

3d- Lat Dignosis and PGI Memory Scale Detection of Down Syndrome And Autism Spectrum Disorder

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Abstract

Science the ancient time the awareness and practices of traditional knowledge in Indian medicine system and therapy system are accepted all over the world, according to the survey of down syndrome and autism spectrum disorder in India. While it had claimed that the association of autism spectrum disorder and down syndrome was uncommon there are now a substantial number of studies demonstrating that subgroup of those with down syndrome will also reach the diagnostic criteria for an ASD. The review examines published research on the prevalence of ASD and down syndrome population is also examined with regard to published case studies and profile on ASD screening and diagnostic instrument. Possible correlation of ASD and down syndrome including level of cogitative functioning, medical factor, gender and family history are also reviewed. Issues regarding the diagnostic assessment of ASDs and down syndrome and suggestions for future research are discussed. at present we study about the ASD and down syndrome at Aarushi institute of red cross MP nagar Bhopal. We have seen different no. of disabilities are on those institute, all of them we study only down syndrome and ASD persons. 3D LAT and PGI memory scale is used as a tool to detect DS and ASD . On there we collect the data of 15 down syndrome persons, 14 ASD persons, some person is caused by two different diseases, for example down syndrome +ASD, DS+HI, ASD+HI, ASD+DS. those disable person use only therapy, for example speech therapy physiotherapy, verbal computer, writing exercise and many programs organized on there. Key points: is autism spectrum disorder and down syndrome prevalence manifestation of symptom medical factor, cognitive functioning, gender, family history, diagnostic issue, at the age of mother 30 above, on one can span our child or aloness

Keywords: Autism, Down syndrome, HI, physiotherapy,3D LAT,PGI memory scale

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I. Introduction

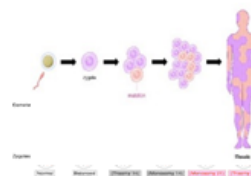
Down syndromes

Down syndrome is also known as Mongolian idiocy or mongolism first discovered by Jhon Langdon (1886). Down syndrome is the natural occurring chromosomal arrangement that has always been a part of the human condition, being a universally present across racial or social -economic line, and effect approximately one in 800 births worldwide, causing intellectual and physical disability and associated medical issues Down syndrome, is a condition that is present at birth, which affects the body's physical and mental development

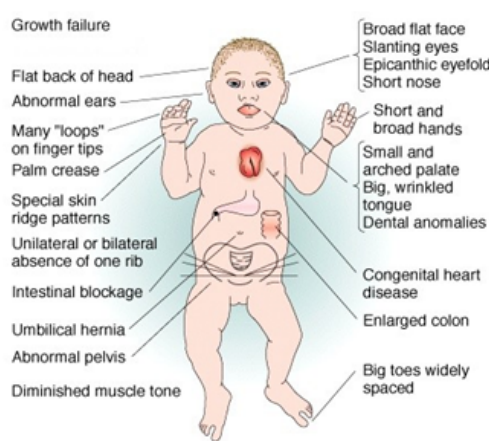


Trisomy 21

the vast of majority of children with down syndrome (approximately 95%) extra chromosomal no. 21 instead the chromosome are 46 in each cell, the individual with down syndrome has 47 chromosomes
 Translocation: 4% of trisomy are Robertsonian translocation. the extra 21st chromosome is attached or translocated on to another chromosome 14, 21 or 22 translocations resulting in trisomy 21 may be inherited so it is important to check the chromosome of the parents in these cases to see if either may be a “carrier”. Mosaicism 1% of down syndromes are due to mosaicism. in case in cellular mosaicism, the mixture is seen a different tissue mosaicism, one set of cells is having blood cell is normal and another have a cell such as skin cell is having trisomy



Characteristic of down syndrome people: DS is caused a distinct facial appearance intellectual disability and developmental delay it may be associated with thyroid or heart diseases. these people include DS is traumatic brain injury Autistic spectrum disorder, cerebral palsy, learning disorder and psychiatric disorder Physical feature of down syndrome not normal



Categories of down syndrome on the basis of IQ (intelligence quotient)

$$IQ = \frac{\text{MENTAL AGE}}{\text{CHRONICAL AGE}} * 100$$

CHRONICAL AGE

DOWN SYNDROME		
MILD	MODRATE	SEVERE
IQ 56 – 69	IQ 35 - 50	IQ 23 – 35

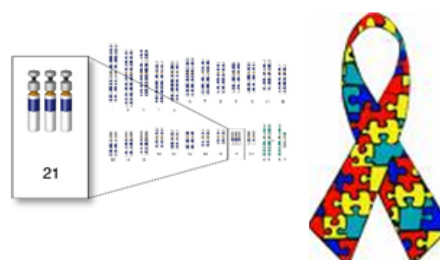
Autism Spectrum Disorder

Autism impacts normal development of the brain in areas of social interaction and communication skills and behavior. Difficult to communicate with others and relate to the outside world.

Occasionally, aggressive and/or self-injurious behavior may be present.

Autism spectrum disorder (ASD) is a development order that affect communication and behaviour. All those autisms can be diagnosed at any age it is said to be a developmental disorder because symptoms generally appear in the first two year of life.

The fastest growing diagnoses of childhood (from ‘91 to ‘99-up 1108%)



Very complex, often baffling developmental disability
 First described by Leo Kenner in 1943 as *early infantile autism*
 “Auto” – children are “locked within themselves.”
 For next 30 years, considered to be an *emotional disturbance*

Today, autism is a **severe form of a broader group of disorders**

These are referred to as **pervasive developmental disorders**

Typically appears during the first 3 years of life

Expressed very differently – a wide range of abilities, strengths and limitations.

TYPES

Actually, the “umbrella” heading is **Pervasive Developmental Disorder (PDD)**.

Autism is one of the 5 PDDs. For now – DSM IV

All have commonalities in communication and social deficits

Differ in terms of severity

Differ in IQ levels

DSM 5 - ASD

Recent estimates from the Centers for Disease Control and Prevention (CDC) indicate that the number of children diagnosed with autism is increasing. Prevalence data collected from various communities around the country show that about 1 in 110 children has an Autism Spectrum Disorder (ASD). These findings corroborate various reports from State Medicaid Agencies, which indicate that an increasing number of people diagnosed with ASDs are seeking services and support through publicly-funded systems. These dramatic increases have generated much interest and concern in Congress, the executive branch of the Federal government, State and local governments, advocacy groups, and people with ASDs and their families about the best ways to address the unmet service and support needs. Many initiatives and legislative actions that aim to address existing gaps have been developed and implemented. One of these initiatives is Real Choice Systems Change (RCSC) Grants funded by the Centers for Medicare & Medicaid Services (CMS). These grants are targeted at improving the community-based infrastructure of States' long-term care systems, including services and supports for people with ASDs and their families. Congress also has taken action to address the needs of people with ASDs and their families by enacting the Combating Autism Act (CAA) of 2006. At the end of 2007, about \$160 million in CAA funds were appropriated to Federal agencies for autism research and awareness programs for the 2008 fiscal year. The Health Services and Resources Administration (HRSA) received \$36 million, the CDC received \$16 million, and the National Institutes of Health (NIH) received \$108.5 million. These funds will assist in combating ASDs through education, early detection, and intervention. For example, the Act seeks to promote the use of evidence-based interventions and techniques for people with ASDs or other developmental disabilities and reduce barriers to screening and diagnosis. In addition, the legislation also established the Interagency Autism

II. Material method

Three-Dimensional Language Acquisition test (3D-LAT)

Language is a code where by the idea about the world are represented thought a conventional system to auditory signal for communication by Bloom,1988. the person being to acquired language by listening to spoken language and by mimicry. child language development moves simple to complete Tests which assess language development in child

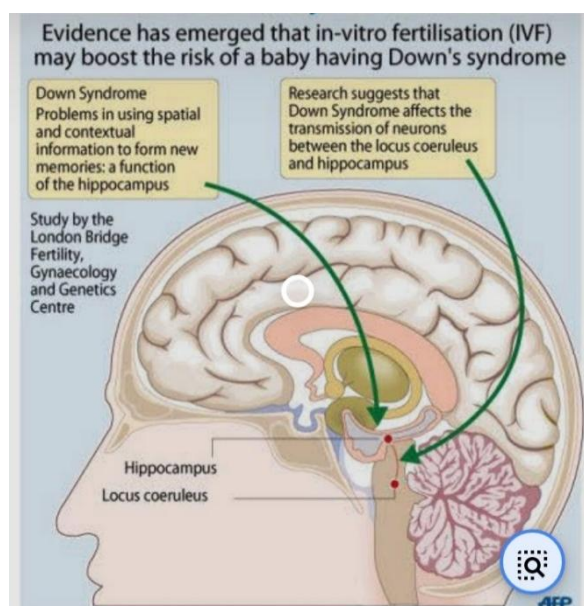
Receptive Expressive Emergent Language Scale (REELS) by Bloch and league (1971)

3-Dimensional Language Acquisition Test(3D-LAT) by Geetha Harleker (1986)

This test is given by department of clinical service all India Institute of speech and hearing, Nimisha campus Manangangothri Mysore

This 3D -LAT test is used by the identification of mental disable child for example DS, CP, HI, patient to identified by One month to 4 years child and also mental retardation mild, moderates or sever of those patients. on the basis of this test to start the therapy to the particular child. this test is following three dimensions are receptive, expression, cognition

The psychiatrist's neurologist and clinical psychologist working in India have long felt the need for, short, simple, objective and valid test of memory test (P.G.I. Memory Scale) was constructed and



standardized in 1977 it is consisting of two test 10 subjects. this memory scale is used by both sexes and the range of age 20 – 70

- Remote memory
- Recent memory
- Mental balance
- Attention concentration
- Delayed recall
- Immediate recall
- Retention for similar pair
- Retention for dissimilar pair
- Visual retention
- Recognition

Bhopal based on not-for-profit organization working with and for people with disabilities and issue related to them the basic objective of our work is to generate opportunities and develop capacity in the people with disabilities, Aarushi works with them to develop capacities in them so that they can assess their choice and make information and decision.

It is the good place for student who are seeking for internship, dissertation or volunteer. people who want to make change in societies by helping mentally specialized people. I feel based to the opportunity to work with special person. I collect all information in Aarushi to study the down syndrome person behavior and also use of P.G.I. MENMORY TEST AND QUESTIONNIRE



Study area





III. Observation

Observation work is done in Aarushi Institute through asking them some question as giving some sentence to learn thus some test are performed learning test performed by giving return work memory test performed by asking them about the P. G. I MEMORY SCALE AND 3D-LAT TEST which are described earlier their IQ test is also performed by questionnaire. observed patient are categorized in two categorized down syndromes above 20 years and below 20 years

Age above 20 years

Person 1 down syndrome + Autism 7 years old (F)

Person 2 down syndromes + cerebral palsy 8 years old (M)

Person 3 cerebral palsy 7 years(M)

Person 1

Behavior: She is not walking properly or slowly walking, she is not spoken but laughing a movement Eating food small bite, follow instruction, much angry to handle, Salivation small amount, Discrimination of nonverbal expression and comprehension.

Oral and peripheral examination: Flat facial profile an upward slant to the eye, Short neck, White spot on the iris of eye, Single deep transverse creases on the palm of the hand, Teeth could appear in a different sequence and position, Teeth are often are rounded point and cone shaped.

Memory test

I used to 3D LAT TEST to asked the question on this parent and detection of DS, CP and differentiated the mild, moderate or severe case on the basis of this test recommendation of therapy of particular patent identified as mild DS + autistic feature is seen and also used questionnaire to his IQ test Answered nonverbal mode but answered all question on questionnaire photos

Score 4.6/10

Learning test

Person 2

Behaviors: He is on wheel chair through cerebral palsy, Not follow instructions, immediately hyper, speak only few words e.g., hmm au oaaa, Not Handel pen or spoon properly, Slow to chewing food

Oral and peripheral examination: Small digits, Head are pointed type, Sollew stomach or Hirschsprung disease, Plastic ear, Loss muscle or hypotonia, Single deep creases.

Memory test

After I used of 3D-LAT test the person is also caused by DS sever +CP disorder and also used questionnaire to identified this IQ. He didn't concentration or not answered all question

Score 2/10

Learning test

I help to learning a few words mummy, papa, sir and I always rapidly speaks to this word

He speaks a few word in one month

Score 40%

person 3

Behaviors: This patient is caused cerebral palsy after birth, speaking problem, Salivation Walking not proper the child is not differentiated “saa” or “sha” properly

Oral and peripheral examination: Teeth are abnormal, Tongue are little bit large, lose muscles Vision issue, Hand and arm are not strength as compare normal child

Memory test

I used to 3D-LAT TEST to determine the cerebral palsy patient this memory good other than the DS child and also question through photos answered all the question

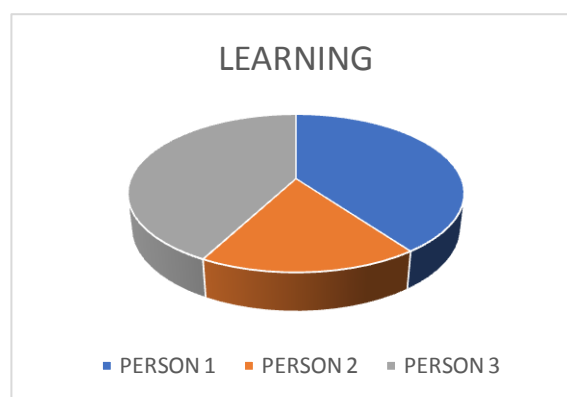
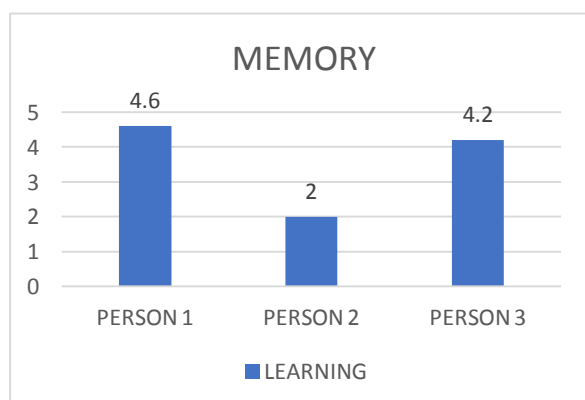
Score 4.2/10

Learning test

I help to learning about the fruit name and color name

He is answered properly

80%



Age above 20 years

Person 1 down syndromes 20 years (M)

Person 2 down syndrome 24 years (M)

Person 3 down syndrome 25 years (F)

Person 4 down syndrome 28 years (F)

Person 5 down syndrome 29 years (F)

Person 1

Behaviors: Imaginary action, no eye contact, Dancing, singing and also imaginary action of actor, Singing and action in also bathroom, Each and every word he is saying only his name Not concentration on words

Oral and peripheral examination: Lips protruding, Salivation but small amount, Large intestine Hirschsprung’s disease, Hearing issues, Single and deep creases palm of hands, Small digits on his hand, Neck muscles also thick hand skin are rough

Memory test

I used to P.G.I MEMORY TEST to ask the question on the basis of remote memory, recent memory, mental balance, attention and concentration, delayed recall, immediate recall, verbal retention for similar pairs, verbal retention for dissimilar pair, visual retention and recognition

He is properly answered only recognition part on the memory test questionnaire, answered by some question of remote memory and recent memory. each and every answered by 30 seconds

Score

40\50=8

Learning test

As mention above he doesn’t fallow instruction but still I tried my best I gave him to learn girls means *ladki*, women mean *aurat*

Then I asked after 10 minutes

He is able to learn girls means *ladki*

Score 70

person 2

Behavior: Some negative behavior he is lying to each one, Repaid Elly washing own face, Each girl to give phone no. and also propose to marry, Washroom lover, whenever he missed, he will be found in washroom, Walking very slow, Never follow instruction

Oral and peripheral examination: Moth protruding, Salivation, White spot-on iris, Teeth abnormal, Walking not properly, Single deep creases on palm of hand

Memory test

I used to P.G.I MEMORY TEST to ask the question on the basis of remote memory, recent memory, mental balance, attention and concentration, delayed recall, immediate recall, verbal retention for similar pairs, verbal retention for dissimilar pair, visual retention and recognition

He is not properly answered by the delayed recall and immediate recall and some answered by the verbal retention similar pair and verbal retention dissimilar pair each and properly answered by the remote memory, recent memory, mental balance and attention and concentration every answered by 30 seconds

Score

42/50=8.4

Learning test

I gave him a sentence

What is your name?

And tell him to learn it as fast as he can and I asked after 10 minutes

He is able to learn it

Score 60%

person 3

Behavior: Hearing issue, she is the patent of DS plus HI, Shy type behavior, No eye contacts, Cannot speak clearly, Much angry to handle, Suddenly got sad without any reason

Memory test

used to P.G.I MEMORY TEST to ask the question on the basis of remote memory, recent memory, mental balance, attention and concentration, delayed recall, immediate recall, verbal retention for similar pairs, verbal retention for dissimilar pair, visual retention and recognition

She is answered by the remote memory, recent memory, and some answered by mental balance question and properly answered by the recognition question.

Score 35/50=7

Learning test

as mention above she follow instruction but still I tried my best I gave him to learn

time is wealth

Then I asked after 10 minutes

She is unable to learn properly

Score 50%

person 4

Behaviors: No negative behavior, Developmental delay, Lazy behavior, she is often feeling headache, always say to bye, Reduce height

Memory test

I used to P.G.I MEMORY TEST to ask the question on the basis of remote memory, recent memory, mental balance, attention and concentration, delayed recall, immediate recall, verbal retention for similar pairs, verbal retention for dissimilar pair, visual retention and recognition

She is answered by the recognition, remote memory, recent memory, visual retention question properly

Score 38 /50=7.6

Learning scale

As mentioned above mostly he doesn't follow instruction but still I gave him to learn spelling of institution

Then I asked after 10 minutes

He was able to learn it at a quite extent

40%

person 5

Behavior: Tongue fluctuation, sometime didn't fallow instruction, Immediate irritable, to drinking or eating at the end of nil, to scare unknown male

Memory test : I used to P.G.I MEMORY TEST to ask the question on the basis of remote memory, recent memory, mental balance, attention and concentration, delayed recall, immediate recall, verbal retention for similar pairs, verbal retention for dissimilar pair, visual retention and recognition

She is only answered by the recognition part question

Score 40/ 50 =8

Learning test

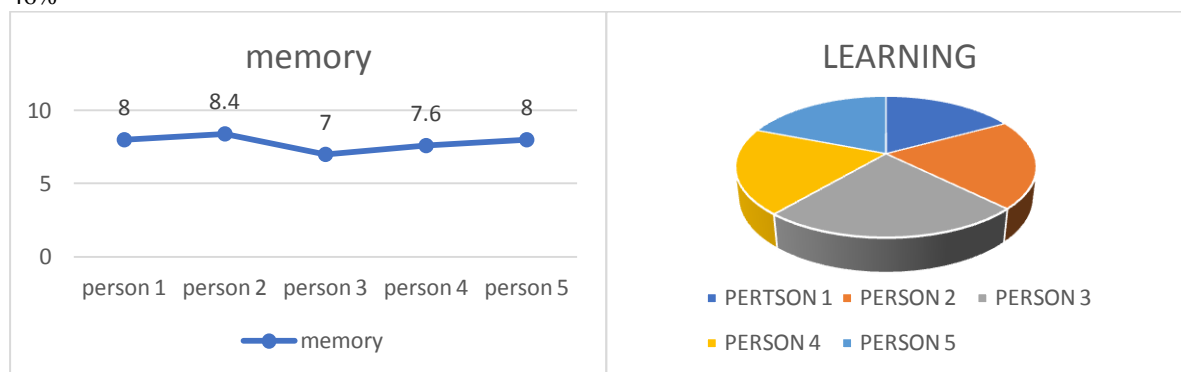
As mention above mostly she doesn't follow instruction but still I tried my best I gave him to learn

table 2

then I asked after 10 minutes

she is able to learn $2 \times 3 = 6$

46%



IQ Test

Questionnaire, P.G.I MEMORY SCALE ,3D-LAT TEST

General IQ of down syndrome person			
Mild down syndrome	Moderate down syndrome	Severe down syndrome	Mosaic down syndrome
50 – 69	35 - 50	20 – 35	10 – 30

Using formula $Mental\ age \div Chronological\ age \times 100 = IQ$

A) DS person above 20 years

Person	Age	IQ	Abnormalities
Person 1	7years (F)	IQ=65	DS mild + ASD
Person 2	8 years (M)	IQ=25	DS severe +CP
Person3	7 years (M)	IQ=60	CP

B) DS person below 20 years

Person	Age	IQ	Abnormalities
Person1	20(M)	IQ=40	DS moderate
Person 2	24(M)	IQ=35	DS moderate case
Person 3	25(F)	IQ=28	DS severe case
Person4	28(F)	IQ=27	DS severe case
Person4	29(F)	IQ=27	DS severe case

ASD

Person -1

Problem: Repetitive behavior, follows instruction of anyone without thinking for a while, He eats lunch fast, every time he shouts again and again till the instruction **Age-26 (M)**

Memory test-

I asked 15 wild animal photos to recognize and repeat it after 5 second then he was unable to recognize the photos.

He only answered 8 questions.

Score:8/15

Learning Test- I gave him a song to learn *tujhe dekha to yeh jana* because he used to sing only One line. next day he sung whole song then I give him to learn *honesty is the best policy*.And tell him to learn it as fast as he can and I asked after 1 minute. He was able to learn it

Score:100%

Person -2

Problem: Repetitive behavior, He always makes fake smile, He is very low, He copies you whatever you do **Age-30 (M)**

Memory test: I asked 15 wild animal photos to recognize and repeat it after 5 second then he was unable to recognize the photos, He only answered 10 questions.

Score:10/15

Learning Test- I gave him to learn time is precious. And tell him to learn it as fast as he can and I asked after 1 minute. He was able. to learn it

Score:100%

Person -3

Problem: Repetitive behavior, Unable to catch pen properly, He has tongue fluctuation and speak through nose, He stuck on one thing even in the task. **Age-18 (M)**

Memory test-I asked 15 wild animal photos to recognize and repeat it after 5 second then he was unable to recognize the photos. He only answered 10 questions.

Score:10/15

Learning Test- I gave him to learn life is all about facts. And tell him to learn it as fast as he can and I asked after 1 minute. He was able. to learn it

Score:100%

Person -4

Problem- Repetitive behavior, He eats lunch fast, can't focus on one thing, He has tongue fluctuation **Age-17 (M)**

Memory test-I asked 15 wild animal photos to recognize and repeat it after 5 second then he was unable to recognize the photos, He only answered 9 questions.

Score:9/15

Learning Test- I gave him a song to learn health is wealth. And tell him to learn it as fast as he can and I asked after 1 minute. He was able to learn it

Score:100%

Person -5

Problem- Repetitive behavior, doesn't reply of anything, talk to himself, Reduced academic skills. **Age-9 (M)**

Memory test-I asked 15 wild animal photos to recognize and repeat it after 5 second then he was unable to recognize the photos, He only answered 9 questions.

Score:9/15

Learning Test- I gave him to learn be polite and reply to everyone. And tell him to learn it as fast as he can and I asked after 1 minute. He was able to learn it

Score:100%

Person -6

Problem- Repetitive behavior, Walking problem, can't speak clearly, Eyes alignment was not focused

Age-15 (F)

Memory test-I asked 15 wild animal photos to recognize and repeat it after 5 second then he was unable to recognize the photos. He only answered 8 questions.

Score:8/15

Learning Test- I gave her to learn be healthy and live long. And tell him to learn it as fast as he can and I asked after 1 minute. She was unable to learn

Score: Fail

Person -7

Problem-Repetitive behavior, Shout when she gets angry, bite himself, can attack on anyone

Age-16 (F)

Memory test-I asked 15 wild animal photos to recognize and repeat it after 5 second then he was unable to recognize the photos. He only answered 10 questions.

Score:10/15

Learning Test- I gave her to learn anger and intolerance are the enemies of correct understanding and tell her to learn it as fast as she can and asked after 1 minute. She was able to learn it

Score:100%

Person -8

Problem-Repetitive behavior, can't concentrate, Swing mood **Age-5 (M)**

Memory test-I asked 15 wild animal photos to recognize and repeat it after 5 second then he was unable to recognize the photos, He only answered 7 questions.

Score:7/15

Learning Test- I gave him to learn life is long. And tell him to learn it as fast as he can and I asked after 1 minute. He was able to learn it

Score:100%

Person -9

Problem- Repetitive behavior, Vocal problem (feminine), Speak too less, Reduced academic skills**Age-25 (M)**

Memory test-I asked 15 wild animal photos to recognize and repeat it after 5 second then he was unable to recognize the photos, He only answered 12 questions.

Score:12/15

Learning Test- I gave him to learn calculation. And tell him to learn it as fast as he can and I asked after 1 minute. He was able to learn it

Score:100%

Person -10

Problem- Repetitive behavior, Talk to himself, Reduced academics skills **Age-9 (M)**

Memory test-I asked 15 wild animal photos to recognize and repeat it after 5 second then he was unable to recognize the photos. He only answered 9 questions.

Score:9/15

Learning Test- I gave him to learn polite and reply to everyone. And tell him to learn it as fast as he can and I asked after 1 minute. He was unable to learn it

Score:40%

Person -11

Problem- Repetitive behavior, doesn't reply of anything, Talk to himself, Reduced academics skills **Age-5 (M)**

Memory test-I asked 15 wild animal photos to recognize and repeat it after 5 second then he was unable to recognize the photos. He didn't answer of the questions.

Score:0/15

Learning Test- I gave him to learn polite and reply to everyone. And tell him to learn it as fast as he can and I asked after 1 minute. He was unable to learn it

Score:10%

IV. RESULT AND DISCUSSION of DS

It is the congenital disease arising due to a defect in chromosome, which result in intellectual impairment and physical abnormalities. this is a gene defect at birth or before birth and it's the long-time condition. Normally a person has 46 chromosomes but, the person who suffered from down syndrome have 47 chromosomes and having an extra chromosome disrupts the way the body and mind function Kids suffering from this genetic disease are at a greater risk of childhood leukemia, heart defect and immune and endocrine system function

DS in India

Down syndrome effected approximately 23,000- 29,000 children born in India every year. through the number are alarming. This is because the low of awareness level and outdated medical facilities.

Babies:

Down syndrome continues to be the most common chromosomal disorder. each year about 6000 babies is born with down syndrome, which is about 1 in every 700 babies born

At birth with down syndrome are often the same size as other babies, but they tend to grow more slowly. Because of less tone muscle, they seem to floppy and trouble holding their head up but usually get batter with time

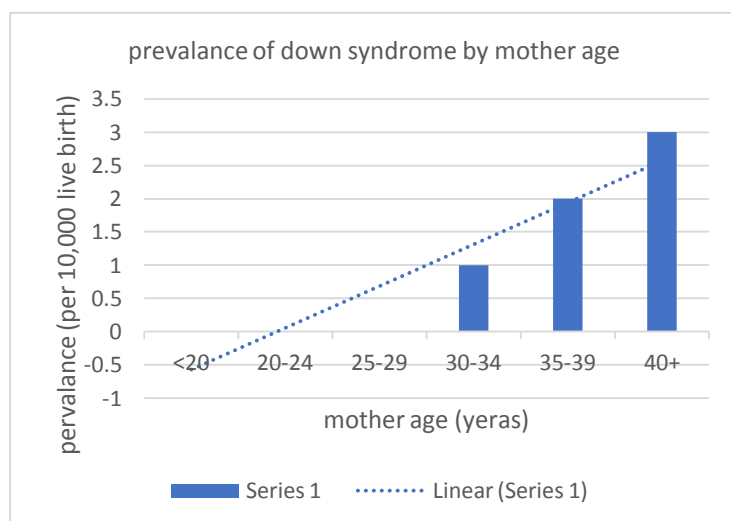
The estimated incidence of DS is between 1 in 1000 to 1 in 1100 live birth worldwide, according to the WHO

Between 1979 and 2003 the number of babies born with down syndrome increased by about 30%

Older mother is likely to have a baby affected by down syndrome than younger mother. in other word, the prevalence of down syndrome increased as the increase of mother age. Prevalence are estimate of how often a

condition occurs among a certain people .to estimate the prevalence of down syndrome, the number of pregnancies affected by down syndrome is compared to the total number of live births

Children and adults: In 2002, about 1 out of every 1000 children and teenagers (0-19 years old) living in united states had down syndrome. this means that 2002 about 83,000 children and teenagers were living with down syndrome Researchers estimated that in 2008 about 1 out of every 1200 people (children, teens, and adults) live the united states with down syndrome. this means that 2008 about 250,700 children, teens, adults are living with

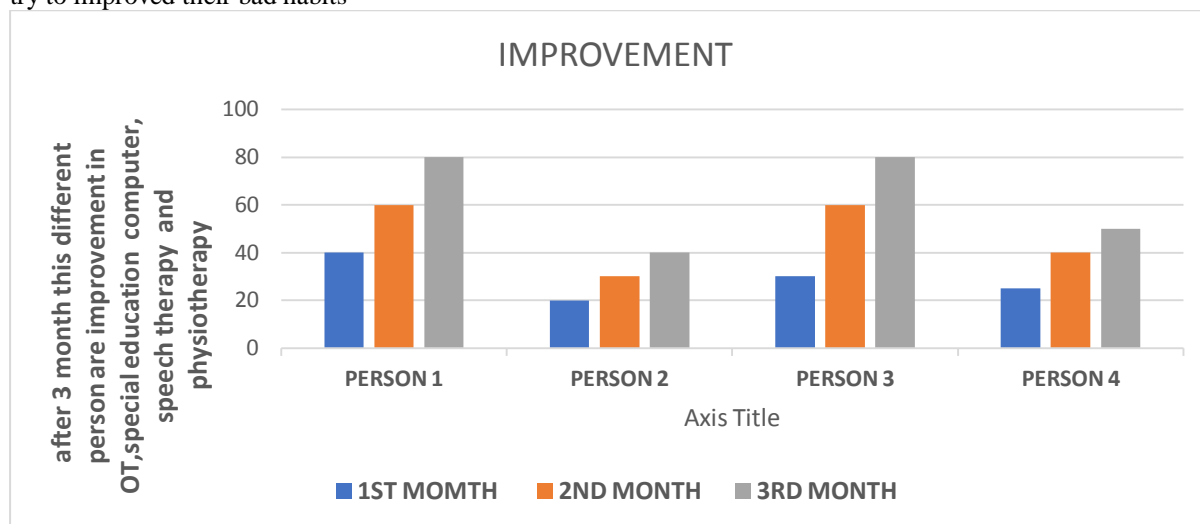


Expectancy for people with down syndrome

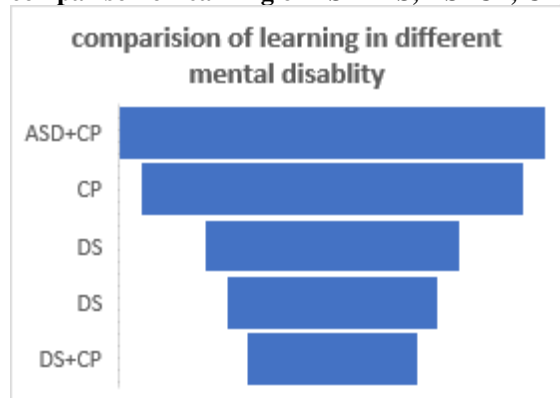
The life expectancy of people with down syndrome increased dramatically between 1906 and 2007. in 1906, on average, person with DS lived to be about 10 years old. in 2007, on average person of DS lived to be 47 years. Today the average lifespan of a person with down syndrome is approximately 60 years

Many factors affected how long a person with DS lives. Sometime infants with down syndrome are born weighing less than 1500 grams or 3.3 pounds

NGO of Bhopal Aarushi we join this institute. After the spending of quality time with down syndrome child we try to improved their bad habits



comparison of learning of ASD+DS, DS+CP, CP, DS and DS



progress report of the disable child in April- may

Goal	Pretherapy	Post therapy
Nystagmus, bubbling	Nystagmus and bubbling	Decrease nystagmus and bubbling
Holding pen or spoon	After the regular exercise	Holding pen properly
Writing	Sleeping and standing line	Write to alphabet
Wheel cheer	After the regular physiotherapy	Stand with the help of stand
Nonverbal mode	Regular oral exercise and phonetic sound exercise	Speak to few words
Identified color	40% identified	70 % identified

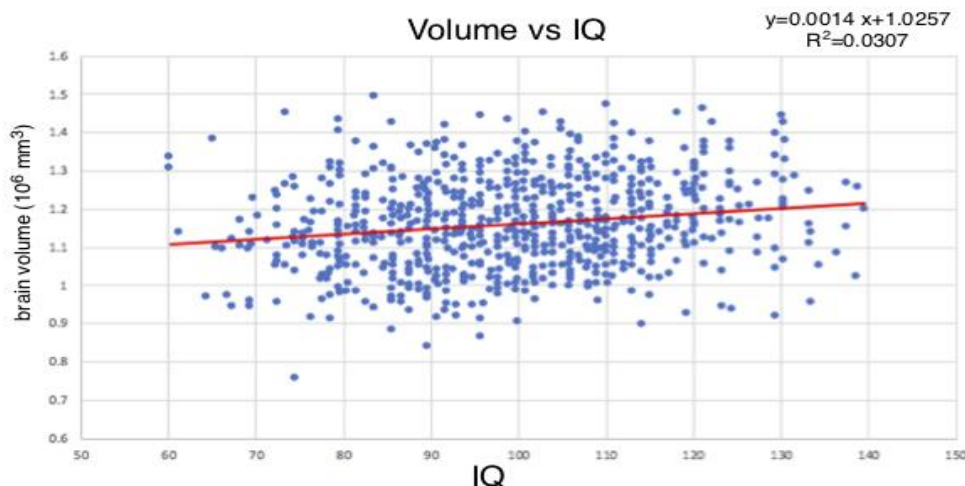
Result and discussion of ASD

Person 1 having a much repetitive behavior when I had joined the institution but after spending quality time along with him his week point and strong point (specially his singing behavior). I gave him task to write “what is your name” then he continues writing suddenly at mid of the task he started saying that my name is from there I start working. As we know evil ends evil. I started countering him on his repetition. And now he is 90% cured with his repetitive behavior. Person 11 is severd case he doesn’t response can’t pay attention there was no response of calling him by his own name. but I tried with some engaging tools (blocks, squares, beads, balloons). Now he was making eye contact with me. I keep on trying and one day he responded me on callin



Table 1: Manuscripts Reviewed by Population Type/Category and Year of Publication

Year of Publication	Children	Transitioning Youth	Adults	Cost/Funding	Total
1998	16	0	1	2	19
1999	4	1	4	0	9
2000	19	3	4	1	27
2001	20	3	1	1	25
2002	24	2	1	1	28
2003	21	4	4	4	33
2004	27	4	0	1	32
2005	16	3	2	1	22
2006	29	4	2	5	40
2007	38	8	5	8	59
2008	19	4	2	1	26
Total	233	36	26	25	320



The IMPAQ team reviewed the titles and abstracts of references identified using the search strategy outlined in Section II and selected 271 articles to be included in the environmental scan. The selected references were organized into the following four categories: children, transitioning youth, adults, and cost/funding. While reviewing articles, evidence provided was considered for all categories for which it applied. As such, a single article may be represented in multiple categories. Table 1 presents a breakdown of the number of references reviewed by population-type/category and year of publication. The table includes references that were retained as a result of both the initial search and the snowballing process. Although the IMPAQ team reviewed a total of

271 articles, many articles applied to more than one population-type/category. In this regard, the number of manuscripts shown in Table 1 includes duplicates. Thus, the total (320) number of articles attributed to population is greater than the total number of articles included in the environmental scan. Although an article may have been counted under more than one category, the majority of articles in this review address children and ASD services. The numbers of articles on the other topics were more evenly distributed.

INFORMATION GATHERING TEMPLATE AND PROTOCOL

The IMPAQ team developed an Information Gathering Protocol and Template to systematically extract the most relevant information from each article reviewed. The Information Gathering Template is a data gathering tool that provides the reviewers with descriptive fields in which to enter relevant information from each article. Each reviewer received comprehensive training on how to use the template and protocol before they began to review manuscripts. The IMPAQ team created the information gathering template using a Microsoft Access database which facilitated data storage and data analysis. Appendix A presents screenshots of the Information Gathering Template in Microsoft Access. This tool allowed the team to organize and analyse the data according to the template categories

Treatment and therapies

Treatment for ASD should begin as soon as possible after diagnosis. Early treatment for ASD is important as proper care can reduce individual difficulties with helping them learn new skills and make the most of their strength. The wide range of issues facing people with ASD means that there is no single best treatment for ASD working closely with a doctor or health care professional is an important part of finding the right treatment program.

Medication

A doctor may use medication to treat some symptom that are common with ASD. With medication, a person with ASD may have fewer problems with: Irritability, Aggression, Repetitive behavior, Hyperactivity, Attention problems, Anxiety and depression

Behavioral, psychological, and educational therapy

People with ASD may be referred to doctor who specialize in providing behavioral, psychological, educational, or skill -building intervention. These programs are typically structured and intensive and may involve parents, sibling, and others family members. Programs may help people with ASD: Learn life skills necessary to live independently, reduce challenging behaviors Increase or build upon strengths, Learn social, communicational, and language skills.

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