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1

BREAST FEEDING, EARLY WEIGHT GAIN AND RISK OF OVERWEIGHT AT PRESCHOOL AGES

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Background: Exclusive breast feeding (EBF) may protect from obesity at later ages. An increased weight gain during the first year of life (Δ weight) may be a risk factor for child obesity.
Objective: To study the association between increased Δ weight and risk of obesity at preschool ages, according to EBF.

Methods: 157 healthy preschool children (36-62 mo) were recruited. Information was obtained from clinical records. According to their weight/height ratio at 3-5 years they were categorized as: healthy (HC) or overweight (OC). The Δ weight was calculated; a logit model was calibrated. ROC analysis was performed to assess Δ weight and risk of overweight at 3-5 years.

Results: 39.5% (62/157) were overweight. No significant differences were found between groups for: birth weight, height, EBF \geq 4 mo, maternal BMI. The Δ weight was higher in OC than in HC (7.24 ± 1.0 vs. 6.37 ± 1.1 kg; $p < 0.0001$). ROC curve showed a Δ weight = 6.79 kg as the best cutoff point (S: 66%, E: 71%), for the risk of overweight at 3-5 years. The rate of overweight at 3-5 years among children with Δ weight $>$ 6.79 kg was not different between those with EBF and those who were weaned (34/52 vs. 8/19; NS).

Conclusions: Preschool children with increased weight gain during the first year of life had a similar risk of overweight, either with exclusive breast feeding $>$ 4 mo or with early weaning. A weight gain in the 1st y $>$ 6.79 kg is an independent risk factor for becoming overweight or obese at 3-5 years.

2

INTRAVENOUS HYDRATION THERAPY WITH ISOTONIC VERSUS HYPOTONIC SOLUTIONS: RANDOMISED CONTROLLED TRIAL

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Background: Hypotonic fluids (HF) for intravenous hydration ($\text{NaCl} < 0.9\%$) in the hospital setting is a common practice for pediatricians. However, it predisposes patients to develop hyponatremia.

Methods: Patients aged 6 months to 14 years who needed intravenous hydration were randomly allocated to receive isotonic fluids (IF) or HF. Main outcome was plasma sodium (pNa^+) at baseline (T0), 4 (T4) and 8 (T8) hours, and the percentage of patients who developed hyponatremia ($\text{pNa}^+ > 125$ and < 135 mEq/L).

Results: A total of 72 patients were included; 35 received HF and 37 IF. Patients with HF presented little change in pNa^+ (mEq/L, mean \pm SD), from 136.2 ± 3 at T0 to 136.4 ± 3.3 at T8; mean difference MD = 0.2, 95% CI -0.9 to 2.6. In IF group pNa^+ increased from 135.5 ± 4.2 at T0 to 138.8 ± 3.3 at T8; MD 3.3 95% CI 0.7 to 2.3. IF had a protective effect (OR = 0.13; 95% CI 0.02 to 0.65) for developing hyponatremia. In the HF group, 8/26 initially isonatremic patients developed hyponatremia vs. 0/20 in the IF group. Neither hypernatremia nor adverse effects were detected.

Conclusions: Use of isotonic solutions for intravenous hydration has a protective effect on developing hyponatremia. Using hypotonic intravenous fluids for hydration in pediatric patients must be avoided.

3

MIGRANT POPULATION AND PERINATAL HEALTH

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Background: International migrants represent a growing population. Their situation outside their own country could be very complicated, with strong impact on the public health system.

Objective: To compare perinatal risk between immigrant mothers and their infants, and local (Argentinean) mothers and their newborns. **Methods:** Case-control study including 2000 mothers and their newborns (1000 immigrants and 1000 local) assisted at Ramón Sardá maternity. **Results:** Local mothers showed more LBW newborns (9.9% vs. 5.3; $p < 0.01$), primigravid women (42% vs. 37% $p = 0.012$), and teen pregnancy (6% vs. 1.3%; $p < 0.001$). On the other hand, immigrant mother showed more inadequate pregnancy control (21.7% vs. 13.4%; $p < 0.01$), positive serology for Chagas disease (3.2% vs. 0.4%; $p < 0.01$), and phototherapy in their newborns (20.5% vs. 14.3%; $p = 0.04$). **Conclusion:** Local mothers and their babies have a higher proportion of low birthweight, primigravid women and teen pregnancy. Immigrant women have higher positive serology for Chagas disease rate, deficits in prenatal control and requirement of phototherapy.

4

EFFECT OF CALCIUM SUPPLEMENTATION ON IRON BIOAVAILABILITY

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Background: Although previous studies have shown that calcium inhibits acute iron absorption, there is no evidence showing long-term effect of calcium supplementation on iron bioavailability.

Objective: To determine the effect of calcium supplementation on heme-iron and non-heme iron bioavailability. **Methods:** Prospective, randomized, controlled, double-blinded clinical trial, including 26 otherwise healthy women (40 \pm 5 years): 13 received 600 mg of elemental Ca/day as CaCO_3 (Ca-group), and 13 received placebo (P-group) during a 47 days follow up. Heme iron and non-heme iron absorption were determined before and after treatment using ^{55}Fe and ^{59}Fe radioisotopes. Two-way ANOVA tests were used to determine differences for treatment, time and interaction.

Results: Both groups showed similar iron status. Heme-iron bioavailability (geometric mean and range ± 1 standard deviation) before and after treatment was 16.5% (8.3-32.8) and 26.0% (15.5-43.6) for Ca-group, and 21.8% (13.0-36.6) and 25.1% (16.5-38.3) for P-group. Non-heme iron bioavailability before and after treatment was 39.5% (19.9-78.7) and 34.1% (19.1-60.6) for Ca-group, and 44.6% (24.9-79.7) and 39.3% (24.3-63.4) for P-group. Two-way ANOVA demonstrated no differences in heme-iron and non-heme iron bioavailability for treatment and interaction. For time, only heme-iron bioavailability shows significance ($p = 0.002$).

Conclusion: Calcium supplementation does not negatively affect iron bioavailability. On the contrary, these data suggests that calcium supplementation improves heme-iron absorption.

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URICEMIA IN THE METABOLIC SYNDROME OF OBESE CHILDREN

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Background: Metabolic syndrome (MS) includes clinical signs and metabolic disorders in children, which could be predictors for diabetes and cardiovascular disease at later ages. Hyperuricemia has been suggested as another risk factor, but its role in paediatric patients has not been adequately established.

Objective: To assess the association between uricemia (Ur) and the magnitude of general or visceral adiposity measurements, or metabolic disorders in obese children. **Methods:** Seventy seven obese patients living in Santiago were studied (6-15y; 41 males, BMI >2 z-score of WHO standards), controlled at the Public Health System, with no other chronic disease. We assessed: weight, stature, abdominal circumference (AC), visceral adiposity and fatty liver (ultrasonography); glycemia, insulinemia, serum lipids, transaminases, and Ur.

Results: The upper limit (x+2 SD) was similar to that for adults (<5.5 mg/dL). Ur was greater in children with hyperinsulinism (4.1 ±1.4 vs. 3.4 ±1.0 mg/dL; p<.01), with no significant differences according to HOMA; differences were also found between children with GOT transaminases > or <26 U/mL: 4.4±1.3 vs. 3.3 ± 1.0 mg/dL, p<.001; logistic regression showed GOT as the only measurement associated to Ur (p= 0.008), controlling by age, severity of obesity, HOMA, visceral adiposity, blood pressure, or GPT transaminases. No significant differences were found by BMI, visceral adiposity, or GPT transaminases.

Conclusions: Uricemia presents increased concentrations associated to increased GOT transaminases and hyperinsulinism, but not with BMI or visceral adiposity; it should be measured in obese children, as part of MS and in the follow up.

6

EFFECT OF PROBIOTIC YOGURT IN THE MANAGEMENT OF ACUTE DIARRHEA IN CHILDREN

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Objective: To compare the effect of a probiotic yogurt and a lyophilized probiotic in the treatment of acute diarrhea in children less than 3 years of age.

Methods: Randomized, double-blind, controlled clinical trial including children aged 10 – 35 months, hospitalized for acute diarrhea. Children were randomly assigned to receive one of two treatments: oral hydration solution plus *Saccharomyces boulardii* (active control group) or oral hydration solution plus a yogurt containing *Lactobacillus rhamnosus* (intervention group). Primary outcome was duration of diarrhea; secondary outcomes were duration of fever, vomiting, and hospitalization (hs).

Results: 47/56 subjects completed the protocol. Baseline characteristics were similar in both groups. There were no differences between the intervention and the control groups regarding duration of diarrhea (71 hs vs. 79 hs; p=0.3), fever (11 hs vs. 24 hs; p=1.02), vomiting (17 hs vs. 32 hs; p=0.37) or hospitalization (86 hs vs. 75 hs; p=0.26).

Conclusions: In this study, we demonstrate that the use of functional foods such as yogurt with probiotic (*Lactobacillus ramosus*) has the same effect that probiotic alone.

7

BIOACTIVE COMPOUNDS FROM *ROSMARINUS OFFICINALIS* AGAINST MULTIDRUG-RESISTANT CLINICAL STRAINS OF *STAPHYLOCOCCUS AUREUS*: *IN VITRO* ACTIVITY

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Background: Antimicrobial resistance is one of the most important world health problems. *Staphylococcus aureus* is one of the major opportunistic human pathogens. The increasing number of multidrug resistant strains (MDR), like methicillin (met) and vancomycin (van) resistance, generates significant efforts to discover new antibiotics.

Objective: To investigate bioactive compounds from *Rosmarinus officinalis* (rosemary) with antimicrobial activity *per se*, or as modulators of bacterial resistance, *in vitro* against strains of *S. aureus* resistant, met and van resistant, isolated from pediatric patients.

Methods: Constituents of essential oil (EO) were separated and identified by gas chromatography-mass spectroscopy. Of all compounds (45 accounted for 93.7% of total), α -pinene (31.2%) and 1.8-cineol (21.6%) were the majority. We determined the antibacterial activity of EO and the two main components by spectrophotometry and micro-broth dilution carried out in microplates against two isolates of *S. aureus*, one of them a met-resistant (MRSA) (mec+ nuc+), and the other, a strain from collection (μ 3) with heterogeneous resistance to vancomycin (hVRSa). The bactericidal activity for both strains was determined by death curves.

Results: Concentrations of 40 μ l/ml and 20 μ l/ml of EO, as well as 20 μ l/ml and 12 μ l/ml of α -pinene inhibited 100% growth of MRSA and hVRSa, respectively. The 1.8-cineole showed no significant activity. Bactericidal action was confirmed by death curves.

Conclusions: EO of *Rosmarinus officinalis*, and α -pinene, showed antibacterial activity against MDR strains and they could be potential antibiotics. It is necessary to evaluate *in vivo* activity.

8

ANTENATAL SILDENAFIL AND BOSENTAN ATTENUATES PULMONARY VASCULAR REMODELING AND PROMOTES AIRWAYS DEVELOPMENT IN RATS WITH CONGENITAL DIAPHRAGMATIC HERNIA

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Background: Lung hypoplasia, pulmonary persistent hypertension in the newborn, and its morphological changes are the main features of congenital diaphragmatic hernia (CDH), a high morbidity and mortality condition.

Objective: To determine if antenatal sildenafil and/or bosentan attenuates vascular remodeling, promotes bronchial branching, and improves alveolarization in experimental nitrofen-induced CDH.

Methods: Randomized, controlled trial. To induce CDH, nitrofen (100 mg) was administered to pregnant rats at postconception day (PCD) 9. Rats were randomized to 5 groups: 1) control, 2) nitrofen only, 3) nitrofen+sildenafil (100 mg/Kg/day at PCD 16-20), 4) nitrofen+bosentan (30mg/Kg/day, PCD 16-20), and 5) nitrofen+bosentan+sildenafil (same doses and administration days).

Results: The offspring with CDH were characterized by severe pulmonary hypoplasia (lung weight to body weight ratio: 0.0261±0.0028 in nitrofen group vs. 0.0393±0.0054 in controls (p=0.001). The nitrofen+sildenafil group showed smaller pulmonary arterial wall thickness than nitrofen group (3.2±0.75 μ vs. 4.5±0.67 μ ; p=0.02). Nitrofen+bosentan group showed more terminal bronchioles than the nitrofen group (12.9±3.4 vs. 8.2±1.7; p=0.002). Nitrofen+sildenafil+bosentan group showed significant differences with nitrofen group in terminal bronchioles (13.5±2.2 vs. 8.2±1.7; p=0.001), and pulmonary arterial wall thickness.

Conclusion: In experimental nitrofen-induced CDH in rats, antenatal treatment with sildenafil attenuates vascular remodeling, and bosentan promotes terminal bronchioles development.

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EFFICACY OF CONVENTIONAL BLUE LIGHT LAMPS VS.. LED PHOTOTHERAPY WITH TWO LEVELS OF IRRADIANCE

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Background: Hyperbilirubinemia (HB) is the main cause of admission to neonatal special care units in low risk term or near term infants. Shortening time of phototherapy (PT) could have impact on length of hospitalization.

Objective: To compare the efficacy of PT (defined as duration of treatment) between conventional blue light tubes and LED equipment in infants with non-haemolytic HB.

Methods: Randomized, controlled trial including newborns with gestational age \geq 35 weeks, with non-haemolytic HB and American Academy of Pediatrics criteria for PT. After informed consent obtained, they were randomized to one of three groups of treatment: blue light tubes delivering 30 μ W/cm²/nm (BL) or a LED set at 30 μ W/cm²/nm (L30) or 40 μ W/cm²/nm (L40).

Results: A total of 165 patients were included; 54 in BL, 56 in L30 and 55 in L40. Birth weight, gestational age, age (hours) at randomization were similar between groups. Total time on PT (hours) was 54.4 ± 6.9 in BL, 53.4 ± 10.7 in L30 and 41.7 ± 6 in L40 (p<0.001). Total seric bilirubin levels at PT discontinuation and after 24 hours were lower in the L40 group.

Conclusions: LED PT at 40 μ W/cm²/nm reduced by 12 hours the duration of treatment compared with LED or blue light lamps at 30 μ W/cm²/nm. Safety of high dose PT, and costs savings still remain to be studied.

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THE IMPACT OF INADEQUATE MICTURITION HABITS ON UROFLOWMETRY PARAMETERS IN HEALTHY SCHOOL CHILDREN

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Background: Normal bladder function depends of an adequate bladder volume, effective sphincter function and appropriate detrusor contraction-relaxation.

Objective: To describe the impact of voiding habits on uroflowmetry parameters in healthy school-children.

Methods: 126 healthy children aged 6 to 7 years (53 females, and 73 males) from different elementary schools were included. Children with urinary tract infection were excluded. All subjects were asked to complete a bladder diary for a period of 7 days in order to evaluate bladder voiding patterns. With the uroflowmetry the maximum flow rate/voiding time index (Q_{max}/T_{void}) was calculated. Chi square and V of Cramer tests were used to evaluate association between micturition habits and uroflowmetry parameters.

Results: We identified voluntary voiding postponement as inadequate micturition habits in 69 children (55%), 33 females and 36 males. 111 children underwent uroflowmetry, 15 were excluded for an incomplete bladder diary. On uroflowmetry, 65 children (58.5%) were found to have an abnormal flow pattern, including accelerated curve in 30 children (47%), flat curve in 19 (29%), interrupted micturition in 8 (12%) and increased bladder volume in 8 (12%) children. Only 12 (18.5%) patients with adequate micturition habits had abnormal uroflowmetry parameters, compared to 53 (81.5%) with inadequate micturition habits (p<0.001).

Conclusions: Anomalies in frequency and intervals of micturition (voiding postponement) are associated with an abnormal voiding pattern on uroflowmetry in healthy school children.

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EVALUATION OF THE USE OF BENEFICIAL PRACTICES IN THE CARE OF VERY LOW BIRTH WEIGHT INFANTS

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Background: Health systems often fail to provide the desired quality of care, allowing that a significant proportion of patients do not receive treatments of proven effectiveness.

Objective: To evaluate the prevalence of use of beneficial practices and its variability among public neonatal services of Buenos Aires.

Methods: Descriptive, multicenter study developed in 12 public maternities of Buenos Aires, during 2009. Pregnancies under 24 weeks, major congenital malformations and those patients who died or were referred to another hospital before the evaluation of practice, were excluded.

Of 37 practices identified as potentially beneficial, those with the greatest impact on mortality and morbidity were selected by local consensus. Practices with a lack of data greater than 20% in one unit were excluded from the analysis. Selected practices were: antenatal steroids (FPM), surfactant administration in patients with hyaline membrane disease admitted for mechanical ventilation (MV), minimal enteral nutrition within 72 hours of birth (MEN), total parenteral nutrition (TPN) in the first 48 hours, ROP screening according to recommendations and, breastfeeding rate at discharge. Statistical analysis: median and range of practice accomplish.

Results: During the study period 371 patients weighed below 1500 g were born (range 8 to 89 per center). FPM 57% (27-89), MV 78 (60-100), TPN 60 (29-100), MEN 53 (25-87), ROP 82 (54-100), breastfeeding 87 (60-100).

Conclusion: This study demonstrates the wide variability among centers in the use of proven effective practices. This knowledge could be applied in strategies to improve the quality of care.

12

OSTEOPOROSIS IN ADULTS: ROOT IN CHILDHOOD? ANALYSIS OF 981 PRIMARY SCHOOL STUDENTS. NEW DENSITOMETRY TABLES

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Background: Highest expression of peak bone mass in humans is observed towards 27 year of life, constituting a reserve used in adulthood. When problems exist in childhood bone remodeling with slow physical growth, it might be a deficiency in calcium metabolism and bone mass below the fracture threshold, causing accidents in adulthood.

Objective: To evaluate bone density in primary school children, elaborating percentiles tables. To evaluate relationship between slow physical growth problems during the three periods of rapid growth in childhood, and osteoporosis in adulthood.

Methods: An observational study including 981 primary school children of Mexico City, otherwise healthy. Body mass index was calculated according to WHO 2007 standard. Bone densitometry was evaluated with DEXAP mobile densitometer. Densitometry percentiles tables, by age and gender, were developed from the equation straight line fitness forearm, calcaneus and central.

Results: Six tables densitometry by age percentiles tables were developed (forearm, calcaneus and central, for boys and girls). Up to 5.1% of the study population were outside percentiles 10-90 (1.2% below 10 percentile, and 3.9% above percentile 90); 82% of them were considered obese.

Conclusions: Only 1.2% of students did not reach the 10 percentile.

13

PRETERM INFANTS HAVE IMPROVED GROWTH IN CYCLED LIGHT/DARK COMPARED WITH CONTINUOUS LIGHT

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Background: The neonatal intensive care unit environment, including continuous bright light levels, may have negative effects on the growth and development of preterm infants. Continuous bright light has been related to infant stress as manifested in increased activity levels, decreased sleep, and bradycardia. Yet, light/dark cycle (LD) has the potential to promote circadian rhythms with health benefits including hormonal regulation, activity-rest cyclicity, and vital sign regulation. Thus, growth might either be decreased with the stress related to exposure to bright light or increased with the development of circadian patterns and rest-activity rhythms when exposed to LD.

Objective: The purpose of this study was to evaluate the benefits of LD versus continuous light (CL) on health in preterm infants born at 32 weeks' gestational age.

Methods: Randomized, controlled study comparing growth and length of stay of preterm infants receiving two different light patterns (LD or CL from birth). Two-way ANOVA and Tuleyposthoc test were performed. The protocol was approved by the institutional review board; written informed consent was obtained in all cases.

Results: Infants receiving LD gained weight faster than infants in CL. Infants receiving LD had a shorter hospitalization than in CL.

Conclusions: These findings suggest that LD has significant benefits over CL regarding weight gain and length of stay in preterm infants.

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EFFICACY OF THEOPHYLLINE SINGLE OR COMBINED WITH FLUTICASONE FOR BRONCHOPULMONARY DYSPLASIA TREATMENT

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Objective: To compare the efficacy of fluticasone and theophylline, alone or combined, in the treatment of severe bronchopulmonary dysplasia (BPD) in preterm infants.

Methods: Randomized, controlled, masked clinical trial including preterm infants <32 weeks gestational age, with BPD. Patients were randomized to one of three groups (20 subjects/each): 1) inhaled fluticasone 125 ug, 2) theophylline 1 mg, and 3) fluticasone + theophylline. Medication was BID for 2 weeks in all cases. Lung liquid IL-1 β , IL-6 and TNF- α were measured. Success treatment was considered when a decrease >20% in the FIO₂ was achieved.

Results: After treatment, decrease in FIO₂ >20% was more frequent in the theophylline (14/20), and fluticasone + theophylline groups (12/20) than in the fluticasone group (5/20) (P<0.005 and p<0.02, respectively). After treatment, the cytokines median value (pg/mL) diminished in the theophylline group (IL-1 β : 150 to 110, p=0.03; IL-6: 210 to 55, p=0.04, and TNF- α : 200 to 49, p=0.04). The same was observed related to the fluticasone + theophylline group (IL-1 β : 220 to 80, p=0.02; IL-6: 172 to 92, p=0.02, and TNF- α : 210 to 80, p=0.04).

Conclusions: Theophylline, alone or combined with fluticasone, diminished oxygen requirements and proinflammatory cytokines in the preterm neonates with severe BPD.

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"BUFFY COAT" CULTURE COMPARED TO TOTAL BLOOD CULTURE IN NOSOCOMIAL SEPSIS OF THE NEWBORN

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Background: Nosocomial sepsis is a serious problem in neonatal intensive care. The gold standard for diagnosis is the total blood culture (TBC). The Buffy Coat (BC) culture has not been used as a diagnostic tool.

Methods: Diagnostic tests evaluation study, including newborns (NB) 28 to 41 weeks of gestational age, both genders, weighing > 800g, and NOSEP-1 scale \geq 8 points. Paired samples of blood for TBC and BC culture were obtained. Positivity rate, sensitivity, specificity, predictive values and likelihood ratios were calculated. Also time to positive test and contamination rates were compared.

Results: 52 NB were included. Twenty TBC and 22 BC cultures were positive. Positivity rate for TBC was 40.4%, and for BC culture 42.3%; 3 TBC were positive with negative BC culture, and 4 positive BC cultures had negative TBC (Kappa= 0.723). BC culture sensitivity for positive TBC was 86% (95%CI 68.5 - 95.4), specificity 87% (75.4 - 93.7), positive predictive value 82% (65.4 - 91.1), negative predictive value 90% (77.9 - 96.8), LR+ 6.6 (2.8- 15) and LR- 0.16 (0.05 - 0.4). We found no difference in time to positive results between TBC and BC culture in hours (p = 0.21). Contamination rate was 1.9% for both methods.

Conclusions: BC culture is as good as TBC for microbiological diagnosis of nosocomial sepsis in newborn infants. It also allows for the use of the remnant plasma for further analysis.

16

MENTAL REPRESENTATION OF PREGNANCY AND WOMEN IN PREGNANT TEENS AND ADULTS AND ITS RELATION TO SELF-CONCEPT

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Background: Adolescence and pregnancy are critical periods of biopsychosocial change, requiring adaptive responses and use of psychological resources. Vulnerable resources expose females teens to psychosocial and developmental issues. Self-conception is a multidimensional and complex construct. It is built on interaction with the world, and is the most complete way each one see himself/herself and perceives the environment.

Methods: Qualitative and quantitative study, including adolescent and adult pregnant women. After agree to participate was obtained a demographic data questionnaire Tennessee self-concept scale and semantic networks questionnaire were administered.

Results: Of 348 cases, 22.7% were teenagers, average age 16.4 \pm 1.7 years, education of 9.4 \pm 1.8 years, 57.2% with partner and most of them were housewives, with school dropout. There were significant differences in self-concept subscales (behavior, physical self and moral-ethical self, p \leq 0.01 for all) between teenagers and adult women. That observation was related with semantic concepts on pregnancy and women.

Conclusions: Teen pregnancy can be explained by self and mental representations, with diminished perception of behavior, rules and values, overrated self-perception and idealization of pregnancy and motherhood.