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DESCRIPTIVE EPIDEMIOLOGY OF INFLUENZA IN THE PAEDIATRIC POPULATION IN IRELAND, 2009 – 2018

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In Ireland, influenza places a considerable burden on the health system, with the highest disease occurrence among young children and the elderly. Trivalent influenza vaccines are recommended for use in risk groups in Ireland each season. In this study, we aim to support decisions regarding alternative vaccination strategies, such as the use of quadrivalent vaccines and/or universal vaccination of children.

We describe the burden of influenza among cases aged 0 to 14 years in Ireland from 2009/2010 to 2017/2018 influenza seasons, using data on clinical influenza-like illness (ILI) GP consultations reported through the sentinel GP network and reported laboratory confirmed severe influenza cases from Ireland's Computerised Infectious Disease Reporting System.

The highest GP ILI consultation rates in children were observed during seasons when influenza A(H1N1)pdm09 predominated (460/100,000 during the 2009 pandemic and 206/100,000 in 2010/2011) and during influenza B/lineage vaccine mismatched seasons (118/100,000 in 2017/2018). The 2015/2016 season was also an influenza B/lineage mismatched season, with both influenza A(H1N1)pdm09 and B predominating, with a peak ILI rate of 112/100,000. Since 2009, 3520 hospitalisations, 166 critical care admissions and 39 influenza-associated deaths were reported in children with laboratory-confirmed influenza. The total number of children hospitalised with confirmed influenza has ranged from 66 (7/100,000) in 2011/2012 when influenza A (H3N2) predominated, to 1104 (110/100,000) in the 2017/2018 season, an influenza B/lineage vaccine mismatched season. The age-specific rates for hospitalised paediatric influenza cases were highest in those aged 0–4 years, ranging from 16/100,000 in 2011/2012 to 197/100,000 in 2017/2018. The 2017/2018 influenza season was a severe prolonged season, with paediatric influenza hospitalisations two times greater than the 2009 influenza pandemic. Of children in risk groups, hospitalised with influenza, during the 2016/2017 and 2017/2018 seasons, 86–88% of cases were unvaccinated.

Elevated sentinel GP ILI consultation rates, influenza hospitalisation rates, and critical care admissions were observed during seasons when influenza A(H1N1)pdm09 predominated and also during influenza B/lineage vaccine mismatched seasons. Additional strategies are needed to reduce the morbidity and mortality associated with influenza in risk groups, improve vaccine uptake in at-risk children and to protect healthy children currently not eligible for influenza vaccination. The impact of influenza on the Irish population suggests that quadrivalent vaccines and/or universal childhood influenza vaccination could be considered, as in other European Member States.

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THE EFFECT OF BREASTFEEDING ON THE RATE OF INFECTIONS IN THE THE FIRST 2 YEARS OF LIFE

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Background and aims The aim of our study was to investigate the effect of duration of exclusive breastfeeding (EBF) and duration of breastfeeding (BF) on the rate of infections during the first 2 years of life.

Methods The study group consisted of healthy infants who admitted to the outpatient Healthy Child Clinics of Istanbul University, Cerrahpasa Medical Faculty for their routine control between February 2016 and May 2017. Files of the patients were reviewed retrospectively with regard to breastfeeding and infection history such as upper and lower respiratory tract infections (URTI, LRTI), acute gastroenteritis (AGE), urinary tract infection (UTI) and acute otitis media (AOM) during the first 2 years of life.

Results A total of 200 infants (91/109: male/female) with a birth weight and length of 3286.2 ± 446.9 gr, 50.4 ± 2.4 cm, respectively and who were born at term were enrolled. The rate of vaginal and cesarian delivery was 72.5% and 27.5%, respectively. The mean duration of EBF and total duration of BF were 4.2 ± 2.8 and 11.6 ± 5.3 months, respectively. In those without any infection (42.5%), duration of EBF and total duration of BF were 5.9 ± 0.4 and 13.4 ± 4.6 months, respectively while in those with 1 infection (29.5%) it was 4.6 ± 3.3 and 11.8 ± 4.6 months and with ≥ 2 infections (28%), it was 1.3 ± 1.9 and 8.7 ± 5.9 months, respectively. This difference between each group was statistically significant ($p < 0.001$). There was no difference in the rate of infections with regard to type of delivery, gender, anthropometric values at birth, maternal educational status and maternal age. Most of the infections were URTI (52.5%) followed by LRTI (14.5%), AGE (12.2%), UTI (11.7%) and AOM (8.9%).

Conclusions Epidemiological data support the benefits of breast-feeding in preventing gastrointestinal and respiratory infections in both developing and developed countries. Our study also showed that increased duration of exclusive breastfeeding and increased duration of breastfeeding in general were associated with lower infection rate in infants in the first 2 years of life. WHO recommends exclusive breastfeeding up to 6 months of age, with continued breastfeeding along with appropriate complementary foods up to two years of age or beyond. Therefore, lactating mothers should be encouraged to breastfeed their infants and it is our duty to raise awareness on breastfeeding for its encouragement.

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AWARENESS OF SIDS RISK FACTORS IN IRISH MOTHERS-A QUESTIONNAIRE BASED STUDY

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Background SIDS is the sudden unexpected and unexplained death of an infant under 1 year of age. Studies so far, have

only provided risk factors leading to SIDS. Though avoidance of these risk factors has led to substantial reduction (80%) in the rate of SIDS over last 2 decades, it is still the leading cause of death in infants between four weeks and 6 months of age. The most recent data provided by Irish central statistics office reports 14 deaths (0.21 deaths per 1000 live births) in year 2014. We aimed to find out the awareness of the risk factors leading to SIDS amongst mothers who delivered at Mullingar Regional Hospital.

Methods A prospective assessment was performed by distributing multidimensional questionnaire to the women admitted in postnatal ward following birth of their baby in Mullingar Regional Hospital, Ireland. Anonymously collected data was analysed using SPSS2 software. Regional hospital ethical committee approved the study.

Results One hundred two participants were included in analysis. 9.6 percent ($n=9$) participants had never heard of SIDS. Of those who had, 46% (43/93) and 54% (53/93) have heard it from healthcare providers and media respectively. Major risk factors identified by number of participants were; prone sleeping position (80%, 75/93), overheating of the baby (91%, 85/93), Soft bedding (90%, 84/93), bed sharing of infants (69%, 65/93), Maternal smoking during pregnancy (60%, 56/93), Smoking around babies environment (58%, 54/93) and maternal alcohol intake during pregnancy (56%, 53/93). 20% participants failed to identify prone sleeping position as the risk factor. A significant number of participants were unaware of other major risk factors such as smoking during pregnancy, smoking around baby and bed sharing with baby. 100% of the participants wanted more information about SIDS. Televised campaign (68%, 70/102) and reading materials (56%, 58/102) were the 2 most preferred method of delivering SIDS information to the participants. 66% (68/102) participants wanted the information delivered as part of prenatal education and further 29% (30/102) wanted it before discharge from the post-natal ward. 53.9% (55/102) and 31% (32/102) participants opted midwife/maternity nurses and paediatrician respectively as the person to deliver information about SIDS.

Conclusions This study concludes that there is a wide gap in knowledge about risk factors for SIDS and almost all participants felt they need more information. We hope implementing methods to narrow this knowledge gap would further reduce the incidence of SIDS.

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ALTERED TOLL LIKE RECEPTOR 2 (TLR2) SIGNALLING IN CHILDREN WITH DOWN SYNDROME

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Background Toll like receptors (TLRs) are key in initiating innate immune responses. TLR2 is crucial in recognising lipopeptides from gram positive bacteria and is implicated in chronic inflammation. Children with Down syndrome (DS) are prone to infections from these pathogens and have an increased risk of autoimmunity. Sparstolonin B (SsnB) is a

TLR antagonist shown to reduce cytokine production and improve outcomes in sepsis. We hypothesized that TLR2 signalling may be anomalous in children with DS and contribute to their clinical phenotype.

Aims We aimed to evaluate TLR2 pathways in 3 ways; by determining the expression of TLR2 on the surface of neutrophils, monocytes, and their subsets; examine gene expression of key regulatory proteins involved in TLR signal propagation, MyD88, IRAK4, and TRIF; and lastly to determine cytokine production at baseline and following immunomodulation with pro-inflammatory stimuli (LPS, Pam3Csk4) and the anti-inflammatory agent SsnB.

Methods Whole blood was collected from children with DS and age matched controls. Samples were treated with lipopolysaccharide (LPS) 10ng/ml, Pam3Csk4 (5ng/ml), SsnB (10μM) or in combination. TLR2 and CD11b expression on neutrophils and monocytes was evaluated by flow cytometry. RNA was isolated from Trizol[®], cDNA was synthesized and then evaluated by quantitative PCR for expression of MyD88, IRAK4, and TRIF. A panel of pro and anti-inflammatory cytokines were evaluated using the MSD[®]MULTI-SPOT assay system from Mesoscale (MSD Diagnostics, USA). Statistical analysis employed unpaired t-tests, ANOVA, analysed using GraphPad Prism and FloJo software.

Results Children with DS ($n=20$) and controls ($n=15$) were recruited. TLR2 expression was significantly raised on neutrophils ($p=0.02$), total monocytes ($p=0.05$), intermediate monocytes ($p=0.02$) in children with DS compared to controls. At baseline the expression of MyD88 was significantly lower ($p=0.001$), and TRIF significantly raised in children with DS ($p\leq 0.0001$). The TLR antagonist SsnB was effective at reducing TLR2 and CD11b expression and abrogating cytokine production in both cohorts.

Conclusion TLR2 pathway is dysregulated in DS. There is greater expression of TLR2 on the surface of neutrophils and monocytes. Downstream signalling is altered with reduced MyD88 and increased expression of TRIF, which may represent compensatory upregulation of MyD88 independent pathways. This altered innate immunity may contribute to chronic inflammation in DS. SsnB attenuates pro-inflammatory mediators and could be of therapeutic benefit.

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EVALUATING THE QUALITY OF HIP SURVEILLANCE RADIOGRAPHS IN CHILDREN WITH CEREBRAL PALSY

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Background Hip dislocation can seriously affect the quality of life of children with cerebral palsy. Regular radiological surveillance is an important part of the management of cerebral palsy, but can be challenging, due to the nature of the condition.

Objectives To evaluate the technical quality of hip surveillance radiographs of children with cerebral palsy and to assess the suitability of the 'Hip Screen' phone application to be used in measurement of migration percentage.

Materials and methods 100 radiographs of patients undergoing hip surveillance due to a risk of hip dislocation caused by cerebral palsy. Pelvic rotation and inclination were assessed using the standards recommended by the literature. Migration