strong Sign Stand for If Then Relation While Weak Sign Stand for entailment or consistent relation. due to PYKE limitation, weak sign will be eliminating due to non-supportability of PYKE

Also, the scope of diseases is limited to given knowledge representation as single Symptom can be shared between a lot of disease like dry skin. The information was taken from a doctor who specializes in blood vessels and diabetic foot

## LOGICAL LANGUAGE

### Metabolic syndrome:

1-at least 2 factors must be met to say patient has metabolic syndrome

$$\begin{aligned} & [ (Diabetes \wedge Dyslipidemia) + (Diabetes \wedge Hypertension) + (Diabetes \wedge Obesity) \\ & \quad + (Dyslipidemia \wedge Hypertension) + (Dyslipidemia \wedge Obesity) \\ & \quad + (Hypertension \wedge Obesity) ] \wedge Metabolic\ Syndrome \end{aligned}$$

2-if person has metabolic syndrome & diabetes (Type 2), then he must suffer from atherosclerosis

$$Metabolic\ Syndrome \wedge Diabetes \Leftrightarrow Atherosclerosis$$

### Diabetes (Type-2):

3-Diabetes (Type 2) Symptoms:

Strong Sign: polyphagia, polydipsia, and polyurea

Weak Sign: Weight Loss and Weak immunity

$$(polydipsia + polyurea) \wedge polyphagia \rightarrow Diabetes$$

4-Patient with diabetes (Type 2) can suffer from Peripheral neuropathy as complication of disease

5-Diabetes (Type-2) led to Weak immunity and recurrence of infection

$$Diabetes \rightarrow (Weak\ Immunity\ and\ Recurrence\ of\ infection) + Peripheral\ neuropathy$$

## Cardiovascular diseases:

6- atherosclerosis lead to cardiovascular diseases

7- shortness of breath or exhaustion along with angina pectoris strong sign of cardiovascular diseases

*Atherosclerosis + (Shortness of Breath + Exhaustion) ^ Angina Pectoris → Cardiovascular Diseases*

## Hypertension:

10- Headache is result from hypertension (Most Common Symptoms)

11- if blood pressure greater than 140/90mmHg then patient has hypertension (Most accurate symptoms)

*HeadAche + Blood Pressure >  $\frac{140}{90}$  mmHg → Hypertension*

## Dyslipidemia:

12- Dyslipidemia Symptoms:

Strong Sign: chest pain and Leg Pain

Weak Sign: shortness of breath

*Angina Pectoris ^ Leg Pain → Dyslipidemia*

13- Dyslipidemia can lead to cardiovascular disease at risk levels

*Dyslipidemia → Cardiovascular Diseases*

## Obesity:

14- if Body Mass Index (BMI) > 30.0 kg/m<sup>2</sup>. then person has obesity (You can Calculate it through GUI)

$BMI > \frac{30kg}{m * m} \Leftrightarrow Obesity$

15- Obesity patient has high risk of cardiovascular diseases, Diabetes (Type-2), or Hypertension

*Obesity → Cardiovascular Diseases + Diabetes + Hypertension*

## Peripheral neuropathy:

14- Peripheral neuropathy Symptoms:

Strong Sign: Gradual onset of numbness (Lack of feeling), prickling or tingling in your feet or hands (can spread upward into your legs and arms), burning pain, and Redness or cyanosis of peripheral depending on the air temperature

Weak Sign: Muscle weakness, Sharp pain and Decreased sweating and dry skin

At least 2 of strong signs must be satisfied

16- Peripheral neuropathy led to blistering of the skin

*Peripheral neuropathy* → Blistering of the skin

## Peripheral Arterial:

17- Peripheral Arterial Disease symptoms:

Strong signs: Muscle strain, pain in foot, and Weakness in peripheral muscles, foot, and toes gangrene, or delayed wound healing

Weak signs: Foot and leg hair loss & dry skin

At least 2 must be satisfied

18-if patient has peripheral arterial disease due to diabetes, then it must have peripheral neuropathy

*(Peripheral arterial disease ^ Diabetes) → Peripheral neuropathy*

## Diabetic foot disease:

18- if patient has peripheral arterial disease, peripheral neuropathy & diabetes (Type 2) then he has Diabetic foot

*Peripheral arterial ^ Peripheral neuropathy ^ Diabetes  $\Leftrightarrow$  Diabetic Foot*

19-Diabetes leads to peripheral neuropathy

*Diabetes  $\rightarrow$  Peripheral neuropathy*

21-Diabetes is often accompanied by vitamin B (because of frequent urination, diabetes medications, malnutrition and malabsorption associated with the disease along with peripheral arterial disease caused by diabetes mellitus.)

22-Diabetes can result in dry skin due to vitamin deficiencies, peripheral neuropathy, peripheral arterial disease, and dehydration

*Diabetes  $\rightarrow$  deficiency of vitamin B + Dry Skin*

23- dry skin has many causes and can be found with a lot of diseases

It doesn't have representation it simply means never use dry skin as measure for disease as it already occurs in 3 diseases in this scope

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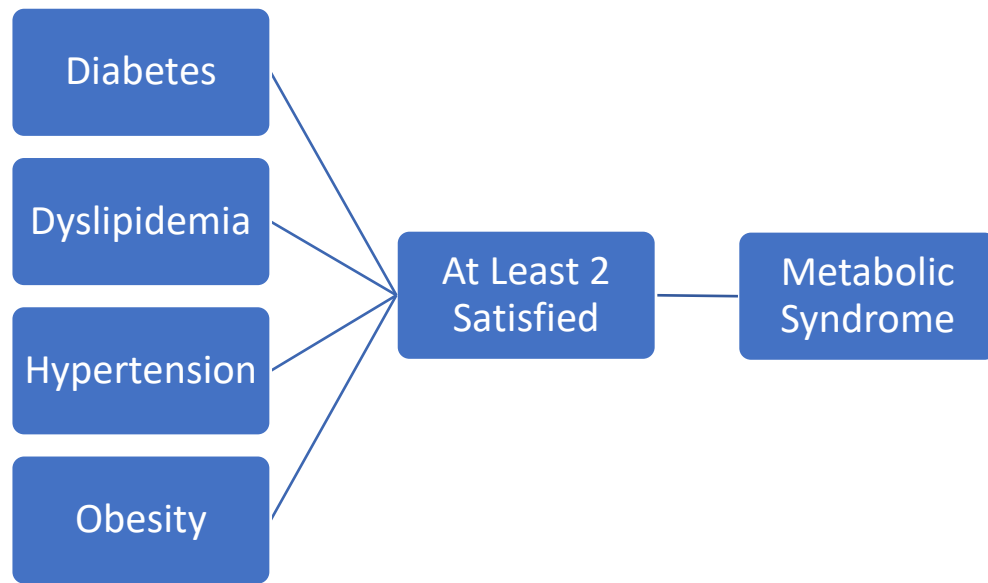
12/18/2022

# Knowledge Engineering

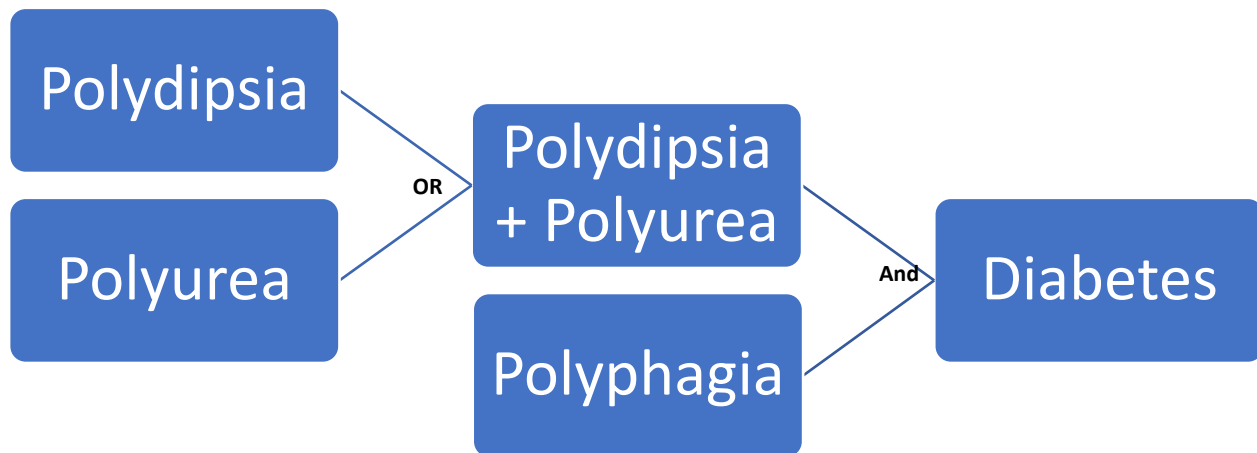
For Knowledge Representation  
Document

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FCI-CU

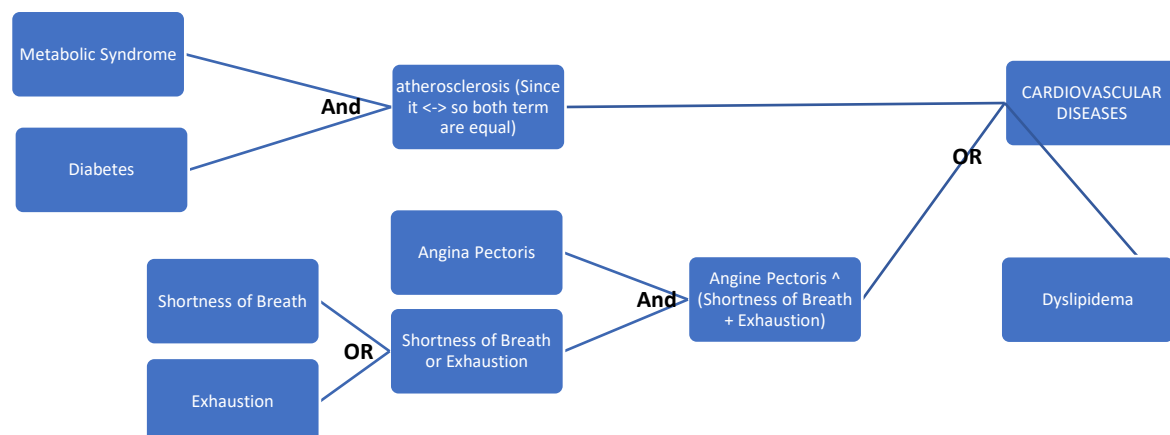
## Metabolic Syndrome:



## Diabetes (Type-2):

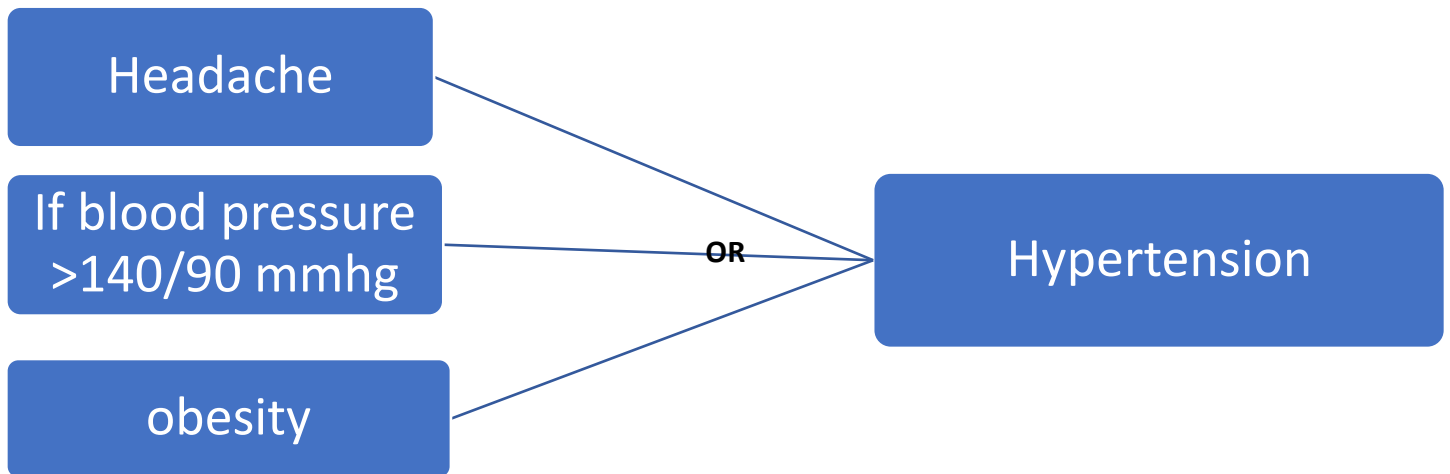


## Cardiovascular diseases:





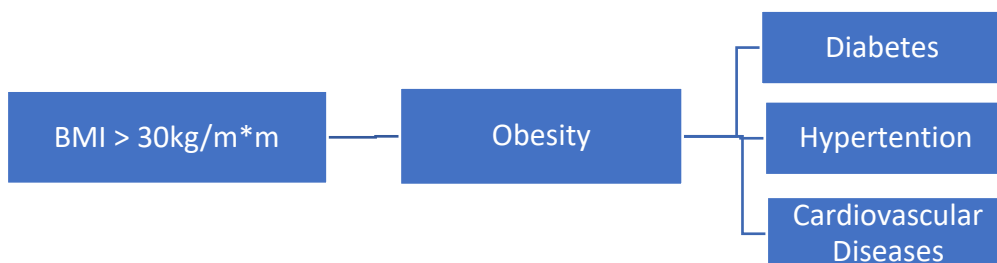
Hypertension:



Dyslipidemia:



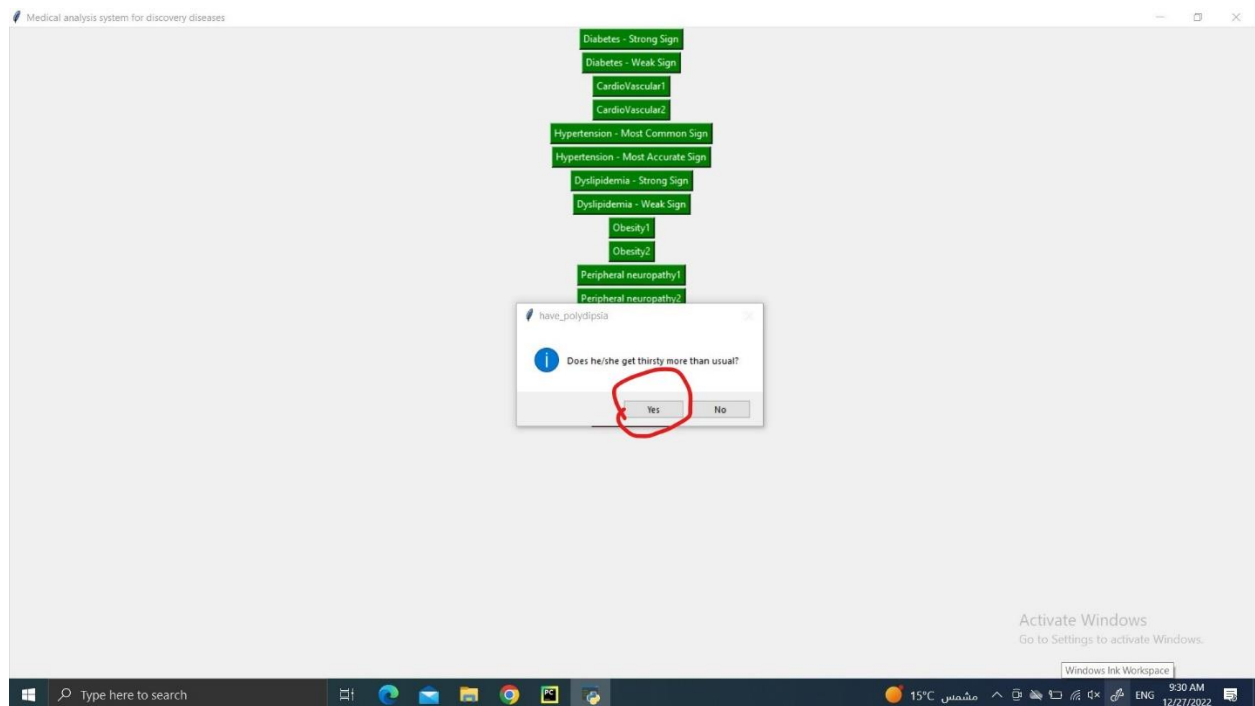
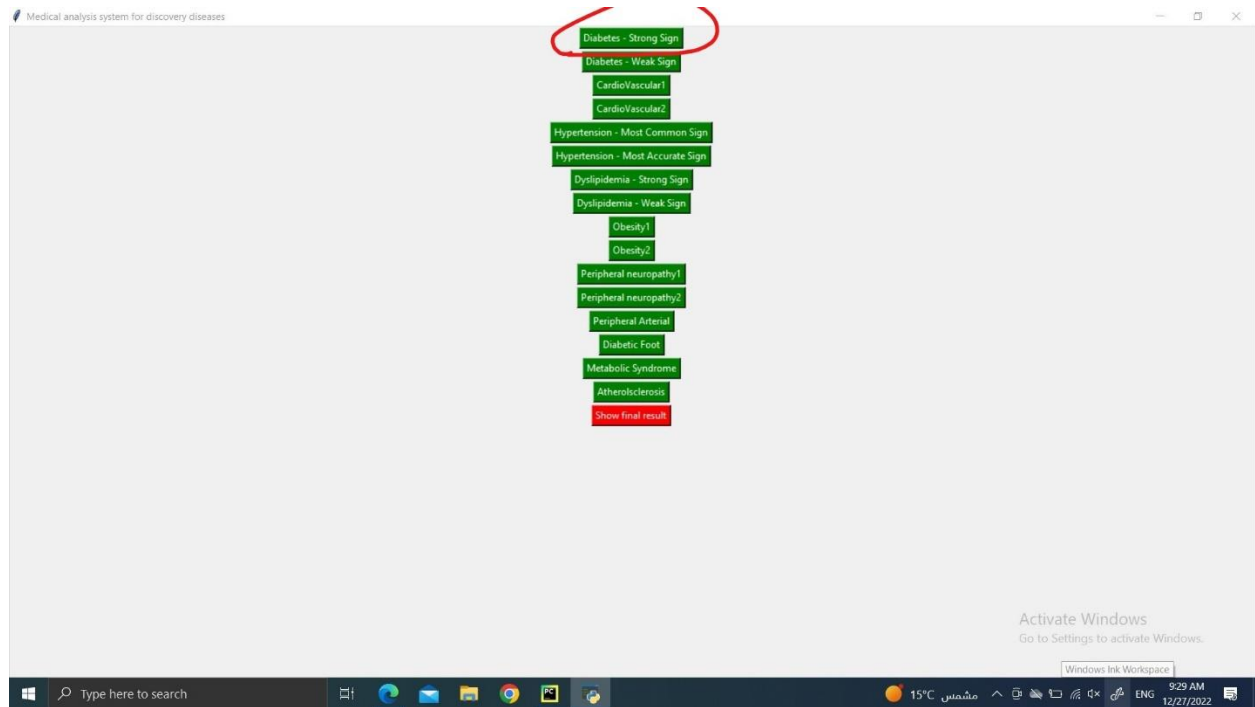
Obesity:

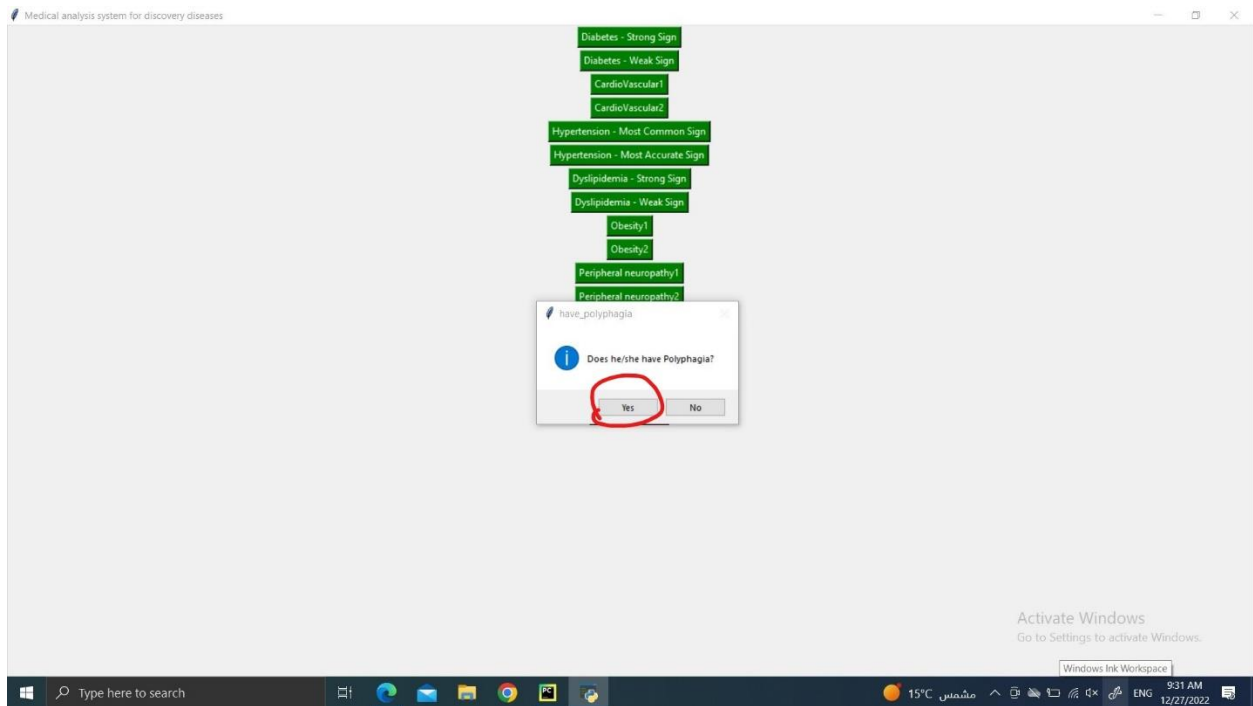
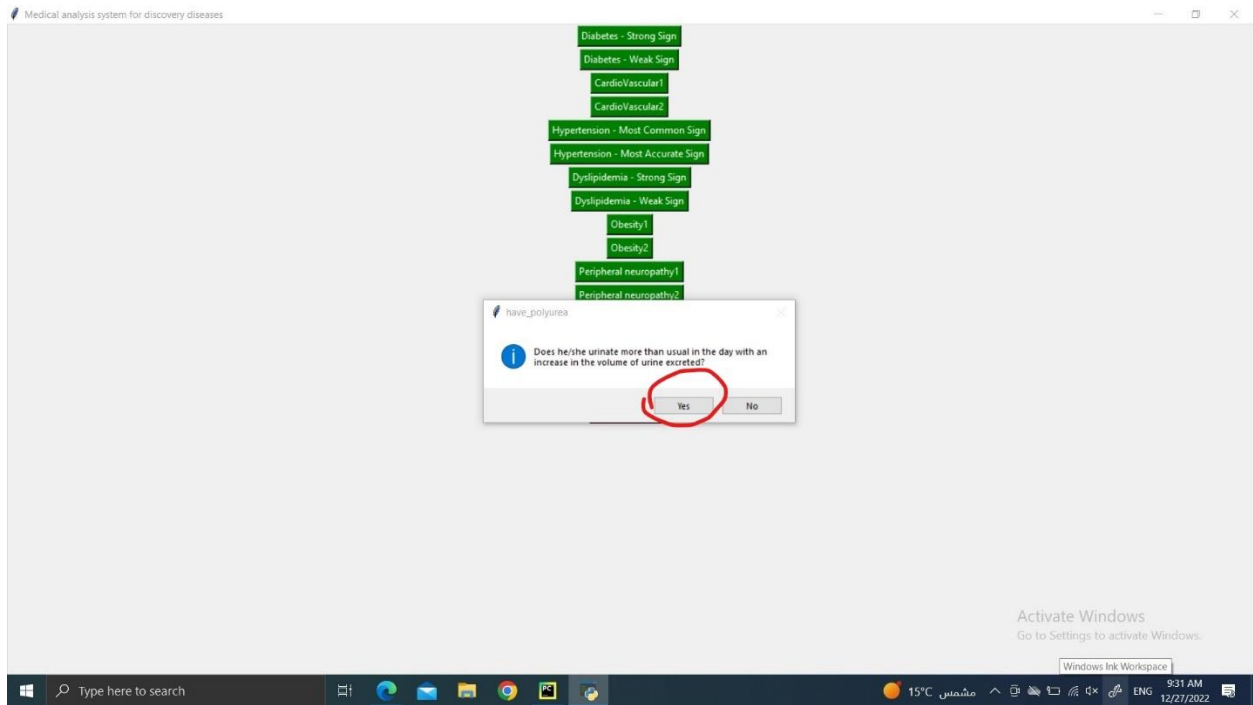


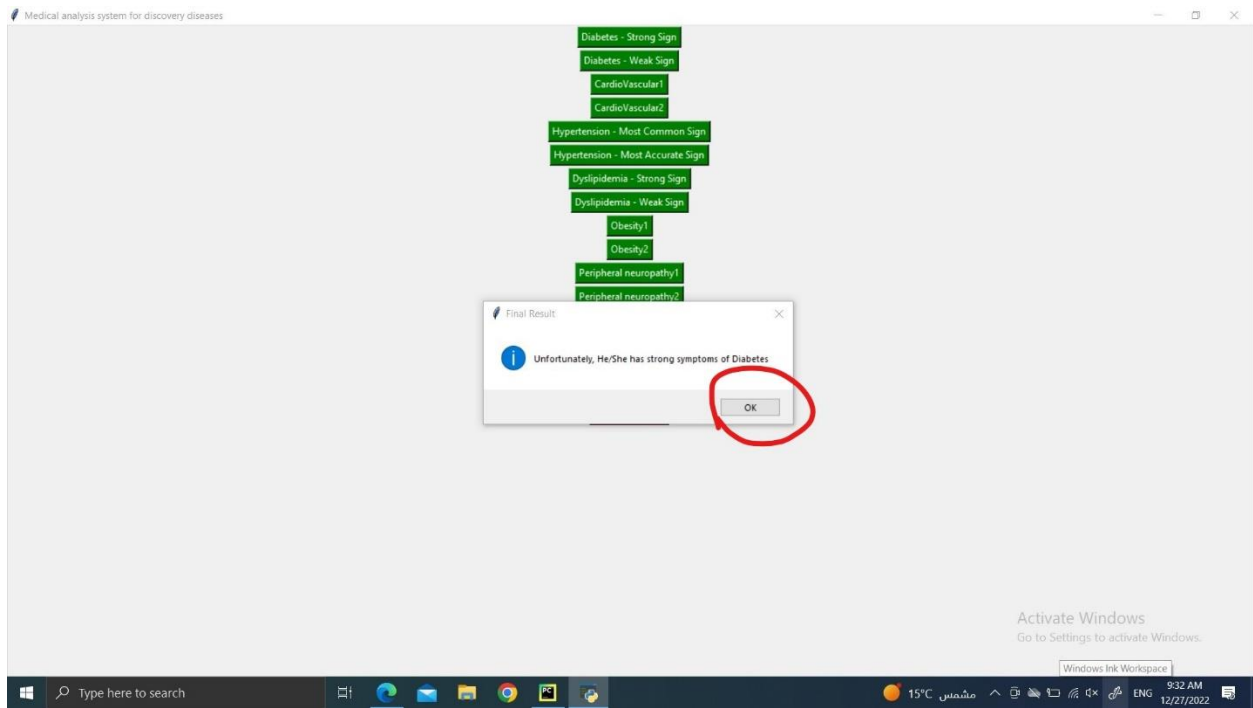
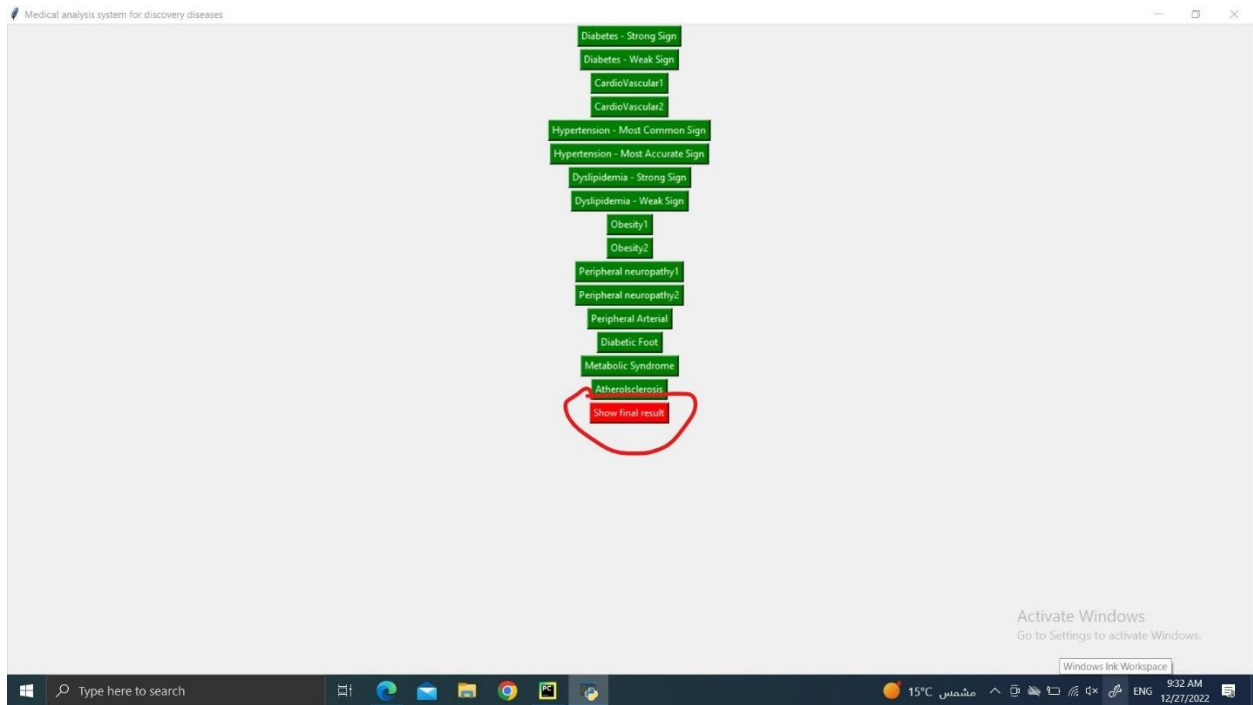
Peripheral neuropathy:



## Screenshots\_diabetes:







# Screenshots\_Metabolic:

