

WG1 report March 2016

COST Action no. IS1405: Building Intrapartum Research Through Health - an interdisciplinary whole system approach to understanding and contextualising physiological labour and birth (BIRTH)

Mechthild M. Gross, Jean Calleja Agius, Maria Carmen Collado, Soo Downe

Epigenetics and the hygiene hypothesis in relation to intrapartum events, and associations with longer term non-communicable diseases (WG1)

An optimal outcome should be a spontaneous birth at term with as little interventions as possible (ACOG 2014, Betran et al. 2016, Bugg et al. 2013, Sng et al. 2014, Vogel et al. 2015, Dahlen et al. 2016, Almgren et al. 2014). The positive aspects of a vaginal birth at term include long term effects for the child (Mesquita et al. 2013, Tollanes et al. 2008). Recent research emphasised the impact of caesarean sections on the later life of the child because of changes in the microbiomes which causes immune-mediated disease (Tollanes et al. 2008, Sevelsted et al. 2016, Stockholm et al. 2016). Further, vaginal birth of primiparous women increases the probability for vaginal birth in future pregnancies (Grylka-Baesclin et al. 2016). Regarding interventions DNA methylation correlated with duration of labour (Almgren et al. 2014) confirming the epigenetic impact of childbirth (EPIIC hypothesis, Dahlen et al. 2016, Koleva et al. 2016). This research will contribute to the debate how epidemiology and epigenetics will be connected (Gage et al. 2016, Relton et al. 2012).

An optimal maternal and neonatal birth outcome is a core issue in evidence based health care during labour (Devane et al. 2007, Tripathi et al. 2016, Smith et al. submitted). Due to the static approach in randomised controlled trials, the dynamic nature of pregnancy and labour received less attention in research until two decades ago (Albers et al. 1996, Gross 2001, Vahratian et al. 2006). Reviews dichotomised the process into early versus delayed interventions during labour (Bugg et al. 2013, Smyth et al. 2013, Sng et al. 2014). In clinical terms, optimal labour is considered as a process which develops over time. Longitudinal analyses referred to previous landmark studies (Friedman 1955, Friedman and Sachtleben 1963) and applied different techniques (Zhang et al. 2002, 2010). Time to event analysis showed that events occurring during labour and their timing were stronger associated with the duration of first stage of labour than factors that pre-existed at the time of onset of labour (Gross 2001, Gross et al. 2005, 2014). Rupture of membranes, cervical dilatation at admission and start of midwifery care for example were significantly associated with labour duration in contrast to factors such as maternal age, education and antenatal classes (Gross et al. 2005). This has been flanked by more recent research regarding existing variations in the definition of onset of labour or the progress of labour and their clinical predictive values for labour outcome (Hamilton et al. 2016, Hanley et al. 2016). Women views matter in these areas as a lot of women desire a normal labour.

Due to these recent developments WG 1 aims

- to review scientific paradigms in ongoing birth cohort studies in a multidisciplinary setting,
- to scope longitudinal methodologies and a scientific knowledge base and

- to link ongoing studies and develop a health related perspective. Relating findings from biomarkers and epidemiology are of great interest.

1. Ongoing birth cohort studies in a multidisciplinary setting

Naseerah from UCLAN set up an overview over all currently ongoing cohort studies. This overview reports on studies such as Avon Longitudinal Study of Parents and Children (ALSPAC), Danish National Birth Cohort (DNBC), ELFE (Étude Longitudinale Française depuis l'Enfance), Lifeways Cross-Generation Cohort Study, ABCD (Amsterdam Born Children and their Development study), PIAMA-study, PRIDE Study (PRIDE: PRegnancy and Infant DEvelopment), Norwegian Mother and Child Cohort Study (MoBa), and BiB (Born in Bradford).

Of further interest are all those birth cohort studies which use more recent techniques. These are the Spanish Birth Cohort, known as the MAMI-EU project (Dr. Izaskun Garcia-Mantrana, IATA-CSIC, Valencia, Spain) and the NOIS/MCAR –Maltese Birth Cohort (Dr. Jean Calleja-Agius, Malta).

2. Publication: Starting from a Healthy Perspective: the Gut-Brain-Microbiota axis at the time of birth.

Authors: Jean Calleja-Agius (1), Maria Carmen Collado (2), Alexandra Tortell (3), Maurizio Nedkov (4), Clarissa Fenech (5), Mechthild M. Gross, (6)

Through the course of time, humans and bacteria have co-evolved culminating a complex being which functions through a system of interactions between human and microbial parts. This communicative organization, also known as the gut-brain-microbiota axis, describes a unifying physiological concept, which involves numerous pathways for the transmission of regulatory signals. The mode of delivery, as well as other intra-uterine and perinatal factors can influence the gut microbiota, and thus have an impact on neural and behavioral development in humans.

This publication is in the stage of revision.

3. Training School: BEYOND BIRTH COHORTS: from study design to data management

The Training School took place at the Institute of Agrochemistry and Food Technology-National Research Council (IATA-CSIC) at the University of Valencia between November 23rd to November 25th 2016. Prof. Maximo Vento (Valencia, Spain), conference president of the IUENPS conference (Palacio de Congresos, Valencia) welcomed the participants and introduced the Spanish Maternal & Child Network RED SAMID. This presentation was flanked by the interesting developments regarding homebirth in Catalonia-Spain, presented by María Jesus Pueyo and Ramón Escuriet (Barcelona, Spain).

Dr. Teresa Alarcon gave an interesting presentation on flow-chart and protocol development as well as Standardized Protocols (SOPs). These are essential components to harmonize cohorts. New techniques and tools to study biological samples were introduced by Dr. Giuseppe D'Auria (FISABIO, Valencia, SPAIN). Dr. Neville Calleja (Malta) focussed on the secondary processing of personal health data within the new Data Protection Regulation. He further illustrated principles of setting up and maintaining a register and introduced to survival analysis as a special form which is required for

longitudinal analysis. Further lectures covered an overview of the new Clinical Trials Regulation (Dr. Jacobo Santamaria (Coordinador Red-Biobancos, FISABIO, Valencia), the principles of setting up and maintaining national registered biobanks, as well as data analysis for big data management (Dr. Giuseppe D'Auria, FISABIO, Valencia, SPAIN). These include Omic tools and data analysis and management, Statistical tests and taxonomy with R software, includes Chi-squared, Wilcoxon, Kruskal –Wallis and other statistical test Graphing.

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