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2010 FACE POSTER COMPETITION ABSTRACTS

11TH ANNUAL FETAL ALCOHOL CANADIAN EXPERTISE (FACE) RESEARCH ROUNDTABLE

September 14, 2010
Vancouver, British Columbia

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2010 FACE RESEARCH ROUNDTABLE POSTER COMPETITION ABSTRACTS

1
Articulation issues in children with Fetal Alcohol Syndrome compared to children with typical development

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Background: Studies suggest that prenatal exposure to alcohol leads to impairments in language but have not examined speech motor control. This study examines speech motor and language differences among children with fetal alcohol syndrome (FAS) and typically developing children.
Methods: For this study in progress, two standardized speech-language tests (Structured Photographic Articulation Test II and the Verbal Motor Production Assessment) and the Primary Test of Nonverbal Intelligence are being administered to a target group of children, ages three to ten, diagnosed with FAS, and to a group of controls matched for chronological and cognitive development. Preliminary results are limited to descriptive measures and qualitative comparisons.
Results: Preliminary results suggest children with FAS demonstrate severe motor deficits in the area of focal oromotor control compared to their chronologically age matched peers. Children with FAS examined to date present with inconsistent articulation errors.
Conclusion/Discussion: Children with FAS appear to have more articulation errors related to motor control, along with language errors, than their neurotypical peers. The specific area of concern is the focal oromotor control that governs mandibular, lingual and labial-facial control for volitional speech movements.

Key Words: *Fetal alcohol syndrome, speech-language development, speech-motor control*

Source of funding: TTUHSC Department of Speech-Language Hearing Sciences
Conflict of interest: none
Student: Full-time Masters student
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2
Rapid quantification of fatty acid ethyl esters by an improved method that is suitable for pretnatal alcohol screening

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Background: Elevated levels of fatty acid ethyl esters (FAEE) in meconium are a useful biomarker for heavy prenatal alcohol exposure. In order to support an efficient universal screening program, an analytical method to quantify FAEE in meconium needs to be accurate, inexpensive, and rapid. Moreover, when quantified by gas chromatograph mass-spectrometry (GC-MS), it needs to produce chromatograms with minimal background from a very complex matrix. The purpose of this study was to develop an analytical method that would satisfy these criteria.
Methods: The sample undergoes liquid-liquid extraction with heptane:acetone, the heptane layer is isolated and evaporated, and then the resulting residue undergoes headspace-solid-phase microextraction coupled with GC-MS. Four FAEE (ethyl palmitate, ethyl linoleate, ethyl oleate, and ethyl stearate) are quantified from 0.5g of meconium using D_5-ethyl esters as internal standards.
Results: The detection limits ranged from 0.020 to 0.042nmol/g and are 6 to 25-fold lower than the individual FAEE threshold concentrations (0.5nmol/g). This method also has good precision with the coefficient of variation ranging from 2.6 to 19.4% for concentrations of individual FAEE between 0.5 and 2.62nmol/g meconium (n=4). Calculated concentrations of FAEE that underwent extraction from meconium were 100-101% of the expected concentration, demonstrating good accuracy. This method was also able to produce clean chromatograms from meconium samples that could not be quantified using a previous method due to high chromatographic background.
Conclusions: This method provides an optimal approach to detecting and quantifying FAEE in meconium that could be utilized in a universal screening program for prenatal alcohol exposure.

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Key Words: *Biomarker, gas chromatography mass-spectrometry, fatty acid ethyl esters*

Source of funding: none
Conflict of interest: none
Student: Full-time PhD student
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3
Source monitoring difficulties among children with Fetal Alcohol Spectrum Disorders

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Background/Objectives: Deficits in memory are well documented in children with FASD; however, one aspect of memory that has not been studied in children with FASD is source monitoring. Source monitoring refers to a group of cognitive processes that enables an individual to determine the origins of their knowledge, beliefs, and memories. The goal of this study was to examine whether children with FASD have deficits in source monitoring as compared to non-FASD children.
Methods: Participants included 15 children with FASD and 15 typically developing children aged 6 to 12 years. Children were presented with auditory word lists after which they were required to recall the source of the word in three conditions: reality monitoring, external monitoring, and internal monitoring. Reality monitoring refers to distinguishing between memories that are internally generated versus externally generated (e.g. Did I say that or did Person A say that?). External source monitoring involves discriminating between two separate external sources (e.g. Did Person A say that or did Person B?). Lastly, internal source monitoring refers to differentiating between at least two types of self-generated (internal) memories (e.g. Did I say that or did I think that?).
Results: Children with FASD showed poorer performance than the comparison group across all three conditions in both recognition memory and memory for source. Group differences were especially pronounced in the internal source monitoring condition.
Conclusions: Information about source monitoring deficits further delineates the intricacies of memory deficits in FASD, and has implications for both assessment and intervention.
Source of funding: Glenrose Hospital Clinical Research Fund
Student/Trainee: no
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4
FASD classrooms in Canada: in search of best practices

Koren G

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Background: As part of a needs assessment conducted in 2009 by the Motherisk Fetal Alcohol Spectrum Disorder (FASD) Clinic, interviews were conducted with various education practitioners. The needs assessment revealed that one fundamental reason educators may find it difficult to address the needs of FASD affected students (whether diagnosed or not) is the absence of evidence-based best practices, with respect to educational interventions for FASD. This is a significant barrier for educators wishing to address their students' needs through developmentally appropriate program planning.
Objectives: To document classroom environments and practices currently implemented by educators who work with children with an FASD. Furthermore, to promote the development of best practices for FASD related educational interventions. Additionally, we aim to compliment the Public Health Agency of Canada's stated objectives to increase collaborative information sharing efforts amongst practitioners.
Methods: Schools around Canada with specialized classroom programs for FASD were targeted. Schools and classrooms were visited, key elements of the physical environment were documented, and at least two persons involved in program development and delivery were interviewed. The descriptive and literary evidence was analyzed.
Results: Several publicly funded FASD focused classrooms are located in Manitoba, Alberta, and Ontario. A summary of nine classrooms within five schools, servicing approximately 72 high-risk and high-needs FASD-diagnosed students is presented. All classrooms share overt similarities in areas of sensory-based programming and unique physical classroom environments. As some programs have been operating for many years now, there is ample evidence of consistent and promising practices with high-need FASD affected students.
Conclusion: Commonalities found among these five school programs represent promising practices for educators working with FASD diagnosed children. Educators describe these findings as effective and fundamental aspects of their respective programs. Future studies should identify markers of effectiveness for these promising practices.

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Key Words: *Education, school-age, intervention, best practice*

Source of funding: Motherisk Program
Conflict of interest: none
Student: no
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5
White matter microstructure in Fetal Alcohol Spectrum Disorder

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Background: White matter (WM) tracts form essential connections in the brain and enable proper cognitive functioning. Diffusion tensor imaging (DTI) provides indirect measures of WM integrity, and has been used in our lab to reveal abnormalities in 7/10 WM tracts[1] and regional correlations of WM with math ability[2] in children with FASD (aged 5-13 years). However, WM development continues into adolescence when many secondary disabilities worsen in FASD, so investigation of a wider age range is needed.
Methods: New participants (n=36) with an FASD (5-30 years) and 36 matched controls underwent DTI scans. Cognitive tests of mathematical ability, word identification, and receptive and expressive vocabulary were administered to FASD participants. Group differences in DTI parameters were assessed for 12 major WM tracts. Partial correlations were then performed between these DTI parameters and cognitive scores.
Results: Statistically significant diffusion abnormalities were observed in the body and splenium of the corpus callosum, the left and right superior longitudinal fasciculus (SLF), and the left inferior fronto-occipital fasciculus (IFO). DTI parameters in the splenium and left and right SLF significantly correlated with word ID scores, and expressive vocabulary scores.
Discussion: Diffusion abnormalities in the corpus callosum have been consistently demonstrated[1,3-8], suggesting that this area may be particularly vulnerable in FASD. Abnormalities in the SLF are consistent with our previous study of younger children.[1] Significant correlations of DTI parameters in the SLF with reading and vocabulary scores are consistent with the putative role of this tract in language and auditory processing, and may correspond to difficulties encountered in FASD.

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Key Words: *Diffusion tensor imaging, white matter integrity, cognitive functioning*

Source of funding: Canadian Institutes of Health Research Grant
Conflict of interest: none
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6
Restoring hope: an adapted attachment parentingDVD series empowers caregivers of children who have FASD

Densmore RJ

Background: As per “Top Unmet Important Family Needs from Caregivers Raising Children with FASD and Behavior Problems”: *“Family Matters:” Fetal Alcohol Spectrum Disorder and the Family.* Olson HC, et.al. Developmental Disabilities Research Reviews 2009: 15 (242), caregivers suffer enormous strain. Five of these "Top Unmet Needs" are: 1) a sense of isolation; 2) overwhelm; 3) bewilderment; 4) lack of useful "tools"; and 5) not knowing what to expect. The aim of this research was to adapt an existing DVD series that teaches restoration and maintenance of attachment to parents and caregivers, for those who look after children affected by FASD.
Method: An 8 session *Power to Parent-The Vital Connection* DVD course was presented to two different parent groups in the fall of 2009 and spring of 2010. The DVD topics included: 1) aggression; 2) counterwill ("talking back"); 3) polarized attachment (such as when kids are "caught" between two parents in a marital conflict); 4) crisis management; 5) stages of attachment; 6) "Alpha kids" who want to be "in control"; and 7) ways

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of connecting with kids who are trying to "pull away" from parents or other caring adults.
Results: Parents rated improvement of 5 of the Top Unmet Needs from a pre-course score of 2.4 to a post-course score of 3.6. Optimism, confidence and sense of empowerment improved from 1.9 to 3.1 (Scale: 1=very low 2=low 3=OK 4=optimal); parents rated the usefulness of the course's seven topics at 3.7 (Scale: 1=not helpful 2=helps a bit 3=helpful 4=very helpful)
Conclusion/Discussion: This small, unfunded study suggests isolated inadequately supported rural parents can significantly benefit from this psycho-educational 8 session attachment-parenting programme.

Key Words: *Parent support, caregiver support, attachment, burnout prevention*

Source of funding: none
Conflict of interest: Dr. Densmore is a Certified Facilitator of Dr. Gordon Neufeld's Attachment Parenting DVD Courses; Dr. Densmore has launched a website called fasdrelationships.ca that discusses Dr. Neufeld's approaches and how these can be adapted for FASD in more detail--there is no charge to access this information on the website.
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7
National FASD screening tool development project: the maternal drinking guide

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Background: Maternal drinking history is necessary for improving identification of at-risk women and reducing risks for both mother and child. Due to concerns surrounding stigma, it is essential to utilize effective screening techniques to engage women of childbearing age and obtain accurate maternal alcohol use report. The purpose of the maternal drinking guide (MDG) is to identify women at risk of alcohol use in pregnancy. Knowledge of prenatal alcohol use is essential for: 1) subsequent FASD diagnosis in the future; and 2) harm reduction strategies.
Method: To investigate maternal drinking history, a systematic review of all evidence-based methods validated for detecting alcohol use in pregnancy was conducted. Evidence of maternal problem drinking or illicit drug use (as it is highly predictive of problem drinking) can be considered a "positive screen" to prompt FASD diagnostic testing of the child, if necessary.
Results: Although the maternal drinking guide provides several options, the most appropriate choice of screening tool(s) used will depend on provider expertise, practice and patient's characteristics. The guide also includes an algorithm comprising all three levels of screening: 1) practice-based (e.g. single-question, quantity-frequency questions); 2) alcohol-screening questionnaires (e.g. TWEAK); and 3) laboratory tests to corroborate or refute alcohol exposure by the woman.
Conclusion: At minimum, all healthcare providers should routinely incorporate practice-based questions as part of their standard practice during the history-taking process. The MDG will play a key role in FASD prevention and intervention strategies and help providers improve their identification of at-risk women and children.

Key Words: *Maternal drinking history, FASD diagnosis, pregnancy, screening*
Conflict of interest: none
Source of funding: Public Health Agency of Canada (PHAC)

8
Meconium testing for prenatal alcohol exposure: maternal participation in a pilot neonatal screen program

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Background/Objectives: Fatty acid ethyl esters (FAEE) in meconium are validated biomarkers of fetal alcohol exposure. In clinical practice, meconium analysis can potentially be used to identify newborns at risk for alcohol-related disabilities, who can then be followed up and assisted if any disabilities emerge. This study aims to determine whether women are willing to partake in such screening by assessing

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maternal participation in a pilot neonatal screening program for prenatal alcohol exposure.
Methods: All Grey-Bruce women delivering at St. Joseph's Hospital were offered a screening program involving meconium analysis and long-term follow-up of positive cases. With consent, meconium was collected and tested for FAEE using validated methods. Positive cases were followed-up by a public health nurse who conducted timely developmental assessments and made referrals to appropriate intervention programs if delays emerged. The rates of voluntary participation and positivity for fetal exposure in this open screening program were then compared to the rates previously observed in this population when testing was offered anonymously.
Results: Of the 55 women who were offered screening, 43 consented. Among these, one positive case was identified and is currently being followed-up by the Public Health Department. The consent rate in this open screening program is significantly lower ($p<0.05$) than in the previous study where testing was anonymous (78% vs. 94%, respectively), and the positivity rate is only 3% in contrast to 30% positivity rate observed with anonymous testing ($p<0.01$).
Conclusions: Findings suggest that open screening results in lower participation and low positivity for fetal exposure. This implies that despite the potential benefits of such screening programs, maternal unwillingness to consent may severely limit the usefulness of meconium testing for large population-based open screening.

Key Words: *Meconium, fatty acid ethyl esters, neonatal screening*

Source of funding/Conflict of interest: The study was supported by a CIHR operating grant (GK). GK is supported by the Ivey Chair in Molecular Toxicology, Department of Medicine, University of Western Ontario. The authors have no additional conflict of interest to disclose.

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9
Neuronal migration, cell death, and axonal guidance defects in *caenorhabiditis elegans* exposed to developmental ethanol exposure

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Background/Objectives: In the nematode *C. elegans* post-embryonic ethanol exposure causes failure to develop some of its mechanosensory neurons. The objective of this study is to examine the identity of the absent mechanosensory neurons and other possible neurological defects.
Methods: *C. elegans* expressing GFP in their mechanosensory neurons were raised on 0.4M-0.6M ethanol-infused agar during post-embryonic development. The presence and location of the mechanosensory neuron cell bodies and the morphology of their axons were examined at the final stage of the post-embryonic development.
Results: We found some exposed animals did not have AVM and/or PVM neurons (these two neurons were born during post-embryonic development), but none of the other 4 neurons born before the exposure were absent. The migration of AVM neuron towards its posterior final designation was affected. Some animals showed axon grown towards an incorrect direction.
Conclusion/Discussion: The result suggests that ethanol exposure during neuronal development in *C. elegans* may result neuronal cell death, and neuronal migration and axonal guidance defects. This simple model can serve as a platform for rapid screen for genes involved and for drugs that can attenuate these neurological defects caused by developmental ethanol exposure.

Key Words: *C. elegans, axon guidance, cell death, neuronal migration*

Source of funding: CIHR
Conflict of interest: none
Student/Trainee: Full Time Graduate Student

10
Using *C. elegans* as a high throughput model of FASD to delineate the effects of different patterns of embryonic ethanol exposure

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Background/Objectives: The effects of alcohol on the fetus depend on the dose, timing, duration and frequency of exposure, but investigations into these 4 exposure factors can be expensive and time-consuming using mammalian models. To address this problem we use *Caenorhabditis elegans*, a nematode model with a large brood size with a 3-day lifecycle.

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Methods: *C. elegans* embryos were exposed to different exposure conditions and examined for various physical pathologies.
Results: We found that exposure during early development (gastrulation) most frequently produce physical defects, higher exposure frequency produced more severe physical defects compared to a single exposure of the same duration, only very high doses of ethanol induced dysmorphology, and even with exposure timing precisely controlled, large phenotypic variation still existed in our isogenic population, suggesting that genetic and temporal factors are not sufficient to explain the high phenotypic variance in FASD.
Conclusion/Discussion: We demonstrate that ethanol exposure during embryonic development in *C. elegans* produces comparable physical abnormalities to other models of FASD. The technologies available to this model organism will allow fast and easy screening for mechanisms responsible for specific FASD pathology.

Key Words: *Growth retardation, dysmorphology*

Sources of funding: HELP, CIHR
Conflict of interest: none
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11
Language impairments in children with Fetal Alcohol Spectrum Disorder

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Background: Fetal Alcohol Spectrum Disorder (FASD) is associated with a range of disabilities, including physical, behavioural, and cognitive deficits. One specific area of concern in children with FASD is the use and development of speech and language. Language difficulties in FASD have been linked to learning problems and social difficulties.
Objectives: The goal of this study was to examine the specific language difficulties of children with FASD, and to identify which aspects of language are particularly pronounced among these children.
Methods: Forty-eight children, aged 5 to 13, (25 with FASD, 23 control children) were tested on the CREVT-2, the TOLD-P:3, and the TOLD-I:3, which are standardized measures of language ability.
Results: Children with FASD had significantly lower scores than control children on both receptive and expressive subtests of the CREVT-2. Younger children with FASD scored significantly lower than controls on the Relational Vocabulary and Sentence Imitation subtests of the TOLD-P:3, and older children with FASD were significantly delayed on the Word Ordering, Grammatic Comprehension, and Malapropisms subtests of the TOLD-I:3.
Conclusions: This study identified several areas of marked difficulty in children with FASD, adding to the current understanding of language development in this population. The results have potential implications for tailoring early interventions, and providing evidence-based support to children prenatally exposed to alcohol.

Key Words: *Cognitive development, language*

Conflict of interest: none
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12
Economic impact of Fetal Alcohol Spectrum Disorder in Canada (FASD): putting the pieces together

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Objective: To develop a sound methodology for calculating a comprehensive, evidence-based picture of the economic impact of Fetal Alcohol Spectrum Disorders (FASD) for Canada.
Method: The development of an economic impact model requires strong cross-jurisdictional and cross-sectoral partnerships. The Public Health Agency (PHAC) has initiated this process by commissioning the development of the model. Based on a systematic world literature review, a methodology has been developed that includes an analytic framework and identifies components and concepts of a general Canadian model for calculating the economic impact of FASD.
Results: A new comprehensive methodology for the estimation of the economic impact of FASD has been developed. The model considers the systems which those affected are likely to come in contact with throughout their lives, as well as life/developmental stages of those affected, direct and indirect costs to systems, individuals, and families, including the lost productivity of the parents/caregivers, and the lost potential of the affected individuals.

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Discussion: Data on the cost of FASD in Canada is important evidence for informing decision-making, policy development and the implementation of programs and services.

Key Words: *Economic impact, cost analysis*

Source of funding: Public Health Agency of Canada
Conflict of Interest: none
Student/trainee: no

13
Early primary school outcomes associated with children's prenatal exposure to alcohol and tobacco

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Objectives: *Early Primary School Outcomes Associated with Children's Prenatal Exposure to Alcohol and Tobacco* from the Better Beginnings, Better Futures Study is a secondary analysis of a longitudinal data set. The study explores data related to outcomes of children with mothers who were high-risk drinkers or smokers or both.
Method: Measures in five domains of child development outcomes were analyzed: general development, cognitive development/ academic performance, social/emotional functioning, physical health, and behaviour problems. Analyses were designed to determine whether prenatal exposure to alcohol and/or nicotine may have differential effects on these aspects of children's functioning during the early primary school years. The analyses were carried out on a longitudinal data set comprised of over 400 children.
Results: The results indicated that children whose mothers reported high-risk alcohol consumption during pregnancy, showed long-term negative outcomes on measures of school performance and behaviour problems and were accentuated in children whose mothers also reported smoking during the pregnancy. These findings suggest that prenatal exposure to maternal high-risk drinking and smoking may be linked to cognitive and social development at critical periods in children's development with lifelong consequences.
Conclusion: These findings suggest that prenatal exposure to maternal high-risk drinking and smoking may be linked to cognitive and social development at critical periods in children's development with lifelong consequences.

Key Words: *Longitudinal data, alcohol, tobacco, primary school outcomes*

Source of funding: Public Health Agency of Canada
Conflict of Interest: none
Student: no

14
Fetal Alcohol Spectrum Disorder Diagnostic Telemedicine Program: measurement of cost and client satisfaction

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Background: Ontario can not meet the demand for diagnosis of FASD in Northern Communities. As a result, there has been an increase in referrals to a Toronto FASD Clinic. Despite government travel subsidy, families have described attending the Toronto clinic stressful and costly.
Objectives: 1) to measure the cost of conducting an FASD assessment via Telemedicine Program versus Toronto clinic; 2) to measure caregiver/client satisfaction of the 2 methods.
Methods: Telemedicine program was developed by the Toronto FASD Diagnostic Clinic in collaboration with two centres in Thunder Bay and North Bay. A 10-item Likert scale was used to measure caregiver and client satisfaction: Telemedicine Program versus the Toronto clinic. Incremental cost analysis was used to measure costs of the two methods.
Results: Costs of assessments using Telemedicine (n=49) were compared to costs of assessments of Thunder Bay/North Bay clients at the Toronto clinic (n=48). Average cost savings of $1,280.00 per patient was demonstrated when the Telemedicine program versus the Toronto clinic was used. Forty (40) caregivers and 9 youth who participated in the Telemedicine program demonstrated a higher level of satisfaction compared to 43 caregivers and 10 youth from Thunder Bay and North Bay who attended the Toronto clinic (8.8 ± 1.8 vs. 6.7 ± 1.2, $p < 0.05$).
Conclusions: Diagnosis of clients via Telemedicine was found to be cost effective, and demonstrated a higher level of satisfaction by clients than the Toronto clinic. Findings support increasing diagnostic capacity by the use of Telemedicine in other Northern Communities.

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Key Words: *Telemedicine, cost, client satisfaction*

Source of funding: Keenan Research Center
Conflict of interest: none
Student: no

15
The nature of sleep in Canadian children with Fetal Alcohol Spectrum Disorder

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Background: Sleep disturbances in children with FASD have been described by clinicians and caregivers. There is a paucity of research examining the nature of sleep in children with FASD.
Objectives: To determine sleep duration, sleep onset delay, and the frequency of other sleep disturbances in Canadian children with FASD. To identify factors that impact on sleep.
Design/Methods: Cross-sectional study design. Participants included caregivers of Canadian children aged 5 to 8 years with FASD. Validated 35-item Sleep Questionnaire examining sleep duration, and sleep onset delay; sleep history; and a 7-day sleep diary were used to collect data. Mean (SD) scores of sleep duration and sleep onset delay were calculated. Frequencies of other sleep disturbances reported in the diaries were identified. Stepwise multiple regression analysis was used to determine factors that influenced sleep.
Results: 325 caregivers of Canadian children with FASD aged 5 to 8 years (mean = 6.2 years) participated. Mean sleep duration was 7.2 hours (SD1.4). Mean sleep onset delay was 63 minutes (SD, 16). Other sleep disturbances identified were night terrors (74), sleep walking (n = 10), waking more than twice during the night (169), and day-time fatigue (23). Lack of bedtime rituals, severity of the child's condition, and a history of abuse negatively impacted on sleep ($p < 0.01$).
Conclusions: Findings indicate the needs for clinicians to support the sleep of children with FASD. Research using objective measures as well as caregiver reports may identify more information about the mechanism of sleep difficulties in children with FASD.

Key Words: *Sleep, questionnaire*

Sources of funding: Keenan Research Center, St. Michael's Hospital, CIHR
Conflict of interest: none
Student: no

16
Sleep needs assessment survey for children with FASD

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Background: Children with FASD are at high-risk for developing sleep disturbances or sleep disorders. Parents and physicians may not recognize day or night time symptoms to be related to sleep, and these symptoms may be unreported. Results of clinical assessments and research suggest that screening would be helpful for triaging patients for further clinical sleep assessments.
Objective: To develop an algorithm and a survey which assesses day and nighttime symptoms, behaviour, wellbeing, and family situation is applicable for a national and international epidemiological study.
M**ethods:** Qualitative interviews with birth/adoptive/foster parents (n=8); key workers (n=4); social workers (n=2); PhD/MD (n=3); interviews were recorded, transcribed and analyzed.
Results: We developed an algorithm which we used as a screening tool to assess the significance of sleep challenges as well as the consequences of sleep deprivation on perceived daytime wellbeing. As a second step, we adapted the main elements of this algorithm for an online survey. The survey protects anonymity; however in order to organize the results by geographic location, the first three digits of postal codes are requested. The information collected from the surveys in Canada can be used to advocate for tailored sleep programs and services across Provinces.
Conclusions: We are presenting our screening tool and study design in order to conduct a national and international epidemiological survey.

Key Words: *Delivery of healthcare services, quality of life, family ecology*

Source of funding: Victoria Foundation

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Conflict of interest: none
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Differentiating restless legs syndrome (RLS) as a cause of circadian sleep rhythm disorders (CSRD) in children with FASD: video studies in home setting – commercially available low-cost equipment

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Background: Children with FASD have a higher prevalence of CSRD; thus a description of what happens before falling asleep is significant. RLS, a "disorder characterized by disagreeable leg sensations that usually occur prior to sleep onset and that cause an almost irresistible urge to the move the legs," can cause difficulties falling asleep. Video studies may be helpful for the diagnosis of RLS among children who have difficulties expressing sensations associated with RLS.
Objective: To develop a reliable, inexpensive video monitoring solution that can be sent out via courier for home-based video studies.
Methodology: Various software and hardware options were explored with the following criteria. Hardware: infrared camera, low physical bulkiness/weight, portable, durable, cost effective, memory and power capacity for at least 8 hours of continuous audio/video recording. Software: synchronized audio/video, live time-stamp, smooth/continuous frame rates, low video artifacts, automatic splitting into multiple smaller files (to prevent file loss with system failure, and expedite file synchronization and viewing of recorded video).
Results: Our solution was to use a netbook/laptop to store video data and power a commercially available USB infrared security camera (total $\leq$ $500). The internet connection enables remote access from the research lab to facilitate home setup. We tested eight video recording programs and found only one that met our requirements [Debut Video Capture Software®]. All equipment fits into a case (2.8 kg total) with dimensions 34x30x10cm.
Conclusion: We developed a portable, inexpensive, and cost-effective solution to perform video sleep studies that produce consistent good quality videos.

Key Words: *Infrared camera, home video sleep studies*

Source of funding: Victoria Foundation
Conflict of interest: none
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Differentiating restless legs syndrome (RLS) as a cause of circadian sleep rhythm disorders (CSRD) in children with FASD: video studies in the home setting – using optical flow to quantify movements

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Background: RLS is a "disorder characterized by disagreeable leg sensations that usually occurs prior to sleep onset and that cause an almost irresistible urge to the move the legs" and can cause difficulties falling asleep and maintaining sleep. Video studies may be helpful for the diagnosis of RLS among children who have difficulties expressing sensations associated with RLS.
Objective: To develop software that quantifies different types of movements during sleep, as captured on video.
Methodology: After a qualitative analysis of the child's sleeping positions and movements during sleep, video files are analyzed using Optical Flow. Optical Flow computes horizontal and vertical pixel displacements between consecutive frames of a video. It is possible to define regions of interest (e.g. legs) and determine the amount of motion (over time) within each region separately.
Results: Magnitudes and frequency of movements are plotted on a time graph before and after falling asleep. Movements are plotted showing magnitude and frequency for the chosen sequences. The program can analyze specific regions of interest with respect to each other.
Conclusion: The optical flow analysis enables us to quantify RLS related movements as one cause of CSRD.

Key Words: *Optical flow, automatic analysis, home video studies*

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Conflict of interest: none
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Neuropsychological assessment of attentional deficits in children with ARND and ADHD

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Background: FASD and ADHD exhibit similar attention deficits, however, the underlying impairment in attention pathways may be different. No attentional studies have focused specifically on individuals with ARND.
Method: Behavioural data obtained during fMRI tasks (conjunction and spatial cueing) and psychological measures of attention (Conners' Rating Scales [CRS] and Continuous Performance Test-II [CPT]) were examined to determine cognitive/behavioural differences in children with ARND and ADHD. Three groups of children aged10 to 14 years were recruited: 1) ARND (N=17), 2) ADHD (N=20), 3) Typically Developing (TD) Controls (N=21). The data were analyzed using ANOVA.
Results: Mean accuracy on the spatial cuing and conjunction fMRI tasks were significantly lower for the ARND (p=0.008 and 0.001) and ADHD (p=0.018 and 0.037) groups compared to the TD group, respectively; there were no significant differences between ARND and ADHD groups. On the CRS, parent and teacher ratings on the Inattention scale were significantly higher for the ARND and ADHD groups compared to the TD group. No significant differences were observed between ARND and ADHD groups on this task. On the CPT, the ARND group made significantly more errors of omission than the TD group (p=0.033) but not compared to the ADHD group.
Conclusion: Attentional differences in children with ARND and ADHD cannot be distinguished using either fMRI behavioural data or the Parent/Teacher behavioural ratings of attention. The CPT was able to distinguish the ARND group from the TD group but not for the ADHD group.

Key Words: *ARND, fMRI, attention*

Sources of funding: Alcohol and Beverage Medical Research Foundation and Canadian Foundation for Fetal Alcohol Research
Conflict of interest: none
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Neuropsychological assessment of working memory deficits in children with ARND and ADHD

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Background: Working Memory (WM) deficits have been identified in both FASD and ADHD. No WM studies have been carried out specifically on individuals with alcohol related neurodevelopmental disorder (ARND).
Method: Behavioural data obtained during a fMRI task (1-back), and psychological measures of working memory (Working Memory Index [WMI] from the Wechsler Intelligence Scale-IV [WISC-IV] and the Working Memory scale on the Behaviour Rating Inventory of Executive Function [BRIEF]) were compared to determine cognitive/behavioural differences in children with ARND and ADHD. Three groups of children aged 10 to 14 years were recruited: 1) ARND (N=17), 2) ADHD (N=20), 3) Typically Developing (TD) Controls (N=21). The data were analyzed using ANOVA.
Results: Mean accuracy for the 1-back task were significantly lower for the ARND (84%, p=0.005) and ADHD (81%, $p < 0.001$) groups compared to the TD group (95%), but no significant difference was observed between the ARND and ADHD groups. On the WMI, the ARND group demonstrated significantly lower mean scores (71) than the ADHD group (90, p=0.001) and the TD group (103, $p < 0.001$). The BRIEF WM scale for parent and teacher ratings were significantly higher for the ARND group (scale score = 77 and 81, respectively) compared to the ADHD group (69, 68, p=0.023, p=0.0.24) and the TD group (50, 49, $p <0.001$, $p <0.001$).

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Conclusion: Working memory deficits in the ARND group can be distinguished from the ADHD and TD groups using these two psychological measures, but not based on performance of a 1-back task.

Key Words: *ARND, fMRI, working memory*

Sources of funding: Alcohol and Beverage Medical Research Foundation and Canadian Foundation of Fetal Alcohol Research
Conflict of interest: none
Student: Full time
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Determination of the feasibility for a randomized control trial to assess a school based intervention for elementary school students diagnosed with a Fetal Alcohol Spectrum Disorder (FASD)

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Background: This project is a formative assessment of an intervention for students with Fetal Alcohol Spectrum Disorder (FASD) in grades one to seven as well as the measures necessary for a randomized control trial. The Ministry of Education Provincial Outreach Program for FASD (POPFASD) developed a year long mentorship process to assist teachers in creating a school environment more conducive to learning for children affected by FASD. The intervention focuses on changing teachers' practice to create environmental, instructional and curricular accommodations (physical, instruction, social) to support the unique needs of a student affected by FASD.
Methods: To assess the fidelity and feasibility of the intervention and the outcome measures necessary for a large scale, randomized control trial, a mixed method research design using inductive content analysis nested within a quasi-experimental study was used in select schools in Prince George, BC.
Results: The intervention was found to be feasible and had good fidelity. Outcome measures used successfully measured change over time in classroom behaviour and academic achievement of students affected by FASD.
Conclusion/Discussion: Results indicate the mentorship intervention, and accompanying study design is a good candidate for a large scale randomized control trial, provided challenges in recruitment of students diagnosed with an FASD can be overcome.

Key Words: *School, intervention*

Source of funding: Victoria Foundation FASD Action Fund
Student: Full time
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The Canada Northwest FASD Research Network

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Background: The Canada Northwest FASD Research Network (CanFASD Northwest) began when Ministers from the western provinces and northern territories realized that they needed meaningful data collected and translated in ways capable of informing public policy in various aspects of FASD. The structure of the organization evolved through forums held with those actively engaged in FASD work. We learned that over 170 projects on various aspects of FASD were underway in Western and Northern Canada. Virtually none of them was being assessed, few were talking to or learning from one another. It is clear that FASD can only be advanced if diagnosis, intervention, and prevention are considered together.
Approaches used: CanFASD Northwest identified five priority areas for research, and developed five corresponding Network Action Teams (NATs) committed to bridging these knowledge gaps.
Results: This poster provides an overview of the organizational structure of CanFASD Northwest and advances in knowledge achieved by the NATs. NATs have: 1) established accurate multiethnic norms for palpebral fissure measurements; 2) established clinical standards for assessing diffuse brain dysfunction typical in FASD; 3) developed a method for consistently collecting medical information in diagnostic clinics; 4) evaluated the evidence for effectiveness of primary prevention campaigns regarding alcohol use in pregnancy; 5) begun research examining outcomes of mother mentoring programs; 6) identified opportunities for incorporating FASD prevention into the range of systems and programs that serve women with substance use problems; and 7) completed an evidence review

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examining effectiveness of interventions addressing the needs of people with FASD.

Key Words: *Research, networking, knowledge transfer, evidence-based policy, public health*

Source of funding: Canadian Northwest FASD Partnership
Conflict of interest: none
Student: no

23
Standing on one foot: FASD with and without early life stability

Hatcher JH, Amy KE

New Directions for Children, Youth, Adults and Families, Winnipeg, Manitoba, Canada

Background/Objectives: Youth living with Fetal Alcohol Spectrum Disorders (FASD) face particular challenges in achieving success in school, the workplace, and the wider community. Risk and protective factors each affect the youths' ability to maximize their potential, greatly influencing outcomes. There is an urgent need for an assessment tool that reflects these risk and protective factors experienced throughout their life, as well as the youths' lived experiences. The present study attempts to create an interview tool that will better assess resilience levels among young males.
Methods: Focus groups comprised of the researcher, a young male living with FASD, and adults close to the young male, constructed interview questions to match the cognitive ability of the young male; questions examine early life stability, risk factors, resilience levels, world view, and temperament. Using an iterative research design, this tool will identify the effect of these and other criminogenic factors on life outcomes for predominantly urban males, 16 to 20 years of age, who are or have been involved with the justice system.
Results: It is expected that this tool will greatly assist in accurately predicting the negative relationship between instability in daily living and positive life outcomes for youth living with FASD.
Conclusions/Discussion: Through the use of this tool, risk factors will be better identified and processes can be implemented for early interventions with families unable to provide a stable and supportive environment for their children, particularly if their children are living with the effects of prenatal alcohol exposure.

Key Words: *Risk, protective factors, interview assessment tool*

Source of funding: none
Conflict of interest: none
Student/ trainee: no
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The prevalence and patterns of sleep disorders and circadian rhythm disruptions in children with Fetal Alcohol Spectrum Disorders (FASD)

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Background/Objectives: Sleep disorders have been poorly described in children and adolescents diagnosed with FASD. The objective of this study is to describe the sleep and circadian rhythm characteristics of children with FASD using 2 nights of overnight polysomnography, sleep questionnaires, and the Dim Light Melatonin Onset (DLMO) test. To our knowledge, no comprehensive studies of this nature have been conducted.
Methods: Children aged 5-18 years diagnosed with Fetal Alcohol Spectrum Disorder (FASD) were recruited from various FASD clinics to the Youthdale Child and Adolescent Sleep Centre in Toronto. After a medical consultation, each participant had 2 nights of overnight polysomnography, as well as an additional night of DLMO. Participants completed various sleep, alertness, and mood questionnaires. To date, objective sleep parameters, subjective questionnaire data were analyzed using SPSS for 9 study patients.
Results: Descriptive pilot data shows the mean percentage values for stage 4 slow wave sleep (SWS) were slightly elevated compared to the average normative values (>17.8%) for average ages in this age group in both nights. The mean percentage values of REM sleep was also slightly decreased (<26.4%). Mean percentage values of wakefulness were also increased (>2%), suggesting increased sleep fragmentation during the night.
Conclusions/Discussion: Polysomnographic analysis supports disrupted sleep patterns in children with

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FASD including increased night awakenings, increased sleep fragmentation, and decreased REM sleep. The increased prevalence of sleep disturbances in this population suggests the need for a more proactive approach to sleep.

Key Words: *Sleep disorders, polysomnography*

Source of funding: none
Conflict of interest: none
Student: Shery Goril, full-time MSc. student

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