

Otterbein University

Digital Commons @ Otterbein

Nursing Student Class Projects (Formerly MSN)

Student Research & Creative Work

8-2019

Fetal Alcohol Spectrum Disorder

Teresa Jordan

Otterbein University, teresa.jordan@otterbein.edu

Follow this and additional works at: https://digitalcommons.otterbein.edu/stu_msn



Part of the [Nursing Commons](#)

Recommended Citation

Jordan, Teresa, "Fetal Alcohol Spectrum Disorder" (2019). *Nursing Student Class Projects (Formerly MSN)*. 394.

https://digitalcommons.otterbein.edu/stu_msn/394

This Paper is brought to you for free and open access by the Student Research & Creative Work at Digital Commons @ Otterbein. It has been accepted for inclusion in Nursing Student Class Projects (Formerly MSN) by an authorized administrator of Digital Commons @ Otterbein. For more information, please contact digitalcommons07@otterbein.edu.

Fetal Alcohol Spectrum Disorder (FASD)

Teresa Jordan RN,BSN

Otterbein University, Westerville, Ohio

Fetal Alcohol Spectrum Disorders



FASD is an umbrella term used to describe a range of cognitive, behavioral, and physical disabilities due to prenatal exposure to alcohol.

Fetal Alcohol Syndrome (FAS): FAS represents the most involved end of the FASD spectrum. Fetal death is the most extreme outcome from drinking alcohol during pregnancy. People with FAS might have abnormal facial features, growth problems, and central nervous system (CNS) problems. People with FAS can have problems with learning, memory, attention span, communication, vision, or hearing. They might have a mix of these problems. People with FAS often have a hard time in school and trouble having a good relationship with others (Centers for Disease Control and Prevention (CDC), 2019).

Alcohol-Related Neurodevelopmental Disorder (ARND): Individuals with ARND might have intellectual disabilities and challenges with behavior and learning. They might perform poorly in school and have difficulties with math, memory, attention, judgment, and poor impulse control (CDC, 2019).

Alcohol-Related Birth Defects (ARBD): People with ARBD might have problems with the heart, kidneys, or bones or with hearing. They might have a mix of these (CDC, 2019).

Neurobehavioral Disorder Associated with Prenatal Alcohol Exposure (ND-PAE): ND-PAE was first included as a recognized condition in the Diagnostic and Statistical Manual 5 (DSM 5) of the American Psychiatric Association (APA) in 2013. A child or youth with ND-PAE will have problems in three areas: (1) thinking and memory, where the child may have trouble planning or may forget material he or she has already learned, (2) behavior problems, such as severe tantrums, mood issues (for example, irritability), and difficulty shifting attention from one task to another, and (3) trouble with day-to-day living, which can include problems with bathing, dressing for the weather, and playing with other children. In addition, to be diagnosed with ND-PAE, the mother of the child must have consumed more than minimal levels of alcohol before the child's birth, which APA defines as more than 13 alcoholic drinks per month of pregnancy (that is, any 30-day period of pregnancy) or more than 2 alcoholic drinks in one sitting (CDC, 2019).

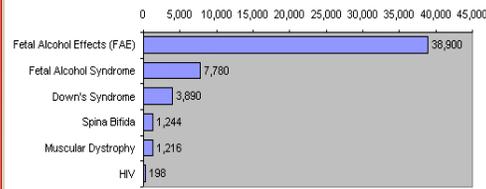
*The term fetal alcohol effects (FAE) was previously used to describe intellectual disabilities and problems with behavior and learning in a person whose mother drank alcohol during pregnancy. In 1996, the Institute of Medicine (IOM) replaced FAE with the terms alcohol-related neurodevelopmental disorder (ARND) and alcohol-related birth defects (ARBD) (CDC, 2019).

FASD is a leading cause of life-long disability and yet, completely preventable!

Prevalence of FASD in the US

Of 3,890,000 U.S. Babies Born Per Year...

SOURCE: Fetal Alcohol Syndrome Community Health Center

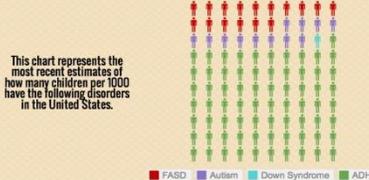


21/08/2017 Top Health News -- ScienceDaily

According to the Centers for Disease Control (2019)

- ❑ 40% of all women drink alcohol on a regular basis.
- ❑ 40% of all pregnancies are unplanned.
- ❑ Approximately 1 in 9 pregnant women reported drinking alcohol in the past 30 days.
- ❑ About one third of women who reported consuming alcohol engaged in binge drinking (4 or more servings of alcohol).
- ❑ Pregnant women who reported binge drinking in the past 30 days reported an average of 4.5 binge-drinking episodes during that same time period.
- ❑ CDC estimates of FAS: 6 to 9 out of 1000 children
- ❑ Experts estimate that the full range of FASD in the US may number as high as 1 to 5 per 100 school age children (or 1% to 5% of the population.)
- ❑ Lifetime cost for one individual with FAS in 2002 was estimated to be \$2 million.
- ❑ It is estimated that the cost to the US for FAS alone is over \$4 billion annually.

Prevalence of Different Developmental Disorders Among Children



Data taken from the CDC and National Resource Center on ADHD. Percentages are not representative of equal age ranges and chart displays proportions of people with the shown disorders, not the exact numbers.

- ❖ Prevalence of FASD is higher than that of Autism and Down Syndrome, but awareness and social support remains much lower. (Weintraub, 2018)

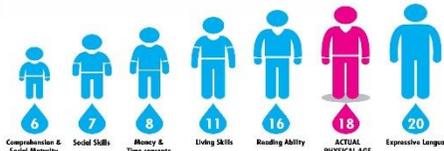


OTTERBEIN
UNIVERSITY

John's Story

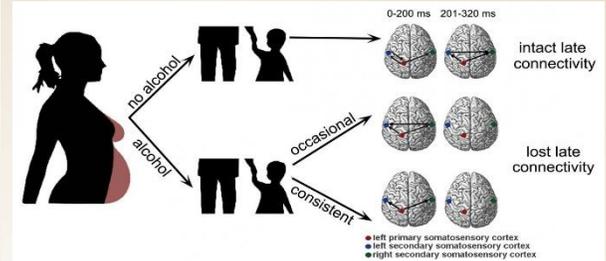
"We met John when he was 11 years old. He was such an unhappy and frustrated child at the time. He had been diagnosed with ADHD and prescribed medication by his family doctor. His symptoms were poorly controlled. In school, he struggled with poor behavior, poor performance, and poor social skills. His teachers disliked him very much. They reported him as 'defiant', 'obstinate', 'disruptive', 'irresponsible', and even 'lazy.' They would often say things like, 'I know he can do better, because he has done so before.' 'He is just not trying. He is too busy trying to be funny.' At home he had little family support. His father was a recovering alcoholic with intellectual delays. He had not seen his mother in about 6 years, since she had lost her parental rights for gross neglect. Father reported that mother had drank alcohol her entire pregnancy with John. It was not until a comprehensive psychiatric evaluation at a pediatric hospital that it was determined John had FASD. The news was quite shocking, as John did not have any of the characteristic physical traits typically seen with fetal alcohol syndrome.

John was referred to a psychologist who specialized in FASD, and a pediatric psychiatrist for medication management. The psychologist and psychiatrist collaborated with the school system to add support services to help John in school. His compensatory behaviors of trying to be humorous and avoidance improved drastically. Father was referred to a counsellor who helped to improve his parenting skills, and that is ongoing even now. Today, John is much happier and thriving. He continues to struggle scholastically, but with support, compassion, and a greater understanding on the part of the teachers, he is less anxious. His behavior is completely improved, and his teachers report that he is 'enjoyable' and a model student. John participates in the track and cross-country teams at school. He is a very strong runner, which gives him confidence. He is learning that running helps manage his ADHD and anxiety. With his new found confidence, John is much more socially interactive and has many friends. I think he is going to make it... I think he has a bright future ahead."



Characteristics of FASD

- Mild to severe intellectual and developmental disabilities; low IQ
- Attention Deficit Hyperactivity Disorder (ADHD)
- Poor social understanding
- Poor coordination and planning
- Poor muscle tone
- Verbal working memory deficits
- Receptive language deficits
- Executive functioning deficits (e.g. difficulty in organizing and planning)
- Slower processing speed and the inability to learn from the consequences of behavior
- Facial dysmorphism- most severe form, fetal alcohol syndrome (FAS); short palpebral fissures, thin upper lip vermilion, smooth, philtrum, and pre- and post-natal growth deficiencies.
- Smaller as babies; short stature as adults (Fainsod & Hicks, 2018)



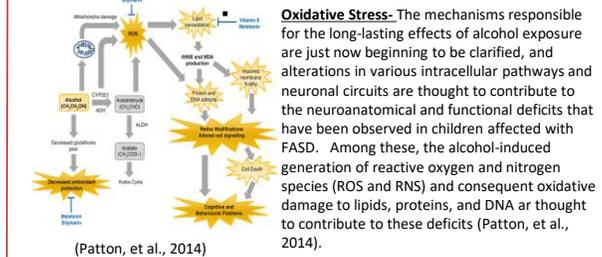
Schematic representation of the presented results a paper in the journal *Chaos*. We compare somatosensory evoked MEG response time series of children with/without prenatal alcohol exposure. The reconstructed networks of the primary (red dot) and secondary (blue and green dots) somatosensory cortex show a lack of inter-hemispheric connectivity in the late response (201-320 ms after stimulus) for children prenatally exposed to alcohol. CREDIT:Gao Lin and Linda Sommerlade (2019)

What went wrong?

Despite the known link, researchers are uncertain about the precise mechanism by which alcohol alters the developing brain.

Current research is focused on the following areas:

- **Alcohol teratogenesis-** Disruption of cellular metabolism- altered glucose utilization and transport, suppression of protein and DNA synthesis, oxidative stress-impairment of cell acquisition/ dysregulation of developmental timing- altered cell cycle, impaired neurogenesis and gliogenesis, mistimed events of cell generation, migration, neurite outgrowth, synaptogenesis, and myelination.- Altered regulation of gene expression- reduced retinoic acid signaling, effects on other transcription factors, epigenetic changes, including DNA methylation, histone modifications, and regulation by ncRNA (non-coding RNA).- Disrupted cell-cell interactions- inhibition of L1 neuronal cell adhesion molecule function- interference with growth factor signaling or other cell signaling pathways- reduced functioning of NMDA (N-methyl-D- aspartate) receptors, delayed development of the serotonin system- inhibition of IGF (insulin-like growth factor) I and II- cell damage/cell death- apoptosis, oxidative stress, withdrawal induces glutamatergic excitotoxicity. – Secondary sources of damage- Altered placental function or other intrauterine factors, hypoxia/ ischemia, acetaldehyde formation (British Medical Association. bma.org.uk. 2016).



(Patton, et al., 2014)

- **Epigenetics- DNA methylation-** Recent evidence indicates an epigenetic etiology in the development of FASD. All three types of epigenetic modulators- DNA methylation, histone modifications, and regulation by mRNAs- are upset by ethanol exposure. These ethanol-related changes can affect gene expression of critical developmental genes and pathways, impacting cell proliferation and differentiation (Legault, et al., 2018).

Implications for Nursing....

- The advanced practice nurse will not avoid the detrimental effects of FASD in clinical practice. Knowledge and compassion will be vital to the successful intervention, helping the client to have an optimal quality of life.
- Prevention and awareness are the ideal focus. Women of child-bearing age must be educated on the detrimental effects of alcohol on the embryo/fetus. There is no known safe time or level of alcohol during pregnancy.
- Early detection and intervention are the key to helping the individual with FASD to achieve optimal quality of life.
- Knowledge is key!

Future research...

- ✓ Biomarkers specific to FASD in order to assist in early detection and intervention
- ✓ Therapies that reduce or reverse oxidative load, such as antioxidant therapy
- ✓ Protective therapies

