Prioritization of diseases in patient's consultation notes using SNOMED CT

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Summary

In medical domain, usually one disease is identified by looking at the patient's data, but it may be possible that the data of an individual patient may have more than one disease at the same time. It is also possible that the diagnosed disease is not correctly identified. Our proposed system aims to identify different possible diseases present in patient's data and on the basis of certain parameters it will identify most likely disease.

Our proposed method will work in two steps:

1- In the first step, it will list out all the possible diseases prioritized with respect to certain parameters, may be shown in the form of percentages.

E.g. List of possible diseases on the basis of symptoms (Percentages show possibility of disease)

- Disease A:60%
- Disease B:20%
- Disease C:10%
- No Disease Detected in Medical Database:5%
- Inaccurate Data (No proper relations exist between symptoms):5%

2- In case of multiple diseases of patient, it will be able to identify more than one possible disease.

> The proposed study involve more than one domain experts for the validation of results.

Keywords:

De-identification; patient records; NLP; prioritize; mental; diseases; health; DSM V

1. Introduction

Death rate and disability rate is increasing day by day due to mis-diagnose of disease. According to survey, 142,000 people died in 2013 due mis-diagnose of disease [1]. This is very common in developing countries that quality healthcare is very expensive that majority cannot afford places that conduct proper procedures to diagnose possible diseases. For instance, in Pakistan, method for diagnosing disease in majority of private consulting clinics is that, walk in patient describes his/her problem to the doctor and on the basis of description doctor prescribes medicine. Doctors in these clinics do not bother to inquire patient's history or his/her family history. As a result of improper and incomplete investigation, a person may recover from one disease and thrive for another. It is one of the facts, that some patients (mostly illiterates) exaggerates their health conditions in front of doctors to get extra medicines. These patients which are large in numbers, think that taking more medicines will cure them in efficient manner. Misdiagnosis is a major problem among the consequences of treatment that results in hundreds and thousands of deaths annually. Misdiagnosis leads to the unnecessary suffering of the patient due to incompetency of the techniques used for diagnosis, not only patients but also their families it also results in the wastage of money. In similar manner, if we study cases of psychiatric patients then it is very crucial not only to diagnose their disease properly but also treat them according to the severity of their reported problems by prioritizing their treatments. This research problem is not only limited to psychiatric patients but also address major problems in other patient cases which addresses multiple diseases. The CEGS N-GRID 2016 NLP challenge shared psychiatric patient's data which was most appropriate for our research problem and motivated us to start development of module that can prioritize diseases of a single patient and help doctors in decision making process. It is becoming a growing problem all over the world not only in under developing countries like Pakistan and India but also in the developed countries as well. At about 45,000 to 98,000 fatalities occur due to the mistakes cause by the medical workers in US [2]. Pakistan has witnessed a number of cases due to the medical malpractices, there is no concept of specialist training in Pakistan, a doctor with a postgraduate qualification is considered as specialist by PMDC (Pakistan Medical & Dental Council).There is no systematic way of collecting and storing patient's history so that it can be used again when needed. Only few hospitals in Pakistan saves patient's data and these hospitals are very costly for majority of people. A system is needed to develop that gives accurate results of diagnosis and help doctors to detect and diagnose the disease not solely based on their past experience of the patient but on the basis of the results generated by the system. The proposed system is based on symptoms and past history which will identify potential diseases of patient and then will be able to set priorities of severe diseases in the order of their risks. This will help doctors to think in all possible directions and take decisions among different possible diseases, this will ultimately reduce the risk of wrong diagnosis and unnecessary suffering of the patient.

1.1 Literature

A. *Similar Work*

In the presented research study, authors participated in CEGS N-GRID 2016. The challenge organizers release data of psychological patients facing certain disorder for the first time. Out of three tracks, the reported methodology is focused on track three in which researchers around the globe were share novel ideas to use this novel data set of mental health record.

Out of 325 patients' records 20 patients records were selected to design proposed method that can assign priorities to multiple disease that were identified in the data sets as our sample data and annotated with SnoMedTagger attached along with manuscript. In medical domain, this is one of the facts that research can produce medical system that suggest and discuss potential causes and risk factors of diseases but it cannot replace a medical expert. These system can identify and classify disease with the help of rules and methods that incorporates domain knowledge with the help of domain experts but are limited to certain accuracy percentages. For instance, researchers have used CBIR (Content Based Image Retrieval) technique in their system which takes image data composed of single disease images as an input and compare it with the existing images in the database [3]. This comparison is based on colour, size, texture etc. The primary objective of this system is to identify multiple diseases using image data rather than reading patient's history extensively. In biomedical domain, researchers often search through massive catalogues of literature to look for potential relationships between genes and diseases [4]. They proposed a reliable and efficient framework named DTMiner that takes large biomedical literature repositories as inputs and identifies credible relationships between diseases and genes. In similar domain, researchers reported a generic approach to gather phenotypic descriptions of patients. By extracting phenotypic information from the textual part enhanced the information in structured data. This information further used for producing patient stratification and disease co-occurrence statistics. This approach used a dictionary extracted from the International Classification of Disease ontology and was language independent. Another system named PolySearch2 is a text-mining system that identify relationships between biomedical entities (such as human diseases, genes, proteins, etc.)[5]. Other group of researchers reported worksite as one of that factor can be a cause of infectious diseases for workers [6].These researchers developed an electronic infectious disease surveillance system that includes attributes of "occupation/grade" and "worksite/school" for all health conditions. They examined the usefulness of occupation/worksite information in the text fields and identify risk factors from the infectious disease data system. This system is helpful in identifying the occurrence of possible work-related infectious disease. A group of researchers assessed 11 kind of symptoms that were related to common adult mental disorders. These mental disorders ranges included ages from 18 to 38 years. This research reported tested the structure of psychopathology and evaluated the validity of the generated models testing relationships between the factors that were obtained and information about the personality functioning and life impairment of individual member. They also studied the family history that was associated with the identified factors and concluded that "individual differences in severe and impairing psychopathology are related with compromised brain integrity from early life" [7]. Literature also showed that SnoMedTagger is a medical semantic tagger that incorporates the knowledge of domain experts (in the form of rules) and SNOMED CT [8] dictionaries to identify and classify semantic concepts in medical narratives. SnoMedTagger [9] tackles major language issues that were a challenge in narratives written by clinicians. This type of systems are suitable to tackle corpus containing medical narratives but cannot prioritize diseases on the basis of their severity. In the presented research, we have also used SnoMedTagger for the identification and classification of diseases by authentic SNOMED CT healthcare terminology.

2. Method

A. In the proposed methodology as shown in *Figure 1: Eagle view of Prioritization (Graphical Abstract)*, first corpus of psychiatric patient's records was annotated using SnoMedTagger [9], which is a Semantic Tagger for Medical Narratives developed on GATE tool [10]. SnoMedTagger works on the concepts of SNOMED CT. By applying basic language processing tasks corpus was tokenized using English language tokenize and sentence splitter was used to split sentences. SnoMedTagger execute JAPE rules to identify and classify SNOMED CT medical concepts in the corpus of medical narratives
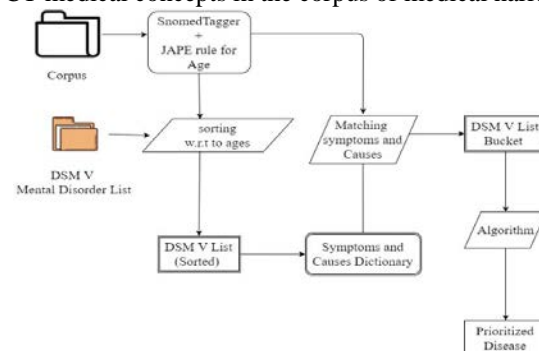

Fig. 1 Eagle view of Prioritization (Graphical Abstract)

In parallel to SnoMedTagger, the most common list of disorders from Diagnostic and Statistical Manual of Mental

Disorders, 5th Edition: DSM-5 (DSM-5) by American Psychiatric Association [35] was also used for annotation. With the help of domain experts, symptoms, causes and range of age related to potential mental disorders were selected. By annotating the symptoms found from the text data, we will apply rules to calculate the percentage of disorders that can likely to be in the given patient record (text data). Age range can narrow down the likelihood of some disorders. This is because age factor can highly distinguish whether the patient is suffering from some disorders or not. Consider an example of a patient who is in his early puberty will probably not a drug addict or cigarette smoker. After filtering the text data through Age rule that will determine the patient age we get text DSM-5 Sorted list. We will classify data into 3 factors: Symptoms, Age and Causes. We researched disorders and noted the all necessary information based on the factors.

For example, A, B, C, D...Z are the disorders and age range for some of them are the following:
A: 20-30
B: 10-18
C: 25-40
D: 30-60

Now let's assume that text data on certain patient highlighted the age as 30.We will match that in which category does our patient age matches as shown in Figure 2: Age filter shortlisting the disorder candidates. We first check it against the range of A disorder, so we will take A into consideration, then we will check it for B, since it doesn't lie in the range of B we will discard B. Similarly, we will check it against the C and D, and they both will the considered.
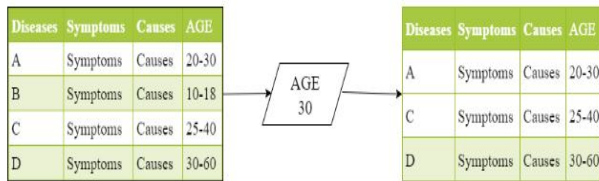

Fig. 2 Age filter shortlisting the disorder candidates

Each disorder has its own dictionary of Symptoms and Causes. The Dictionary of symptoms and causes consist of all synonyms and all possible related words to that of symptoms and causes for better accuracy. Then these will go through the procedure of matching selected symptoms and causes as seen in Figure 3: Matching of Annotated text with Disorder's symptoms and causes dictionaries. We will check if any annotated word that matches the dictionary of our DSM V disorder symptoms and causes as shown in table in Appendices. If yes, then the matched symptom will be move to the particular disease bucket. For instance, if there are 5 symptoms and 3 causes in disease A. Out of

which 3 symptoms and 2 causes are matched with annotated words from document. Then those matched symptoms and causes will be moved to disease "A" bucket. This process will continue till every annotated words are matched.
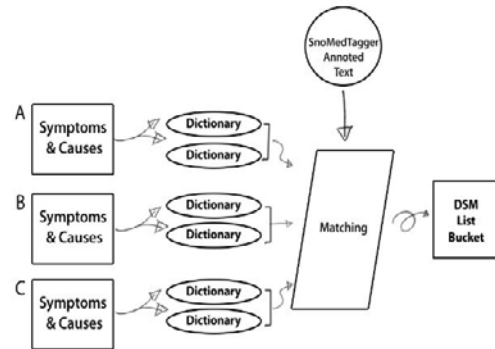

Fig. 3 Matching of Annotated text with Disorder's symptoms and causes dictionaries

Next, we will process mathematical algorithm on disorder list's bucket having matched symptoms and causes. After processing algorithm we will finally have the prioritized disease.

B. Equations

The proposed algorithm will be able to prioritize diseases in the following manner:

Step 1: First the patient's record is analyzed by SnoMedTagger all the terms of interest are highlighted including age, symptoms and causes related to any disorder.

Step 1.1: Now the age found in the record is compared with the age factor of diseases in DSMV mental disorder list to shortlist few diseases from it. Let say A, B, C are selected.

Step 1.2: The symptoms and the possible causes of disorder found in the record are compared with the shortlisted diseases that are selected in step 1.1 in this case A, B, C are the shortlisted diseases, this comparison will be done with the help of dictionaries of diseases.

Step 2: In this step points are awarded to the diseases out of 100, each and every symptom of disease and its causes have equal points and gives total of 100 points as shown below:

Total Points (100) = Symptoms (points) + Causes of disorder (points)

For Instance, if disease A consist of 5 symptoms and 5 causes of disorder in its dictionary, then each symptom of disease and its cause will carry 10 points, its calculation shown below:

Points for each symptoms and causes
= Total point (100) / (Symptoms + Causes) → (1)
Disease A points for each symptoms and causes = 100/(5 + 5)
Disease A points for each symptoms and causes = 100/10
Disease A points for each symptoms and causes = 10 points

To verify that each symptom and cause worth 10 points the combination of both will give total of 100 as shown below.

Awarded points =
(No of symptoms *weightage) + (No of causes * weightage) → (2)

By formula (2), in this case it is assumed that all symptoms and causes are matched.

Disease A = (5 symptoms * 10) + (5 causes * 10)
= 50 + 50
= 100 points

Similarly if we apply formula (1)
Disease B consists of 6 symptoms and 5 causes of disorder, each symptom and cause will carries 9.090 points each. And similarly for Disease C consists of 4 symptoms and 3 causes of disorder, each symptom and cause will be carry 14.285 points each.

Step 2.1: Now the points are awarded to the disease on the basis of its no of matches found in its dictionary. For Disease A only 3 out of 5 symptoms and 3 out of 5 causes of disorders are matched, so according to the formula (2):

Disease A = (3 symptoms * 10) + (3 causes* 10)
= 30 + 30
= 60 points → Result (i)

We get 60 points of Disease "A" out of 100. For Disease B 4 out of 6 symptoms and 3 out of 5 causes are matched, Applying Formula (2)

Disease B = (4 symptoms * 9.090) + (3 causes * 9.090)
= 36.36 + 27.27
= 63.63 points → Result (ii)

We get 63.63 points of Disease B out of 100. For Disease C 2 out of 4 symptoms and 1 out of 3 causes of it are matched.

Disease C = (2 symptoms * 14.285) + (1 causes * 14.285)
= 28.57 + 14.285
= 42.855 points → Result (iii)

We get 42.855 points of Disease C out of 100.

Step 3: Now we calculate the priority in percentage by using following formula:

Priority = (Disease X / sum of total points of sorted DSM V disease) * 100 → (3)

Sum of total points of sorted DSM V diseases can be found by adding Results (i), (ii) and (iii)
Total = A + B + C
Total = 60 + 63.63 + 42.855
Total = 166.485 → Result (iv)

By Formula (3) finding the percentages of diseases:
Using Result (i) and Result (iv)

Disease A = 60 / 166.485 * 100
Disease A = 36.039 %

Using Result (ii) and Result (iv)
Disease B = 63.63 / 166.485 * 100
Disease B = 38.219 %

Using Result (iii) and Result (iv)
Disease C = 42.855 / 166.485 * 100
Disease C = 25.741

C. Result

Table 1: Result in tabulated form

Disease	Awarded Points	Risk in Percentage
Disease A	60	36.039 %
Disease B	62.63	38.219 %
Disease C	42.855	25.741 %

Step 4: Now Prioritizing Diseases in the order of their risk percentages:

Table 2: Prioritizing Diseases in the order of their risk percentages

Disease (in the order of highest priority)	Percentage Risk
Disease B	38.219%
Disease A	36.039%
Disease C	25.741%

3. discussion

The prototype of the proposed methodology is ready and has been developed considering dataset released as part of CEGS N-GRID 2016 NLP research challenge 2017. Currently, authors are in phase of data collection in Pakistan as correct identification of disease and prioritization of treatment with respect to severity of diseases. This is a serious problem if a patient is diagnosed with multiple disease (comorbidity). In case of psychiatric patients, it was also noticed that it is important to treat highly prioritized problem regardless of the fact that they are not directly related to their mental disorder. It can ultimately linked with their physical condition and treating those on high priority might be helpful in treating mental disorders more efficiently and effectively. Two domain experts have validated our proposed method and new corpus of related domain will be tested and reported in our future work.

4. Conclusion

To best of our knowledge, no one has reported any proposed algorithm that can assign priority percentages to multiple diseases for treatment. Our assumptions and hypothesis still need to be researched on novel corpus from Pakistan. Authors are grateful to find this NLP challenge as great opportunity to relate their work on authentic dataset. Authors have used existing SnoMedTagger and DSM-V lists of mental disorders for the identification of potential diseases as it helped not only to find mental disorders but also helped in annotation of general disorders and findings. These identified diseases (disorders) were validated with the help of domain experts and the algorithm to assign priorities to each disease was developed and validated on selected test cases. Our method still need to be tested over complete dataset for its scalability and reliability of usage. Our future contribution will include novel dataset from Pakistan and the challenges to identify and prioritize disease for each single case.

Acknowledgment

Appendices [11-35]

Table 3: DSM V Table with causes, symptoms and age factors

S. No	NAME OF DISEASE	CODES	CAUSES	SYMPTOMS	AGE FACTOR
1	AUTISM	A05	Mostly Genetic	Verbal disability.	2 to 3
			Environmental	Lack of eye contact.	
			It is also said that use of alcohol or cocaine during pregnancy can leads to a child born with Autism.	Decreased social interaction.	
				Difficulty in communication and expressions.	
				Unusual attachment with objects.	
2	Attention deficit hyperactivity disorder (ADHD):	A06	More than 20 genetic studies have shown evidence that ADHD is strongly inherited.	Trouble paying attention.	childhood 6 to 2
			Factors that may cause ADHD(Researchers are yet to determine the exact causes) are:	Acting before thinking.	
			exposure to lead or pesticides in early childhood	Trouble sitting still for even a short time(Hyperactivity).	
			premature birth or low birth weight		
			brain injury		
3	DYSLEXIA/LEARNING DISORDER	A08	Genetic (Observed in children in their school life).	Difficulty in learning and pronouncing spellings.	childhood.
			Adults may be affected after a brain injury, stroke or Dementia (loss of memory).	Difficulty in quick reading and writing.	
				Trouble in memorizing numbers.	
			Sometimes Environmental.	Difficulty in finding relations between words in a phrase.	

No	Disorder	Code	Cause	Symptoms	Onset
				Impaired recognizing ability ('b' is confused with 'd')	
4	Tourette's Syndrome	A11	The exact cause of Tourette syndrome isn't known. It's a complex disorder likely caused by a combination of inherited (genetic) and environmental factors. Chemicals in the brain that transmit nerve impulses (neurotransmitters), including dopamine and serotonin, might play a role	Motor tics involve movement. They include: • Arm or head jerking • Blinking • Making a face Mouth twitching Shoulder shrugging / Vocal tics include: • Barking or yelping • Clearing your throat Coughing • Grunting • Repeating what someone else says • Shouting • Sniffing • Swearing	childhood, and more boys than girls
5	Schizophrenia	B08	Runs in families(Genetic factors). / Imbalance in the complex, interrelated chemical reactions of the brain involving the neurotransmitters (substances that brain cells use to communicate with each other) / Exposure to viruses / Malnutrition before birth	distorted thoughts / hallucinations / Feelings of fright / Paranoia	early adulthood
6	Bipolar Disorder	C00	Antidepressants / Alcohol / street drugs / Childhood trauma / Stressful life / poverty / Self-esteem problems / Genetic inheritance / Brain chemistry	People having a manic episode may: / Feel very "up," "high," or elated / Have a lot of energy / Have increased activity levels / Feel "jumpy" or "wired" / Have trouble sleeping / Become more active than usual / Talk really fast about a lot of different things / Be agitated, irritable, or "touchy" / Feel like their thoughts are going very fast / Think they can do a lot of things at once / Do risky things, like spend a lot of money or have reckless sex / People having a depressive episode may: / Feel very sad, down, empty, or hopeless / Have very little energy / Have decreased activity levels / Have trouble sleeping, they may sleep too little or too much / Feel like they can't enjoy anything / Feel worried and empty / Have trouble concentrating / Forget things a lot / Eat too much or too little / Feel tired or "slowed down"	early adulthood

No	Name	Code	Cause	Symptom	Age / Affected
7	Major Depression Disorder	D02	Neurotransmitters are naturally occurring brain chemicals that likely play a role in depression.	Think about death or suicide	over age 18
				Feelings of sadness, tearfulness, emptiness or hopelessness	
			Alcohol or drug abuse	Angry outbursts, irritability or frustration, even over small matters	
			Major life changes, trauma, or stress	Loss of interest or pleasure in most or all normal activities, such as sex, hobbies or sports	
			Certain physical illnesses and medications	Sleep disturbances, including insomnia or sleeping too much	
			Personal or family history of depression	Tiredness and lack of energy, so even small tasks take extra effort	
				Changes in appetite — often reduced appetite and weight loss, but increased cravings for food and weight gain in some people	
				Anxiety, agitation or restlessness	
				Slowed thinking, speaking or body movements	
				Feelings of worthlessness or guilt, fixating on past failures or blaming yourself for things that aren't your responsibility	
				Trouble thinking, concentrating, making decisions and remembering things	
				Frequent or recurrent thoughts of death, suicidal thoughts, suicide attempts or suicide	
				Unexplained physical problems, such as back pain or headaches	
8	Panic Disorder	E01	Genetics	Increased heart rate	15 and 25 Women are twice as likely to be affected
			Neurotransmitters are chemicals that occur naturally in the brain. It's thought that an imbalance of these chemicals may increase your risk of developing conditions such as panic disorder.	Shortness of breath	
			Increased sensitivity to carbon dioxide.	Dizziness	
			Another theory is that people who experience panic attacks tend to focus on minor physical symptoms and interpret them in a catastrophic way. This triggers a nervous system response that causes the panic attack.	Numbness	

No	Disorder	Code	Causes	Symptoms	Age/Affected
			fear of public places	Change in body temperature	
				Fear	
				Anxiety	
9	Phobias/Irrational Fear	E03	Genetics is the most common factor. The person having a family history of anxiety disorder or phobias is at higher risk.	Panic attacks and anxiety.	10 to 17 Generally women
			Environmental factor. A bad experience with a specific condition or thing can trigger phobia.	Increased heart beat.	
			After a brain injury or trauma.	Running away from the fearful thing or situation.	
				Fainting.	
10	Generalized Anxiety Disorder	E05	Genetics	Excessive, ongoing worry and tension.	31 years old Women are twice as likely to be affected
			Neurotransmitters are chemicals that occur naturally in the brain. It's thought that an imbalance of these chemicals may increase your risk of developing conditions such as panic disorder.	An unrealistic view of problems.	
			Environmental factors: Trauma and stressful events, such as abuse, the death of a loved one, divorce, changing jobs or schools, may	Restlessness or a feeling of being "edgy"	
			contribute to GAD.		
			The use of and withdrawal from addictive substances, including alcohol, caffeine, and nicotine, can also worsen anxiety.	Irritability.	
				Muscle tension.	
				Headaches.	
				Sweating.	
				Difficulty concentrating.	
				Nausea	
				The need to go to the bathroom frequently	
				Tiredness	
				Trouble falling or staying asleep	
				Trembling	
				Being easily startled	
11	Obsessive-Compulsive Disorder	F00	Genetics	**Obsessive thoughts:**	14 and onset 19 onwards
			Environmental stressors may be a trigger for OCD in people with a tendency toward developing the condition.	Fear of being contaminated by germs or dirt or contaminating others	
			(Neurological) Some parts of the brain are different in OCD sufferers compared with non-sufferers.	Fear of losing control and harming yourself or others	
			(Behavioral) The behavioral theory suggests that people with OCD associate certain objects or	Intrusive sexually explicit or violent thoughts and images	
				Excessive focus on	

No	Disorder	Code	Causes	Symptoms	Age
			situations with fear and learn to avoid those things or learn to perform "rituals" in order to help reduce the fear.	religious or moral ideas	
				Fear of losing or not having things you might need	
				Order and symmetry: the idea that everything must line up "just right"	
				Superstitions; excessive attention to something considered lucky or unlucky	
				Compulsive behaviors:	
				Excessive double-checking of things, such as locks, appliances, and switches	
				Repeatedly checking in on loved ones to make sure they're safe	
				Counting, tapping, repeating certain words, or doing other senseless things to reduce anxiety	
				Spending a lot of time washing or cleaning	
				Ordering or arranging things "just so"	
				Praying excessively or engaging in rituals triggered by religious fear	
				Accumulating "junk" such as old newspapers or empty food container	
12	Post-traumatic Stress Disorder	G03	War	Guilt, shame, or self-blame	18 to 54
			Natural disasters	Feelings of mistrust and betrayal	
			Car or plane crashes	Depression or hopelessness, including suicidal thoughts and feelings	
			Terrorist attacks	Substance abuse	
			Sudden death of a loved one	Physical aches and pains	
			Rape	Fear of being separated from parent	
			Kidnapping	Losing previously-acquired skills (such as toilet training)	
			Assault	Sleep problems and nightmares	
			Sexual or physical abuse	Somber, compulsive play in which themes or aspects of the trauma are repeated	
			Childhood neglect	New phobias and anxieties that seem unrelated to the trauma (such as a fear of monsters)	
				Acting out the trauma through play, stories, or drawings	
				Aches and pains with no apparent cause	
				Irritability and aggression.	
13	Depersonalization Disorder	H00	Childhood trauma, such as verbal or emotional abuse or witnessing domestic violence	Feelings that you're an outside observer of your thoughts, feelings, your body or parts of your body, perhaps as if you were floating in air above yourself	adults
			Growing up with a significantly impaired mentally ill parent	Feeling like a robot or that you're not in control of your speech or movements	

#	Disorder	Code	Causes	Symptoms	Age
			Suicide or unexpected death of a close friend or family member	The sense that your body, legs or arms appear distorted, enlarged or shrunken, or that your head is wrapped in cotton	
			Severe stress, such as relationship, financial or work-related problems	Emotional or physical numbness of your senses or responses to the world around you	
			Severe trauma, such as a car accident	A sense that your memories lack emotion, and that they may or may not be your own memories	
				Feelings of being alienated from or unfamiliar with your surroundings, perhaps like you're living in a movie	
				Feeling emotionally disconnected from people you care about, as if you were separated by a glass wall	
				Surroundings that appear distorted, blurry, colorless, two-dimensional or artificial, or a heightened awareness and clarity of your surroundings	
				Distortions in perception of time, such as recent events feeling like distant past	
				Distortions of distance and the size and shape of objects	
14	Dissociative Identity Disorder	H02	Anxiety.	Memory loss (amnesia) of certain time periods, events and people	5 to 10
			Depression.	Mental health problems, such as depression, anxiety, and suicidal thoughts and attempts	
			Electroconvulsive Therapy.	A sense of being detached from yourself	
			Mental Illness.	A perception of the people and things around you as distorted and unreal	
			Mental Illness in Children.	A blurred sense of identity	
			Posttraumatic Stress Disorder.	Significant stress or problems in your relationships, work or other important areas of your life	
			Psychotherapy.		
			Rape (Sexual Assault)		
15	Illness Anxiety Disorder/Hypochondriasis	J01	A person is at a higher risk who have a family history of some serious and life threatening disease.	Become anxious and alarming whenever get mild illnesses.	middle aged and older
			Childhood experience of serious ailments.	Repetitive medical checkups.	
			It is accompanied with obsessive compulsive disorder, phobias or anxiety disorder.	Never satisfied with the reassurance of doctor that they are healthy.	
				Especially concerned with certain diseases that run through their families and think that they have inherited them.	

No.	Disorder	Code	Cause	Symptom	Age/Gender
				White coat syndrome (phobia of doctors)	
				Get afraid of reminder of any disease.	
16	Conversion disorder	J02	An arm or leg may be paralyzed	Weakness or paralysis	younger than 10
			People may lose their sense of touch, sight, or hearing.	Abnormal movement, such as tremors or difficulty walking	
			Stress and conflict, which people with this disorder experience as (convert into) physical symptoms.	Loss of balance	
			Conversion disorder tends to develop during late childhood to early adulthood, it may appear at any age.	Difficulty swallowing or "a lump in the throat"	
			The disorder appears to be more common among women.	Seizures or convulsions	
				Episode of unresponsiveness	
				Numbness or loss of the touch sensation	
				Speech problems, such as inability to speak or slurred speech	
				Vision problems, such as double vision or blindness	
				Hearing problems or deafness	
17	Aorexia Nervosa	K03	Genetic factor.	Low BMI (body mass index)	men are ten times less affected than
			Cultural factor.	Refusal to eat out of fear of even slightest weight gain.	females 16 - 17
			Environmental cause. (involving family members making fun fat persons)	Extreme weakness, malnutrition and starvation.	
			Professions which require thin and smart body figure (acting, modeling, athletics	Rapid mode swings.	
				Self harming ad suicidal tendencies.	
				Use of drugs and laxative to reduce weight.	
18	Bulimia Nervosa	K04	History of abuse and trauma.	Low self esteem (being ashamed of uncontrolled eating secretly)	age of six and older around the age of seventy
			Cultural influence.	Recurrent episodes of binging which involves sweets and desserts.	
			Psychological factors (abnormal brain functioning).	Excessively anxious about increasing body weight. Such people use to vomit after eating or diet so as to retain their body weight after each binge.	
			Environmental.	Yellow teethes due to stomach acids as a consequence of excessive vomiting.	
			Stressful transitions or life changes.	Constant weight fluctuations.	
				Chronic dehydration.	
19	Narcolepsy	M02	Family history.	Excessive daytime sleep, even when the person has gotten as much sleep as a normal	15 to 20

				person should during night.	
			Low production of hypocretin (neurotransmitter) as a consequence of autoimmune disorder, it controls sleep.	Hallucination (hearing voices and seeing faces which others cannot)	
			Abnormal sleep cycle.	Cataplexy (muscles weakness and paralysis for few second or minutes)	
			Trauma or psychological stress.	Sleep paralysis	
				Narcolepsy may cause road accidents if a narcoleptic person drive.	

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