

## **FETAL ALCOHOL SPECTRUM DISORDER**

### **ALCOHOL: POISON FOR YOUR UNBORN BABY**

**The good news is that FAS is 100% preventable; the bad news is that it's 100% irreversible**

The information explosion in the science of nutrition very often creates the impression that available information is contradictory. Consequently, it is no longer easy to distinguish between fact, misinformation and fiction. The Division of Human Nutrition, Faculty of Medicine and Health Sciences, Stellenbosch University act as a reliable and independent source of nutrition information.

#### **WHAT IS FETAL ALCOHOL SPECTRUM DISORDER?**

Fetal Alcohol Spectrum Disorder (FASD) is a birth defect caused by heavy alcohol consumption (usually in a binge pattern) during pregnancy. It is characterised by growth retardation, facial and neural abnormalities as well as malformations of other organ systems. Maternal risk for giving birth to a child with FASD is known to vary substantially by population and that the risk also varies between individuals.

Alcohol and its primary metabolite, acetaldehyde, are known tissue toxins which may interfere directly with cellular growth and metabolism. When a pregnant woman consumes alcohol, it is carried to all her organs and tissues including the placenta. The placenta functions to protect the fetus and provides nourishment from the mother to the fetus. Alcohol is able to cross the placental membrane and is then transported directly to all developing tissues of the fetus.

These adverse effects of alcohol on the developing fetus are characterised by an array of disorders, termed Fetal Alcohol Spectrum Disorders (FASD). They include structural anomalies as well as behavioural and neuro-cognitive disabilities. Children at the severe end of the spectrum are defined as having the fetal alcohol syndrome (FASD).

#### **HOW MANY CHILDREN ARE AFFECTED BY FASD?**

FAS is the most common preventable cause of mental retardation worldwide, even more so than Down's syndrome.

In South Africa, FASD is thought to affect at least 3 million of the South African population.

The estimates of FAS prevalence elsewhere in the world range from 0.1-0.2% in developed countries, to 1% in some Native American Indian populations. Thus, the prevalence of FASD in certain areas of South Africa, is the highest reported anywhere in the world.

#### **HOW IS FASD DIAGNOSED?**

In 1996, the Institute of Medicine in the USA defined the following diagnostic categories within FASD:

- ◆ FASD with confirmed maternal alcohol exposure,
- ◆ FASD without confirmed maternal alcohol exposure,
- ◆ Partial FASD with confirmed maternal alcohol exposure,
- ◆ Alcohol-related Birth Defects (ARBD)
- ◆ Alcohol-related Neurological Defects (ARND)

Full-blown FASD is characterised by a specific pattern of malformations, with or without a confirmed history of maternal alcohol abuse during pregnancy. This specific pattern includes minor anomalies of the face, neuro-cognitive deficits and prenatal onset of a growth deficit (length and /or weight) that persists postnatally.

**The following 3 categories are the clinical signs present in a FASD-affected child:**

**A. Growth retardation, both before and after birth, specifically:**

- ◆ Height and weight for age are below the 10th percentile on the NCHS standard curves for height and weight, i.e. the child is underweight and/or short of stature,
- ◆ Head circumference for age is below the 10th percentile on the NCHS standard curves for head circumference, and
- ◆ Failure to thrive (i.e. the child does not grow adequately and weight gain is sub-optimal) according to the Road-to-Health Card (RTHC). \*

**B. A distinct pattern of facial and other physical abnormalities (*Picture 1*), specifically:**

- ◆ Eyes – small and wide-set eyes with epicanthic folds,
- ◆ Ears – small and low-set,
- ◆ Nose – short, upturned with a flat philtrum (i.e. no groove on the area between the nose and upper lip) and a low nasal bridge,
- ◆ Mouth – thin upper lip, cleft lip or cleft palate,
- ◆ Chin – small and recessed,
- ◆ Skeletal – limited joint movement, and
- ◆ Kidney and heart defects may also occur.

**C. Brain and nervous system abnormalities and dysfunctions:**

- ◆ Mild to moderate mental retardation,
- ◆ Delay in developmental milestones (i.e. poor sucking, delayed sitting, crawling, walking and talking),
- ◆ Poor eye-hand co-ordination (e.g. catching a ball),
- ◆ Delayed development of fine motor co-ordination (e.g. picking up an item with his/her fingers) and gross motor co-ordination (e.g. running), and
- ◆ Irritability and hyperactivity.

\*RTHC: weight is plotted against the child's age (weight-for-age) on the card to produce a growth curve. This growth curve is then used to assess if the child's growth is normal for his/her age.

**COMMON CHARACTERISTICS ASSOCIATED WITH MOTHERS BEARING FASD CHILDREN IN THE WESTERN CAPE:**

- ◆ Live in an environment in which heavy drinking is the norm (husband, other family members, friends)
- ◆ Partake in binge drinking (mostly during weekends)
- ◆ Heavy smoking
- ◆ Poor nutrition
- ◆ Poor education
- ◆ Seasonal/agricultural worker
- ◆ Have poor socio-economic circumstances
- ◆ Age greater than 27 years
- ◆ Have given birth to more than 3 children already
- ◆ Unmarried/living with partner
- ◆ Low religiosity

The presence of these characteristics does not necessarily imply that a mother will have children with FASD, unless she consumes large amounts of alcohol during pregnancy. It also does not exclude the possibility that women of other socio-economic backgrounds will not give birth to infants with FAS.

## HOW AND WHEN IS THE FETUS AFFECTED?

There are many critical periods during pregnancy when the developing fetus is highly susceptible to the teratogenic (toxic) effects of alcohol.

- ◆ **1<sup>st</sup> trimester** (0 - 12 weeks): This is the most critical period for the structural development of the fetus. Alcohol can alter the way in which cells grow and arrange themselves as they multiply, causing abnormalities in the embryo. Abnormalities of the face, heart, brain (neural tube defects can occur in severe cases), limbs and urogenital system can occur.
- ◆ **2<sup>nd</sup> trimester** (12 - 24 weeks): Fetal exposure to alcohol may result in miscarriage.
- ◆ **3<sup>rd</sup> trimester** (24 weeks – to delivery): This is the period when the fetus undergoes rapid and substantial growth and alcohol exposure could impair the fetus' overall growth.

The brain, which is thought to be most sensitive to alcohol's teratogenic effect, continues to grow throughout pregnancy and post-partum.

## HOW CAN FASD BE PREVENTED?

One of the most frequently asked questions about FASD is "How much alcohol must be consumed during pregnancy to result in this disorder?" The answer is simple: the exact amount is not known at this point, since each woman and each pregnancy is unique. Prenatal damage by alcohol varies widely and is dependant on the quantity of alcohol consumed, the frequency of consumption and the timing of consumption in relation to the gestational age of the fetus. Additionally, there are a number of variables, such as age, genetic factors, multiple drug use and the nutritional status of the mother, which may interact with alcohol in the development of FASD. The safe answer to the question therefore is that women planning to conceive or who are pregnant should abstain from alcohol, completely.

It is well known, that a direct relationship exists between the amount of alcohol consumed during pregnancy, the resultant blood alcohol concentrations (BAC's) and the extent of fetal alcohol-related abnormalities. Therefore, the more a mother drinks during her pregnancy, the greater the likelihood that her child will have full-blown FASD. Research has associated FAS with heavy drinking during pregnancy, specifically 5 drinks or more [75 ml Absolute Alcohol (AA) per occasion or more than 6-7 drinks (90-100 ml AA)] per week. It is possible therefore for one drinking binge to harm the fetus. Furthermore, women are physiologically less capable than men to "hold" their alcohol. An equal amount of alcohol consumed by a woman when compared with a man of a similar weight will result in a higher BAC in the woman. Other factors related to alcohol metabolism, BACs and the teratogenic effects on the fetus include body size, nutrition, normative perceptions, education, low socio-economic status and cultural practices, including patterns of food consumption. Additionally, the available evidence suggests that alcohol consumption, even in relatively light doses, may alter the fetus in ways that persist long after birth, particularly with regard to behaviour and intellectual functioning.

Most women with unplanned pregnancies are unaware that they are pregnant during the first 12 weeks of pregnancy, and can unknowingly damage their fetus by consuming alcohol. The best advice to such mothers is to stop drinking as soon as they realise that they are pregnant. This will greatly reduce the risk of damage to the fetus. The best method of prevention, however, is to plan pregnancies with effective birth control and to abstain from any alcohol when planning a pregnancy.

## **DOES NUTRITION DURING PREGNANCY HAVE A ROLE IN FASD DEVELOPMENT?**

It is well known that the nutritional status of pregnant women affects the outcome of pregnancy, especially the birth weight of the infant.

Chronic alcohol use can interfere with maternal nutrition. For instance, alcohol is a source of energy and its consumption generally leads to a reduced intake of food. Alcohol can also interfere with the digestion and absorption of food, as well as the metabolism, storage, utilisation and excretion of nutrients such as the B vitamins, vitamins C, A as well as zinc, iron, calcium and magnesium.

Evidence from observational studies indicates that poor nutrition increases the risk of FASD. Mothers of FASD infants tend to be somewhat underweight and gain less than the recommended weight during pregnancy. Undernourished or smaller women may be at greater risk for having a child with FASD because they attain higher BAC's faster than women who drink the same amount but are adequately nourished or have a larger body size.

The amount of weight gained during pregnancy has a consistent relationship to the infant's birth weight. It is also known that infant birth weight is closely related to infant mortality. Sufficient weight gain during pregnancy can only be achieved with appropriate nutrition throughout the pregnancy. The recommended weight gain during pregnancy is specific to a woman's pre-pregnancy weight.

## **WHAT ABOUT DRINKING ALCOHOL WHEN BREASTFEEDING?**

In a mother who breastfeeds, any alcohol consumed will disseminate in the mother's blood stream and into her breast milk. This is passed on to the breastfeeding infant and has the potential to interfere with further development of the brain. Alcohol also changes the taste of breast milk and some studies have shown that infants tend to drink less breast milk after the mother has consumed alcohol. An intake of more than 1g/kg/day alcohol has also been reported to inhibit the milk ejection reflex. In the long-term, this could affect the weight gain and development of the infant.

The current recommendations on the potential effects of alcohol consumption on the infant during lactation appear to be conflicting. The American Academy of Pediatrics in 2001 classified alcohol as "usually compatible with breastfeeding". They do however warn of cases of drowsiness, weakness, slowed growth and inhibited ejection reflex. According to the Canadian Pediatric Society, breastfeeding is not recommended when mothers drink alcohol moderately on a regular basis (more than 2 drinks per day). Since the aim of the Canadian recommendations is to protect the baby from alcohol exposure, formula feeding may have to be considered if the mother refuses to abstain from alcohol or at least reduces her alcohol intake. However, women who abstain or who drink infrequently should be advised to breastfeed, since breastfeeding is the best nutrition for the infant.

## **WHAT ARE THE LONG-TERM CONSEQUENCES OF FASD?**

It is important to realise that a child made vulnerable by his/her mother's alcohol consumption during pregnancy, has a biologically based disability with potential long-term adverse consequences. For instance, parents and health professionals are often concerned about weight gain in children with FASD, but they need to be assured that it is due to the syndrome and not necessarily because of bad parenting or bad eating habits. Even if the child's weight, height and head circumference are all below the 5<sup>th</sup> percentile for age, there should be no need for concern as long as the child gains weight steadily and parallel to the normal growth curve.

The brain and nerve abnormalities found in children with FASD often manifest as hyperactivity, irritability, attention deficit disorder, distractibility and taking longer than normal to complete tasks. These functional impairments in the infant/child make the adequate feeding of such infants/children challenging. Furthermore, physical problems, such as cleft palate, may impair feeding and need to be surgically corrected. Weak sucking leads to very long feeding sessions, which frustrate parents

and increase anxiety. Additionally, these infants are also easily distracted and may be unable to focus on drinking or eating thus increasing feeding times even more.

Adolescents with FASD have been reported to overeat, a behaviour, which may well, be due to abnormalities of the satiety centre in the brain. FASD-affected adolescents are mostly of short stature (due to earlier failure to thrive) and as such they may be prone to developing obesity and its consequences.

## **RECOMMENDATIONS**

### **For the Mother:**

- ◆ When planning a pregnancy, abstain from drinking any alcohol,
- ◆ If you do not plan to fall pregnant and abstain from drinking alcohol, use effective birth control,
- ◆ Do not consume any alcohol during pregnancy,
- ◆ Stop drinking immediately if you realise that you are pregnant,
- ◆ It is essential to gain sufficient weight during your pregnancy,
- ◆ Eat a varied and balanced diet, with special attention to food sources rich in folate, iron, calcium and vitamin C, and
- ◆ Protect your breastfeeding baby from alcohol by abstinence, or by planning the intake of modest amounts (1-2 drinks per week). Allow enough time for alcohol to be metabolised and excreted (usually 2-4 hours) before the infant's next feed.

### **For the Child with FASD:**

- ◆ The child should be weighed regularly to ensure sufficient weight gain,
- ◆ For children who get distracted easily, feed the child in a separate room so as to reduce all stimuli (turn off lights, radio, TV) and give small meals with a limited number of food choices in any one meal
- ◆ Patience is probably the most important characteristic that a parent of a child with FAS should have - especially at meal times.
- ◆ Trial-and-error is advised for deciding on which feeding method works best for the infant/child.

***For further, personalized and more detailed information, please contact a dietitian registered with the Health Professions Council of South Africa.***

*References from the scientific literature used to compile this document are available on request.*

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