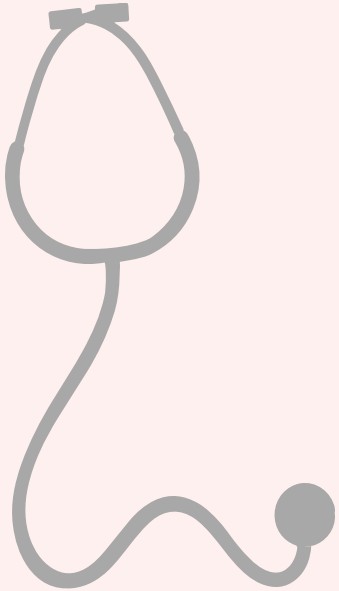

EST 2022

Special care in Epilepsy patients with intellectual disabilities

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Intellectual Disabilities

- **Intellectual disability** is a neurodevelopmental condition that develops in childhood (before 18 yo), characterized by significant limitations in both intellectual functioning and adaptive behavior
- **Intellectual functioning** —also called intelligence—refers to general mental capacity, such as learning, reasoning, problem solving, and so on.

WHO 1992

- (IQ 50–69), (IQ 35-49) (IQ
- 20–34) and (IQ less than 20) (WHO 1992).

ID	mild	moderate	severe	profound
IQ	50-69	35-49	20-34	<20

EST 2022

- **Adaptive behavior** is the collection of conceptual, social, and practical skills that are learned and performed by people in their everyday lives.

Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition.
Arlington, VA APA Publishing. 2013.

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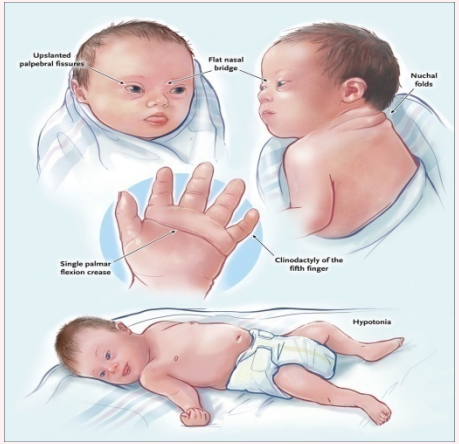
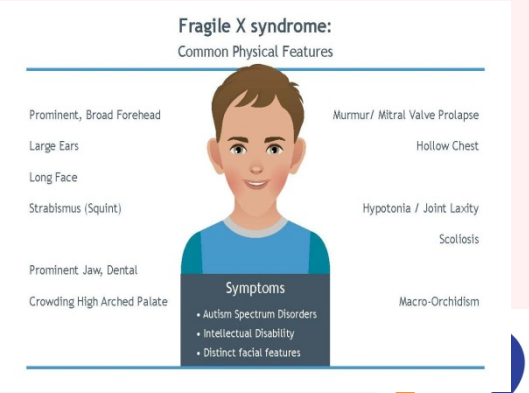
The causes of intellectual disability

- **Genetic conditions** eg: Down synd and fragile X synd
- **Problems during pregnancy** Interfere with fetal brain development include alcohol or drug use, malnutrition, infections, or preeclampsia.
- **Problems during childbirth.** ID may result if a baby is deprived of oxygen during childbirth or born extremely premature.
- **Illness or injury.** Infections eg: meningitis, whooping cough, or the measles can lead to intellectual disability. Severe head injury, near-drowning, extreme malnutrition, infections in the brain, exposure to toxic substances such as lead, and severe neglect or abuse can also cause it.
- **None of the above**. 2/3 of all children with ID : unknown cause





Epilepsy & Intellectual Disabilities :ID

- The prevalence of intellectual disability and co-existing epilepsy is approximately 22%, and this rate grows with increasing levels of disability.
- **1/4 of people with epilepsy have ID**
- **1/5 of people with ID have epilepsy**

Robertson, J , et al. Seizure, 2015; 29:46-62.

Epilepsy & Intellectual Disabilities :ID

- Prevalence of epilepsy ↑ with severity of the ID.
- Seizure type influenced by severity of the ID.
  - Symptomatic generalized epilepsies predominate in those with severe ID (67%; 29% focal epilepsy)
  - Focal epilepsies predominate in those with mild ID (69%; 17% with symptomatic generalized epilepsy), similar to those with normal intelligence
- Epilepsy with moderate and severe/profound ID is often more severe and treatment-resistant than mild ID (p = 0.004), who have similar long term epilepsy outcomes to those with normal intelligence (table 1).

Table 1 Role of IDD in epilepsy types and remission

	Remission, %	Intractable epilepsy, %
All epilepsies		
Mild IDD	49	14
Moderate IDD	32	38
Severe/profound IDD	24	55
Focal epilepsy only		
Normal intelligence	68	15
Mild IDD	57	10
Moderate IDD	28	30
Severe/profound IDD	28	44

J Pediatr 1993;122:861–868., Neurology 2015;85:1512–1521

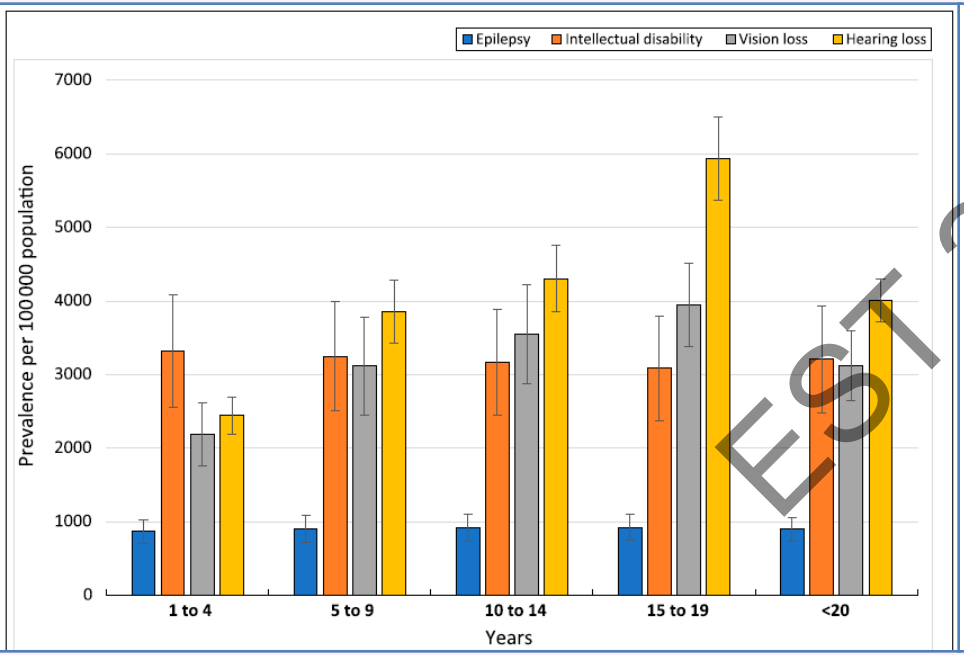
Global Burden of Childhood Epilepsy, Intellectual Disability, and Sensory Impairments

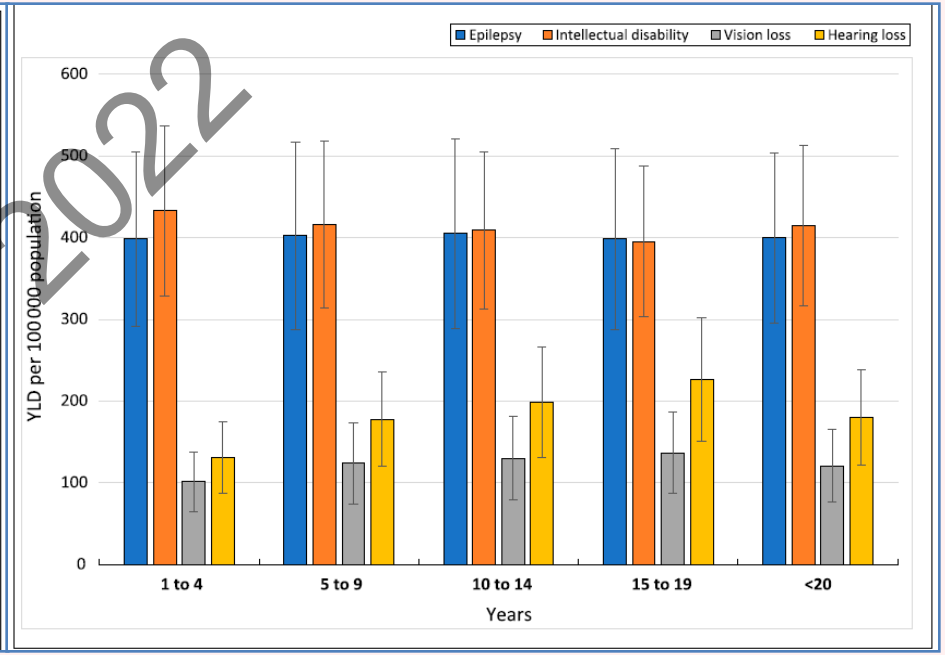
- **The United Nations' Sustainable Development Goals (SDGs)** mandate programs that will ensure inclusive and equitable quality education and promote lifelong learning opportunities for all children and adolescents, **including those with disabilities**.
- **Years Lived with Disability (YLD)** defined as the years of life lived with a condition in a less than ideal health state, are designed to provide a comparable measure of disease burden across diverse health conditions and impairments
- **Disability** weights are the population assessment of magnitude of health loss from specific health outcomes measured on a scale from 0 to 1, in which
  - **0** = a state of perfect health and **1** = death.

Pediatrics. 2020;146(1):e20192623

Global age-specific prevalence & YLD

for childhood epilepsy, intellectual disability, hearing loss and vision loss in 2017.





Epilepsy and intellectual disability were associated with the highest YLD in all age groups

Regional ranking of childhood epilepsy, intellectual disability by severity among children and adolescents based on estimates of prevalence and YLD in 2017.

	Global	North America	Western Europe	Central, Eastern E and Central Asia	Latin America an	Southeast Asia, Eas and Oceania	South Asia	Sub-Saharan Afri	North Africa and
Prevalence									
Treated epilepsy	12	5	5	9	9	12	14	17	10
Moderate epilepsy	8	7	10	8	5	9	9	8	5
Severe epilepsy	6	8	8	7	4	8	7	7	4
Borderline intellectual disability	10	11	12	11	10	4	5	3	9
Mild intellectual disability	1	3	3	3	3	2	3	4	3
Moderate intellectual disability	5	10	7	6	6	5	6	11	7
Severe intellectual disability	9	9	6	4	7	6	8	6	8
Profound intellectual disability	17	17	17	17	14	13	16	12	14
YLD									
Treated epilepsy	17	6	7	8	10	16	17	17	14
Moderate epilepsy	3	4	4	3	3	3	5	3	3
Severe epilepsy	1	1	1	1	1	1	1	1	1
Borderline intellectual disability	16	10	10	15	16	15	14	16	11
Mild intellectual disability	5	5	6	6	7	7	4	6	5
Moderate intellectual disability	4	3	3	4	4	4	3	4	4
Severe intellectual disability	2	2	2	2	2	2	2	2	2
Profound intellectual disability	13	13	13	17	17	17	8	15	9

Severe epilepsy and severe intellectual disability were the 2 most common disabilities with the highest YLD globally and in all regions.

A committed global leadership will ensure that

- These and other vulnerable children and adolescents are truly not left behind in accordance with the obligations under the *Convention on the Rights of the Child and the Convention on the Rights of Persons with Disabilities.*

Diagnostic & Treatment impact in ID-Epilepsy

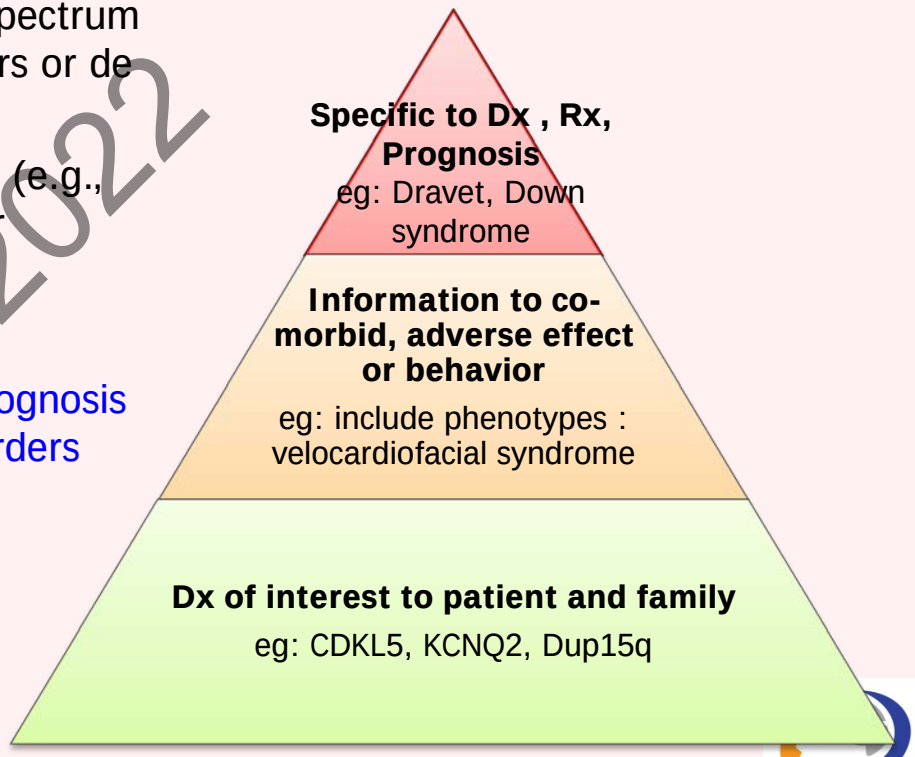
Video-EEG in ID-Epilepsy

- When feasible, it can confirm the seizure type and epilepsy syndrome and assess nonepileptic seizures (NES), medication toxicity, and other diagnostic challenges.
- The interplay of seizure reduction, EEG improvement, and side effects make it difficult to define the AED effects in this population.
- Impairments in cognition, behavior, and coordination due to AEDs may be wrongly attributed to the underlying ID, termed **diagnostic overshadowing.**

Genetic study in ID-epilepsy

- Gene panels can identify causes of ID, autism spectrum disorder, and epilepsy due to Mendelian disorders or de novo mutations.
- When a suspected disorder may impact therapy (e.g., tuberous sclerosis, SCN1A mutation), a stronger argument for testing can be made.
- Genetic disorders identification can

1. Have an immediate impact on diagnosis, Rx, prognosis
2. Identify preventable or treatable comorbid disorders
3. Inform the family about genetic counseling
4. Provide an explanation that relieves guilt
5. Provide patient and caregiver support through syndrome-specific advocacy groups



Genetic diagnosis impact

Neuroimaging in ID-epilepsy

- ID often have other significant co-morbidities alongside their cognitive deficits, including, for example, communication impairment.
- As a result, prolonged investigations may be intolerable without other interventions. It is often necessary for investigations such as MRI to be conducted under general anaesthetic.
- Survey results demonstrate that this significantly increases the waiting time for necessary investigations, with the majority of patients waiting at least 1–3 months, some more than 6 months.
- It appears that health services are not routinely putting reasonable adjustments in place to meet the needs of this population.

M. Kerr, 2017.

AED treatment in ID-Epilepsy

- 14 RCT with 1116 patients with ID-E studied carbamazepine, clobazam,felbamate, gabapentin, lamotrigine, rufinamide, and topiramate.
- No distinguished AEDs with respect to efficacy or side effects.
- The Cochrane reviewers advised making epilepsy care decisions based on etiology and standard practice, not the ID.

Pharmacological interventions for epilepsy in people with intellectual disabilities. Cochrane Database Syst Rev. 2015(9): CD005399.

Cochrane Library

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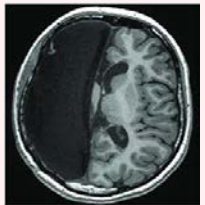
Epilepsy Surgery in ID-epilepsy

- Historically, patients with moderate to severe cognitive impairment were considered poor candidates for epilepsy surgery due to presumed multilobar dysfunction.
- However, among children and adults with TRE and a localized epileptic focus, IQ does not predict surgical outcome.
  - In syndromes such as tuberous sclerosis with ID and multiple structural and potentially epileptogenic lesions, removal of a dominant focus or even bilateral foci can markedly reduce or completely control seizures.
  - Functional hemispherotomy can be curative.
  - Callosotomy and multiple subpial resections may improve seizure control.



Epilepsia 2002;43(suppl 3):71–79.
J Neurosurg Pediatr 2011;7: 421–430.

Psychiatric disorders & ID-epilepsy

- Patients with ID-E are **7-fold more likely** to develop psychiatric disorders than those with ID only

Table 3. One-year incidence of commonly occurring Axis I psychiatric disorders measured by the Mini PAS-ADD in the epilepsy and nonepilepsy groups

Outcome	Epilepsy (n = 30) n (%)	Nonepilepsy (n = 30) n (%)	χ^2	d.f.	p-Value	OR (95% CI)
Depressive disorder	2 (6.7)	0	22.142	1	0.143	–
Mania/hypomania	0	1 (3.3)	1.017	1	0.313	–
Anxiety disorder	0	0	–	–	–	–
OCD	2 (6.7)	1 (3.3)	0.388	1	0.533	2.15 (0.18–25.07)
Psychosis	1 (3.3)	1 (3.3)	0.000	1	1.00	1.0 (0.06–16.76)
Unspecified disorder including dementia	4 (13.3)	0	4.286	1	0.038	–
Any psychiatric disorder	6 (20)	1 (3.3)	4.043	1	0.044	7.25 (0.82–64.5)

OCD, Obsessive compulsive disorder.

Epilepsia, 2011; 52(7):1223–1230

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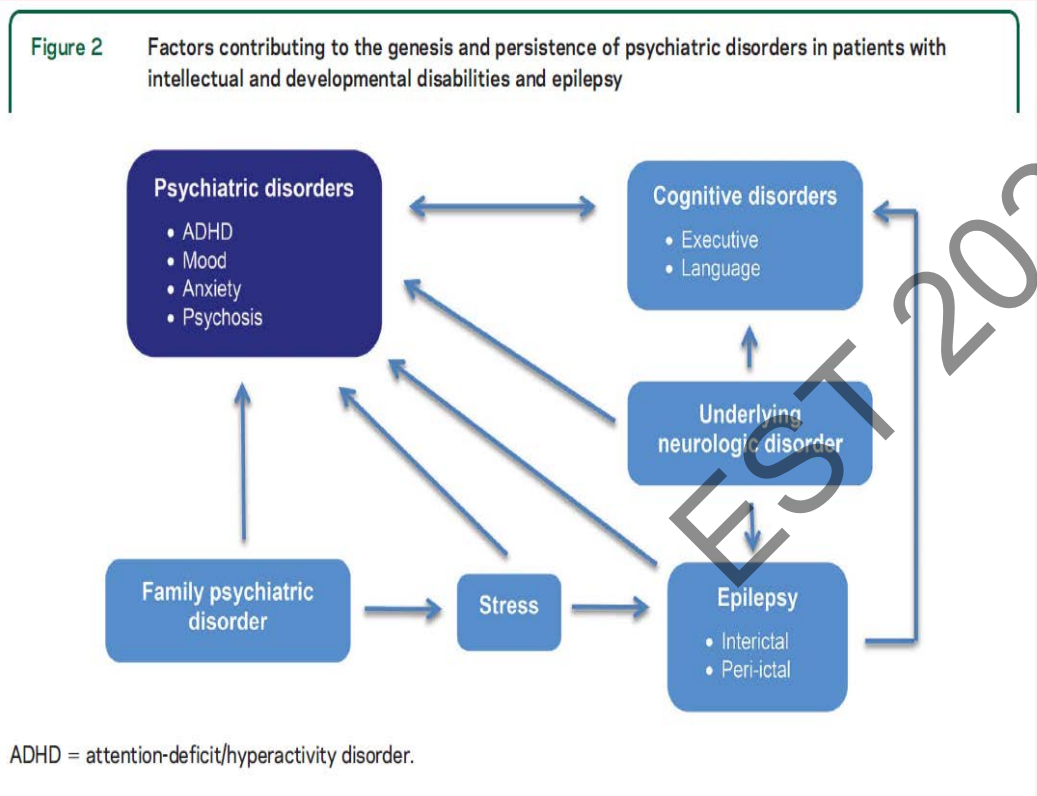
Psychiatric disorders & ID-epilepsy



- **<u>Psychiatric disorders</u>** result from
  - Underlying etiology of ID
  - Epilepsy (peri-ictal dysfunction forced normalization)
  - Genetics
  - AEDS and other medications
  - Living circumstances
- Psychiatric and psychological evaluations are often essential.
- Behavioral therapies, psychotropic medications, and environmental changes should all be considered.

Psychotropic medications

- Often underutilized in ID-E and other epilepsy patients due to fears that these medications commonly provoke seizures.
- Psychotropic drugs are safe & effective in epilepsy pts
- For patients on chronic psychotropic medication, re-evaluation to assess the necessity of ongoing, often polytherapy should be done at least once a year.

Psychotropic medications

TABLE 2. Mean psychotropic medication doses by class and type of drug at initiation and at maximum achieved during study period

Class and Type of Drug	*n*	Mean Initial Dose (mg)	Mean Maximum Dose (mg)	Proportion of Recommended Maximum Dose[a] (mean ± SD)
Antidepressants				
Tricyclics				
Desipramine	1	75	75	0.25 ± 0.0
Amitriptyline	5	16	31	0.10 ± 0.04
Nortriptyline	2	17.5	47.5	0.32 ± 0.26
SSRIs				
Fluoxetine	7	15	16.7	0.18 ± 0.09
Nefazodone	11	100	195.4	0.32 ± 0.10
Paroxetine	4	12.5	15	0.25 ± 0.10
Sertraline	9	30.6	50	0.25 ± 0.06
Anxiolytics				
Buspirone	5	12	17	0.28 ± 0.13
Antipsychotics				
Molindone	2	12.5	15	0.07 ± 0.03
Risperidone	3	4	4	0.67 ± 0.0
Thioridazine	2	17.5	22.5	0.03 ± 0.0
Psychostimulants				
Methylphenidate	2	10	21.3	0.35 ± 0.03

- 57 pts, epilepsy on psychotropic med , age 7–69 years
  - Mean seizure frequency **not** statistically different between pre- vs treatment periods
- Most had improvement in psychiatric status, after Rx
  - 34% very much improved 36% much improved;
  - 21% minimally improved 9% no change
- No patient clinical deterioration during Rx period.
- Rx practices in this study -minimizing seizure risk.
  - Avoided highly epileptogenic psychotropic med
  - Select effective drugs with low epileptogenicity.
- The results of this study cannot be generalized to all psychotropic drugs or to all dosages.
- The safe use of these medications in an epilepsy population may depend on type and dosage

J Neuropsychiatry Clin Neurosci 2000; 12:458–464

Behavioral disorders

Behavioral disorders found

- In AED at high doses,
  - Several AEDs prone to cause psychiatric symptoms in vulnerable patients (e.g., previous or family psychiatric history); include GABAergic drugs (barbiturates, benzodiazepines, vigabatrin, tiagabine, and levetiracetam).
  - Much of these data are anecdotal.
- In patients with ID-E, high seizure frequency, tonic-clonic seizures, & AED polytherapy

The psychopathology in people with ID-E

  - The most frequent expressions are aggressive, impulsive, and oppositional behavior,
  - mood, anxiety, and psychotic disorders are also common.

Whenever possible, physical and pharmacologic restraint should be avoided or minimized.

- Behavioral interventions (e.g., antecedent interventions, differential reinforcement, extinction, functional communication, response interruption) and regular exercise may be very helpful

Child Adolesc Psychiatr Clin N Am 2014;23:25–40

Misdiagnosis

- Misdiagnosis is common.
- **Stereotyped behaviors** can be confused as aggressive behavior or a sign of a seizure.
- Stereotypies may be the expression of self stimulation or a movement disorder.
- NES are common in people with ID-E.
- In populations of patients with NES, 30%–40% have ID and concomitant epilepsy.

Seizure 2012;21:160–164

Secondary care services

(inpatients, outpatients, and accident and emergency (A&E))

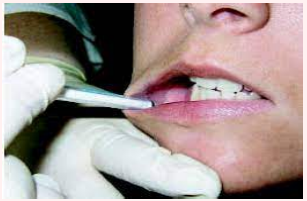
- People with ID, 27% of admissions for ambulatory care sensitive conditions (ACSCs) were for epilepsy
- A hospitalisation rate 54 times higher than for people without intellectual disabilities

A higher rate of admissions amongst people with ID compared with the general population for either the same condition, or for ambulatory care-sensitive conditions might suggest poorer primary health care management.

Balogh R., Brownell M., Ouellette-Kuntz H. & Colantonio A. (2010) Hospitalisation rates for ambulatory care sensitive conditions for persons with and without an intellectual disability-a population perspective. *Journal of Intellectual Disability Research, 54, 820-832.*

Emergency seizure management

- Every patient should have a written seizure action plan including emergency contact information, preferred hospital, medication doses, and allergies.
- Caregivers should know basic seizure first aid and how to treat prolonged or clustered seizures (rescue medication dose and repeated use, and when to call for ER medical services).
- Physicians need to consider causes of worsening seizure control (e.g., nonadherence, low AED levels).



Seizure-related injury & SUDEP

- A prospective, multicenter, case control study found an increased injury rate in persons with epilepsy vs controls (27% vs 17%, p , 0.0001)
- **Strategies** to minimize risk of accidental injury.
  - Injury risk is greatest in generalized seizures without auras and high seizure frequency.
  - Counseling on risks of submersion injury and water safety is essential.

- The incidence of SUDEP : 20 times higher in epilepsy compared with general pop.
- SUDEP is the most important directly epilepsy-related cause of death.
- Symptomatic epilepsy and ID are risk factors for **SUDEP**
- **Supervision**, esp at night, may reduce SUDEP in children & adults with ID-E.
  - Since most SUDEPs occur in sleep and patients are in the prone position, seizure monitors that can alarm caregivers may help to reduce SUDEP risk, but this remains unproven

Epilepsia 2002;43:1076–1083.
Seizure 2015;25:112–116

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Critical Issues in Care Delivery

Transition from pediatric to adult care

- **Successful care of adults with ID-E** depends on
  - Applying recent advances in genetic evaluation, ongoing epilepsy and treatment impact, collecting accurate data, addressing psychological comorbidity, and optimizing care transition.
  - Plans must be made for adults with ID-E who live with elderly parents.
- Many adult neurologists are uncomfortable with ID patients
- Formal training about ID care should become a part of all neurology and epilepsy training programs.

Devinsky O.,et al, Neurology® 2015;85:1512–1521

Minimum care standards for adults with ID-E.

Minimum care standards for adult with Intellectual and development disabilities and epilepsy
Healthcare providers should be educated about the medical, cognitive & behavioral co-morbidities
Healthcare providers should be instructed to patient-centered in communication eg: to make eye contact to speak , show the same respect for non verbal pt as for any other patient
In every patient, the dx should be carefully assessed , no matter what the age of the pt, with regards to underlying cause, epilepsy syndrome, and co-morbid disorders
Consider genetic disorders that could impact Rx (eg: Dravet syndrome)
Consider atypical presentations of epilepsy synd (eg: LGS w/o slow spike-wave or daytime tonic sz)
Autism spectrum and other psychiatric disroder are often co-morbid, their identification may improve care access and help tailor Rx
As children reach adolescence, they & caregiver should be educated about their care and transition to adult care should be planned in advance, adult epilepsy specialist care is usually required
Families should be educated on the nature of adult epilepsy care and an adult care provider identified
A brief personal and medical summary should be prepared and updated annually, and be available for all individuals involved the care of the pt with ID-E, this should include past and current Dx, medications, and beneficial/adverse effects, allergies, and personal preferences (eg: ways to calm the pt in a stressful setting)
Assess the AED regimen efficacy and safety during every clinical visit; consider misattribution of AED side effects to the ID (diagnostic overshadowing)
For patients with treatment resistant epilepsy consider dietary or surgical Rx.
Consider preventive strategies to reduce changes of injury or premature death, including risk from injury, drowning and SUDEP, assess living place, consider social work involvement if needed
Consider the needs of family members and the potential burden they are experiencing and refer for support as needed
An individualized seizure emergency management plan should be part of the medical summary
Integration of care among all health providers, identified one as coordinator; cares should always include careful listening to the pt with ID-E ,his/her input with respect to care decision
Mental health should be reviewed at every visit; referral to mental health support should be considere when concerns arise
Ongoing awareness to assess for changes in neurologic and medical health be aware of red flags eg: weight loss, behavior change, and loss of appetite for unrecognised physical comorbidity

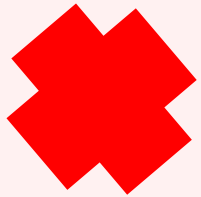
Devinsky O.,et al, Neurology® 2015;85:1512–1521

Service responses to people with intellectual disabilities and epilepsy: a systematic review

Robertson J., Baines S., Emerson E. & Hatton C. J Appl Res Intellect Disabil . 2017 Jan;30(1):1-32

Articles had to meet one of the following criteria

1. Interventions aiming to improve knowledge or practice in relation to service responses to people ID-Epilepsy
2. Current knowledge or practice in relation to service responses to people ID-Epilepsy
3. Opinions of professionals, carers or family with regard to services for people ID-Epilepsy
4. Service related factors associated with outcomes for people ID-Epilepsy



- 35 studies met the inclusion criteria
- Overall study quality was low, with no RCTs on intervention study designs.

There **are no** methodologically robust studies on service related interventions for people with intellectual disabilities and epilepsy.
Further research on improving service delivery is required to substantiate findings reported here

STUDY PROTOCOL Open Access

Improving outcomes in adults with epilepsy and intellectual disability (EpAID) using a nurse-led intervention: study protocol for a cluster randomised controlled trial

Howard Ring[1,2,3*], Nakita Gilbert[1], Roxanne Hook[1], Adam Platt[1], Christopher Smith[1], Fiona Irvine[4], Cam Donaldson[5], Elizabeth Jones[1,2,3], Joanna Kelly[6], Adrian Mander[7], Caroline Murphy[6], Mark Pennington[8], Angela Pullen[9,10], Marcus Redley[1,3], Simon Rowe[11] and James Wason[6]

Ring et al. Trials (2016) 17:297

Further reading

- **Living with epilepsy and a cognitive disability**
  - A guide for families, carers and support workers

- **Management of epilepsy adults with intellectual disability**
  http://www.rcpsych.ac.uk/usefulresources/publications/collegereports/cr/cr203.aspx

THANK YOU