Revista de Enfermagem
do Centro-Oeste Mineiro
2017;7:e1804
https://doi.org/10.19175/recom.v7i0.1804
www.ufsj.edu.br/recom

RECOM
REVISTA DE ENFERMAGEM DO CENTRO-OESTE MINEIRO

Review Article

EVIDÊNCIAS CIENTÍFICAS DOS FATORES DE RISCO PARA ANOMALIAS CONGÊNITAS: REVISÃO INTEGRATIVA

SCIENTIFIC EVIDENCE OF RISK FACTORS FOR CONGENITAL ANOMALIES: INTEGRATIVE REVIEW

PRUEBAS CIENTÍFICAS DE LOS FACTORES DE RIESGO PARA DEFECTOS CONGÉNITOS: REVISIÓN INTEGRADORA

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RESUMO

Objetivo: Identificar através da produção científica atual os fatores de risco para a ocorrência dos nascimentos com Anomalias Congênitas. **Métodos:** Este estudo buscou identificar os fatores de risco para a ocorrência dos nascimentos com Anomalias Congênitas nas publicações científicas, dos últimos 30 meses, de janeiro de 2014 até junho de 2016. Trata-se de uma revisão integrativa, com base nas recomendações de Ganong. **Resultados:** Foram selecionados 19 artigos, com resultados organizados em cinco blocos referentes: a) mãe do recém-nascido com anomalias congênitas, b) ao recém-nascido, c) à assistência ao binômio, d) aos diagnósticos, e) às políticas públicas e informação do evento vital - nascimento com anomalias congênitas. **Conclusão:** São necessárias políticas públicas de saúde para a melhoria do acesso precoce ao pré-natal e da sua qualidade além de melhoria de acesso dessas crianças e suas famílias a tratamento adequado.
Descritores: Anomalias congênitas, Recém-nascido; Epidemiologia.

ABSTRACT

Objective: To identify, through the current scientific production, the risk factors for the occurrence of births with Congenital Anomalies. **Methods:** This study aimed to identify the risk factors for births with Congenital Anomalies in the scientific publications of the last 30 months, from January 2014 to June 2016. This is an integrative review, based on the recommendations of Ganong. **Results:** There was selection of 19 articles, with results organized into five blocks related to: a) the mother of the newborn with congenital anomalies, b) the newborn, c) binomial assistance, d) diagnoses, e) public policies and vital event information - birth with congenital anomalies. **Conclusion:** Public health policies are necessary to improve early access to prenatal with quality, as well as to improve access to adequate treatment for these children and their families.
Descriptors: Congenital anomalies; Newborn; Epidemiology.

RESUMEN

Objetivo: Identificar a través de la producción científica actual los factores de riesgo para la ocurrencia de nacimientos con Anomalías Congénitas. **Métodos:** Este estudio tuvo como objetivo identificar los factores de riesgo para la ocurrencia de nacimientos con anomalías congénitas en publicaciones científicas, de los últimos 30 meses, de enero de 2014 y junio de 2016. Se trata de una revisión integradora, basada en las recomendaciones de Ganong. **Resultados:** Se seleccionaron 19 artículos, con resultados organizados en cinco partes relativas a: a) la madre del recién nacido con anomalías congénitas, b) el recién nacido, c) asistencia para el binomio, d) el diagnóstico y) políticas públicas y la información del evento vital - el nacimiento con anomalías congénitas. **Conclusión:** Se necesitan políticas de salud pública para mejorar el acceso temprano al prenatal y de su calidad, así como la mejora del acceso de estos niños y sus familias a un tratamiento adecuado.
Descriptores: Anomalías congénitas; Recién-nacido; Epidemiología.

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How cite this article:
Barros APMM, Freira MHSF, Migoto MT. Scientific Evidence of risk factors for congenital anomalies: integrative review. Revista de Enfermagem do Centro-Oeste Mineiro. 2017;7:e1804. https://doi.org/10.19175/recom.v7i0.1804

INTRODUCTION

From 1990 to 2007, the Infant Mortality Rate (IMR) in Brazil showed significant drop of 47.1/1000 live births (LB) to 19.3, and in 2015 reduced to 13.8. Therefore, in the last 25 years, there has been a decrease of 72%[1,2]. The decrease in the Brazilian IMR reflects the improvement of population health indicators, with the reduction of diseases caused by malnutrition, unsanitary conditions of life, and control of exogenous pathogens. However, currently, most infant deaths are attributed to congenital anomalies, a public health problem that requires the establishment of a specific policy[3].

According to the WHO, congenital anomaly (CA), congenital defect (CD), or congenital malformation (CM), includes every malformation in the newborn during the prenatal period, through imaging tests, such as obstetric ultrasonography, or after birth, whether structural or functional, also covering the metabolic disorders[4].

The CA are treated as a kind of congenital disorder and, despite the advances of medical and molecular genetics, their etiology remains partially unclear, without explanation. Their origin can be genetic (in a single gene disorder, such as chromosomal aberrations); environmental (exposure to teratogens); multifactorial; or related to sporadic disorders of unknown cause[5]. One reiterates that a large part of the reasons remains unexplained[6].

A Brazilian ecological study shows that 20% of neonatal deaths, and 50% of perinatal deaths are related to CA. In Brazil, the IMR for CA went from 4.0 in 1980, to 6.7 in 1990, and reached 11.4 per 1000 LB, in 2000. In 2004, they became the second cause of infant death in the country[7].

Thus, over the past 17 years, i.e., since 1999, CA were no longer the fifth cause of infant death, and began to appear, in 2004, in second position, responsible for 11% of deaths[8]. In spite of prevention programmes, the occurrence of congenital anomalies has increased in some Brazilian States, apart from the fact that correspond to 30% of deaths of children under one year[9].

In the international scene, the picture is similar, with the children's deaths from CA occupying the most significant positions. According to the World Health Organization (WHO), these numbers are from 2% to 27% of the causes of infant mortality (IM), andn CA affect from 2 to 3% of live births[4].

In Costa Rica, in 2010, the deaths from CA accounted for 34.9% of the population aged under one year, was the second place in causes of deaths, surpassed only by perinatal infections[6]. In Colombia, the infant deaths related to CA permeate between the first cause in Bogota, and the third in Cali[11]. In the United States, more than half of infant deaths, in 2007, were assigned to five main causes, especially CA, occupying the first place, with 20% of the total of deaths; followed by prematurity (17%); sudden infant death syndrome (8%) maternal complications (6%); and accidents/unintentional injuries (4%)[12].

From this point of view, in the Brazilian scenario, the increasing rate of births of children with congenital anomalies, as well as morbidities associated to CA, may have generated great impact on the demand for health services, with serious repercussions on the life of the child, family, and society[3,9].

Therefore, it is necessary to provide speciliazed services, which have qualified professionals to provide appropriate and timely care to this population. Under this perspective, the literature has shown, increasingly, the implications of the CA in the epidemiological pattern, directly affecting the structure of the assistance to the newborn and his/her families, thus confirming a new profile of users. In this sense, one can infer that this profile walks along with technological advances in the health area, particularly the care in Neonatal intensive Care Units, which provide survival, despite the unpredictable possible sequels that will bring the special needs[3].

Thus, given the aforementioned scenario, this research aims to deepen scientific knowledge about the issue, seeking to identify the current scientific production related to risk factors for the occurrence of births with CA. The evidence involved with the series of births with congenital anomalies already researched and published, may guide for necessary initiatives for the organization of the health system, more specifically the lines of maternal and child care, in order to qualify the children and families who experience this trajectory, resulting in benefit to the whole society. In this context, nurses stand out since they permeate all levels of attention to women's and child’s health, and assume the role of shared

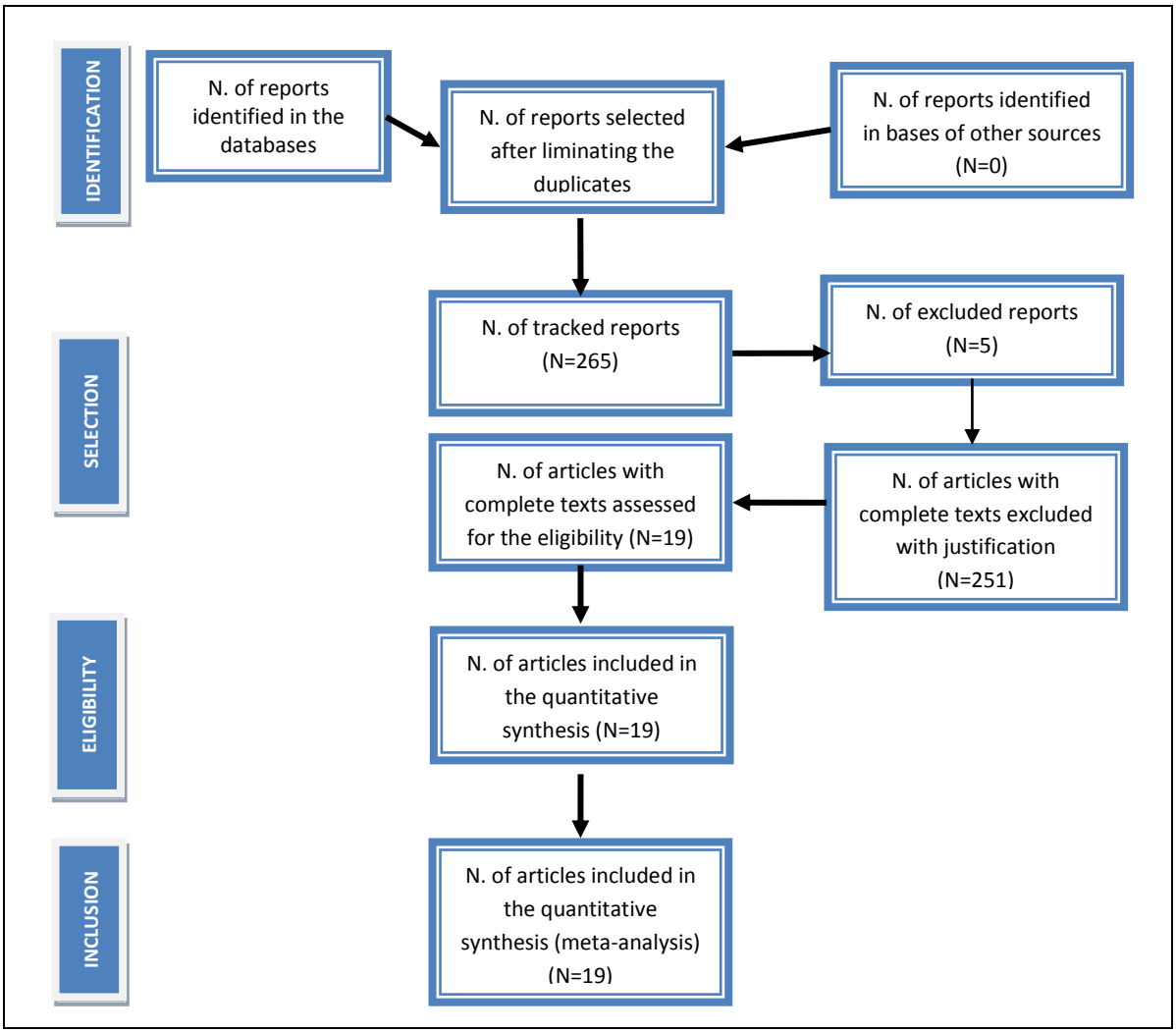
care with those involved, focused on quality and safety.

METHODS

This is an integrative review article, whose purpose is to gather evidence related to a topic, using studies already published. This methodology allows discussing hypotheses, listing suggestions for new theoretical questions, as well as identifying the relevance of new related researches. Therefore, the six steps described by Ganong[13] were chosen as the methodological reference point, namely: selection of hypotheses or questions, exemplification, representation of the characteristics of the primary research, analysis of the findings, interpretation of the results, and citation of the review.

The check list Preferred Items for Systematic Reviews and Meta-Analyses (*PRISMA*)[14] was used, which includes 27 topics to ensure the adequate development of the research, using the flow-diagram for the discrimination of the stages to select the included articles (Figure 1).

Figure 1 - Diagram of description of the stages of selection of articles included in this integrative review, according to the PRISMA, Curitiba, 2016.



Source: Moher et al.[14]; adapted by the authors.

Articles were selected in four databases: BDENF (National Nursing Database); IBECS (Spanish Bibliographic Index of Health Sciences); LILACS (Latin American and Caribbean Literature in Health Sciences); and MEDLINE (Medical Literature Analysis and Retrieval System Online). Using the descriptors from DeCS (Health Sciences Descriptors) "*anormalidades congênitas*", "*anomalías congénitas*" and "*congenital abnormalities*" or "*recém-nascido*", "*recién-*

nacido" and "*newborn*", connected by the Boolean operator "*and*".

Scientific papers published between January 2014 and June 2016 were elected, a period corresponding to 30 months. Due to the number of articles related to the topic, there was need for the delimitation of this period, in order to keep it fresh, but with the opportunity to deepen the analysis. Full texts were included, available in article format, in Portuguese, English or Spanish; free access; containing one of the descriptors. Publications that were repeated, dissertation or thesis, or that did not meet the study objective were exclued.

Among the 270 scientific publications initially identified in the screening, in the selection phase, there were exclusions, because of: unavailable full text or open access (163; 60% of the initial sample); not including one of the chosen descriptors as a keyword (71; 26%); in other formats such, as theses and dissertations (8; 3%); duplicates (5; 2%); and in another language (2; 1%).

The critical analysis for the selection was developed by reading the title and abstract of each preset publication (n=21), aiming to identify the articles that answered to the goal. Later, a complete in-depth reading was performed, resulting in the exclusion of two (1%) articles for not meeting the objective of this study. Therefore, 19 articles were analysed to extract information that could provide new research related to CA, representing 7% of the initial articles.

A form for data collection was used, containing the information: article number; reference (author, year, journal and Qualis); title, author's professional category; publishing institution; language; country of research; database; type of study; main results; contributions; limitations of the study; and suggestions for further research. The results were organized with the support of *Microsoft Office Excel 2010®*, and were organized into evidence sets of risk factors presented for the birth with CA (Table 1).

Thus, the selected scientific publications identified in the last 30 months were compared with each other and with other articles, in order to classify the evidence of risk factors according to the aspects: maternal; assistance; newborns; diagnoses; public policies and information.

RESULTS AND DISCUSSION

Based on the eligibility criteria for this study, Tabelas 1 e 2 show the variables related to the 19 scientific productions selected for this integrative review. Tabela 1 shows the order, country, year, journal, database, type of study and Tabela 2, order, title and goal.

The sample consisted of 15 (78.5%) international researches, produced in 10 countries: 4 (21%) publications from the USA; 2 (11%) from Chile; 2 (11%) Colombia; and 1 (5%) from each of the following countries: China, Canada, Hungary, Sri Lanka, United Kingdom, Tanzania and Croatia; 4 (21%) articles were from Brazil.

Regarding authorship, 37 institutions participated in the development of the researches, being academic or health services. Of these, seven institutions (18.9%) were Brazilian, and 30 (81.1%) were international. With respect to the language of publication, 12 (63.1%) were published in English, 4 (21.1%) in Portuguese, and 3 (15.8%) in Spanish. Regarding the Qualis magazine rating, 9 (47.4%) possessed classification in B extract, and 10 (52%) were not included in this ranking.

There were 88 researchers involved, and the prevalent professional area was the medicine, with 65 representatives (73.9%); followed by 4 pharmacists (4.5%), 4 nurses (4.5%), and other categories such as biologist, dentist, physiotherapist, occupational therapist and psychologist, which totaled 13 professionals (14%). In two publications (2%), the authors' professional category could not be identified.

As for the approach of the studies, 17 articles (89.4%) presented a quantitative approach, 1 (5.3%) qualitative, and 1 (5.3%) mixed. The quantitative studies were performed with reduced or enlarged population design, i.e., from restricted study populations, or hospital services, to populations of live births of municipalities, regions and countries. Among the quantitative researches, 11 (57.9%) stated retrospective temporal cut-off, 2 (5%) prospective, being 5 (26.3%) case-control studies, and 1 (2.5%) was systematic review.

Tabela 1 – Scientific publications by country, year, journal, publication databases and type of study – Jan. 2014 – Jul. 2016.

Order	Country/Year	Journal/Qualis	Database	Approach, temporality and Study Design.
A [11]	Colombia, 2014	Biomédica/ B3	MedLine	Quantitative; Retrospective; Case-control.
B [15]	USA, 2014	Journal of Perinatology/ B1	MedLine	Quantitative; Retrospective; Cohort.
C [16]	Brazil, 2014	Journal of Human Growth and Development*	Lilacs	Quantitative; Descriptive; Cross-sectional.
D [17]	Canada, 2015	J allergy clin immunol*	MedLine	Quantitative; Retrospective Cohort.
E [18]	Hungary 2015	Congenital Anomalies*	MedLine	Quantitative; Case-control.
F [19]	China, 2015	Chinese Medical Journal*	MedLine	Retrospective Quantitative.
G [20]	Brazil, 2014	Epidemiol. Serv. Saúde/ B2	Lilacs	Quantitative; Descriptive.
H [21]	Tanzania, 2015	Pan African Medical Journal*	MedLine	Quantitative; Case-control.
I [22]	Brazil, 2014	Rev Paul Pediatr/ B3	MedLine	Quantitative; Retrospective; Case-control.
J [23]	Colombia, 2014	Colombia Médica*	MedLine	Quantitative; Cross-sectional; Observational.
K [24]	Chile, 2014	Revista Medica de Chile/ B2	Lilacs	Quantitative; Cross-sectional.
L [25]	Chile, 2014	Rev Med Chile/ B2	MedLine	Quantitative; Retrospective.
M [26]	China, 2015	Chinese Medical Journal*	MedLine	Quantitative; Retrospective.
N [27]	USA, 2014	Reprod Toxicol*	MedLine	Quantitative; Descriptive Prospetive.
O [28]	USA, 2015	Pediatrics andNeonatology*	MedLine	Quantitative; Cross-sectional.
P [29]	United Kingdom, 2014	Wiley Periodicals, Inc.*	MedLine	Quantitative; Retrospective, Systematic review.
Q [30]	Croatia, 2014	Medical Science Monitor*	MedLine	Quantitative; Case-control.
R [31]	Sri Lanka, 2014	Ceylon Medical Journal*	MedLine	Quantitative; Descriptive, Prospective.
S [32]	USA, 2014	CID / B1	MedLine	Qualitative; Report of a working group.

Source: Scientific publications analyzed, organized by the authors.
Note: *Does not have Capes (Coordination for Improvement of Higher Education Personnel) Qualis Journal classification, Ministry of Education (MEC), Brazil.

Tabela 2 – Scientific publications according to title and objective – Jan. 2014 – Jul. 2016.

Order	Title	Objective
A [11]	Detección ecográfica de anomalías congénitas en 76.155 nacimientos en Bogotá y Cali, 2011-2012.	Determinar la tasa de detección de anomalías congénitas mediante ecografía obstétrica y la tasa de falsos positivos, comparando poblaciones de Bogotá y Cali atendidas en servicios de salud de diferentes niveles de complejidad.
B [15]	Breech presentation at delivery: a marker for congenital anomaly?	To determine whether congenital anomalies are associated with breech presentation at the time of birth.
C [16]	A importância das anomalias congênitas ao nascer.	Analisar a ocorrência de anomalias congênitas em recém-nascidos em hospitais do município de São Paulo.
D [17]	Risk of congenital malformations for asthmatic pregnant women using a long-acting b2-agonist and inhaled corticosteroid combination versus higher-dose inhaled corticosteroid monotherapy.	To compare the risk of major congenital malformations in pregnant asthmatic women treated with a LABA/ICS combination and those treated with a higher dose of ICS monotherapy during the first trimester.
E [18]	Sex ratio of congenital abnormalities in the function of maternal age: A population-based study.	To estimate the possible effect of maternal age of pregnant women for the sex ratio (SR) of their offspring affected with isolated CA in the national population- based large dataset of the Hungarian Case-Control Surveillance of Congenital Abnormalities (HCCSCA)
F [19]	The Survey of Birth Defects Rate Based on Birth Registration System.	To investigate the surveillance trend of birth defects, incidence, distribution, occurrence regularity, and their relevant factors in Xi'an City in the last 10 years for proposing control measures.
G [20]	Characteristics of children born with congenital malformations in the municipality of São Luís, Maranhão, 2002-2011.	To describe the characteristics of live births with congenital malformation in São Luís, state of Maranhão, Brazil, from 2002 to 2011.

H [21]	Factors associated with major structural birth defects among newborns delivered at Muhimbili National Hospital and Municipal Hospitals in Dar Es Salaam, Tanzania 2011– 2012.	To increase understanding of the magnitude of known risk factors, hence contributing to developing data driven birth defects prevention activities and demonstrating the value of developing a surveillance system for birth defects in Tanzania.
I [22]	Maternal and perinatal aspects of congenital defects: a case-control study.	To evaluate the prevalence of congenital defects and to investigate the maternal and perinatal aspects associated with them in a sample of newborns from the city of São Carlos, São Paulo, through the analysis of their Declarations of Live Births.
J [23]	Evaluation of prenatal diagnosis of congenital defects by screening ultrasound, in Cali, Colombia.	The objective of the study was to determine the frequency of prenatal ultrasound diagnoses of subsequent newborns with congenital birth defects who were hospitalized on two neonatal intensive care units in Cali.
K [24]	Occurrence factors of risk and severity of congenital malformations.	The objective of this study is to identify CFM risk factors and to compare the risk of occurrence of CFM according to severity, given these factors.
L [25]	Prevalence to the birth of congenital malformations in the Chilean maternity hospitals participating in the ECLAMC in the period 2001-2010.	To present the current state of prevalence at the birth of the most relevant congenital malformations in the Chilean hospitals participating in the ECLAMC in the period 2001-2010. To compare the rates of prevalence at birth with those of previous periods already published: 1982-1988, 1989-1994, 1995-1993-5
M [26]	The Survey of Birth Defects Rate Based on Birth Registration System.	To investigate the surveillance trend of birth defects, incidence, distribution, occurrence regularity, and their relevant factors in Xi'an City in the last 10 years for proposing control measures.
N [27]	Perfluorooctanoate Exposure and Major Birth Defects.	To examine the association between estimated maternal prenatal PFOA concentration and maternal report of birth defects across several body systems.
O [28]	Congenital Malformations in the Newborn Population: A Population Study and Analysis of the Effect of Sex and Prematurity.	To provide up-to-date estimates of the current CM prevalence in the United States.
P [29]	Sex Prevalence of Major Congenital Anomalies in the United Kingdom: A National Population-Based Study and International Comparison Meta-analysis.	To estimate sex ratios in specific major CA diagnoses using a large source of routine healthcare data representative of the United Kingdom (U.K.) population and to examine the effects of sociodemographic and maternal factors on these ratios.
Q [30]	The OSR1 rs12329305 Polymorphism Contributes to the Development of Congenital Malformations in Cases of Stillborn/Neonatal Death.	To investigate the role of the OSR1 rs12329305 silent mutation located in exon2 at position 19353152, rs9936833 intergenic/unknown mutation near FOXF1, and HOXA1 rs10951154 mis-sense, transition substitution, and intragenic mutation located in the 5'near gene region at position 27095695 in cases of stillborn/neonatal deaths due to different organs malformations in comparison with a control group of healthy children.
R [31]	Pattern of clinically recognisable congenital malformations in babies born in a tertiary referral centre in Sri Lanka.	To estimate the rate and sex ratio of Congenital Malformations, identify types of CM and aetiological factors in new born babies born at a teaching hospital over a period of six months.
S [32]	Assessment of Congenital Anomalies in Infants Born to Pregnant Women Enrolled in Clinical Trials.	Summarize the workgroup's discussions that focused on assessment of congenital anomalies occur among infants born to women enrolled in clinical trials.

Source: Scientific publications analyzed, organized by the authors.

Based on the information published in scientific publications identified with this research, and in order to make them better presented in the discussion, it was developed from the perspective of variables involving the mother of newborn with congenital abnormalities of the that concern to the newborn, the assistance to the binomial, and the possible diagnoses, and finally, concerning public policy and vital event information-birth with congenital anomalies.

Maternal Variables

Regarding maternal age was not identified as the risk significance of births with CA that occurred mainly in women between 20 to 34 years[15 – 19]. Study in São Luís, in Maranhão, confirms that most live births with CA, had mothers aged 20 to 34 years (70.0%), and 19

years (almost 21%)[20]. Study in Tanzania confirms this information, 77.5% of mothers were among 20 to 35 years, with an average age of 25.9 years[21]. In Porto Alegre in Rio Grande do Sul, the incidence was higher among teenage mothers, with a history of unplanned pregnancies, abortion attempts, with possible membership in the self-medication and/or smoking[22].

It should be noted that the advanced maternal age, 35 years or more, was considered a weakness for CA [22-24], because it increases the risk of trisomies type 21, 13 and 18. In Chile, the Down Syndrome showed incidence of 2.5 cases per 1000 NV, and given that suggested the family planning for women[24-25].

Study conducted in Quebec, Canada, says that women under the age of 18 years or 34 years or more were twice as likely to birth with CA[18]. Phenomenon that can be explained by the period of greatest fertility of the woman, with the largest number of births, and higher incidence of CA in two articles[21,24] pointed out-if paternal age high as risk factor for more severe fact that CA can be probably associated with the high maternal age.

In São Carlos, state of São Paulo, Brazil, maternal schooling below eight years presented statistical Association at birth with CA[22]. In Tanzania, 73.3% of women who had children with CA, had up to 4 years of study [21], it is believed that low schooling raises the risk exposure of teratogenic factors, medications, due to insufficient clarification and/or knowledge about the harm. More than eight years education introduced himself as protection factor[15,21-22,24]. However, in São Luís do Maranhão, Brazil, identified that 58.7% of mothers of children with CA, possessed of 8 for more years of schooling diverging from other reports found in the literature[20].

The socio-economic and cultural factors impacting on access to prenatal care and may result in increase of births with CA, especially in poor regions[11,15,18,22-23]. In Colombia, low income proved to be associated with not performing iImaging tests in a timely manner, or lack of it[15,23].

Births with CA turned out to be more prevalent in women who did not have companion (63.4%). In only one study[20] the location of housing in the countryside (8.11%) is compared to the urban area (7.56%), with significance [26]. It should be noted that family history of BC has increased by three times more chance of birth with BC and greater severity, in study with data from the ECLAMC-Latin American Collaborative Studio Malformaciones Defects-in hospitals of Chile, from 2001 to 2010[24].

In Chile two physical factors associated with the birth with CA were identified, exposure to dental radiation and of thorax or abdomen, and acute diseases in the first quarter related to the increased gestational severity of CA, which more focused on the infant morbidity and mortality[24]. And in the United States, a research developed with social participation, sought to relate a chemical factor, the Perfluorooctanoate, teratogenic origin substance emitted in the process of manufacture of chemicals, with water contamination. It was demonstrated association with brain defects, but not associated to cardiac anomalies, as mentioned in previous studies[27].

The multiparidade was related to the risk for CA, if the presence of prior history of abortion or birth with CA[15,24,26]. In China, Xi'an City, approximately 5% of women who gave birth with CA reported abnormal reproductive history, with stillbirth, miscarriage and children with CA[26]. The twin pregnancy is reported as moderate risk[15,22], occurring between gemelares monozigóticas CA[20]. Significance was not observed among single or multiple pregnancies for newborns with CA, because multiple pregnancies showed low incidence in selected studies[22].

The choice for the kind of surgical birth[15,16,20] is relevant at birth with CA. This is because prenatal diagnosis, with indication of the surgical delivery, and reduction of complications in childbirth, as the fetal distress, it was considered for example that the Gastroschisis is a indication for cesarean section.

In São Luiz do Maranhão, 48% women who had children with CA held four to six prenatal consultations[20], lower the quantitative indication of the who. Respect the recommendation will be a protective conduit for risks of CA, favoring in care to prevent, for example, exposure to teratogens.

Hypertension and maternal infection have shown themselves as factors associated with CA, in regions of Tanzania[21]. In Quebec, the combined treatment with ß2-agonist and inhaled corticosteroid for moderate or severe asthma, increased by 20% the chance of BC, compared to done with high doses of corticosteroid, and the risk is twice as big if associated with the therapy, the woman is at the extremes of age[18].

Newborn Variables

In São Carlos, São Paulo, newborns with CA presented weight and Àpgar values significantly lower. Low birthweight is strongly related to the MI, especially in the perinatal period[22]. In Tanzania, identified a higher incidence of CA in born with low weight[21].

Seven studies associated with births with low birth weight and prematurity[15,16,20-22,24,28]. Prematurity is not a risk factor for birth with CA, which is observed in professional practice that this situation can advance delivery. In Missouri, premature births with CA ranged from 11 to 20%, and for the terms with CA the variation was smaller, 5 to 9%, and absence of relationship as to show the birth[15]. In São Luís do Maranhão, of births with AC, 85% had 37 weeks or more, and 76% had higher weight to 2500 g. In Chile, it was identified that the intrauterine growth retardation proved as a risk factor for CA[24].

In relation to the presentation at the time of delivery, an american study, joined the CA with breech presentation, the term birth and CA of CNS, Musculoskeletal System and the Chromosome. However, in premature births defects more incidents were to oral clefts (15).

However, the breech cannot be considered the causal root of CA, but may signal the presence of an underlying abnormality, which leads to the recommendation for greater attention in the physical examination for the detection of anomalies[15].

In five studies CA was related to male gender[19-21,24-26], which may be related to etiology as limited, or borderline between the female or male[19]. In hospital study developed in São Paulo, almost 56% of CA occurred in males[20]. And yet, in the United Kingdom, study confirms this relationship, the male presents 26% more at risk of CA bigger, when compared to the female. Highlights that the maternal factors and sociodemographic did not influence the relationship between CA and sex[29].

U.S. study has identified 61% of CA occurred in males[30], and pointed to factors regulation in cellular differentiation and morphogenetic development of CA in stillbirths and children with neonatal deaths in [30].

Among the types of AC more identified in articles reviewed include Cardiovascular, musculoskeletal system diseases, Musculoskeletal[20] and Urogenital[15], and the most detected by prenatal Imaging examination were those of Central Nervous System, the Heart valves[23] and Musculoskeletal[20]. In one of the surveys, the musculoskeletal abnormalities, with 30% of the cases, were feet, hip deformities, hemangioma, skin fold pre-Auricular, sinus and hypopigmented rather pré-auriculares spots[31]. And 30% were related to the Digestive System, the anquiloglossia (almost 90%); 18.2% Gênito-urinary system such as cryptorchidism; 10.3% of the circulatory system, with low heart disease risk; 7.9% of the neurological system, prevalence of Hydrocephalus, sacral abnormality, and encephalocele; 3% of chromosomal abnormalities like Down syndrome; 2.9% palatal cleft lip; and 0.8% the abnormalities of eyes, ears and neck[31].

In Chile, a study has shown that Down syndrome showed an increase of 47% between 1982 to 2010, although the overall rates were stable[25]. U.S. study identified a 28.9 AC cases rate per 1000 NV, with 35% of cardiac malformations, and 28% of geniturinary[28].

Asset Variables

The expanded prenatal promotes maternal and child health and enables early diagnosis of CA, it includes vaccine upgrade that should happen during the reproductive planning, for prevention of rubella and tetanus CA values[22].

In Tanzania, the antimalarial drug presented large CA protection because the Etiologic Agent consume folic acid to replicate itself, competing with the fetus that also uses it in the embryonic development [21]. Folic acid supplementation reduced on 50% the risk of anencephaly and spina bifida, when compared to women who didn't used it[21,26].

Thus, the early initiation of prenatal care is essential for prevention of CA[21,31], due to vaccination, supplementations with folic acid, the image tests for early diagnosis, and favouring the birth planning in reference services, with Neonatal intensive care units.

Teratogenic substances, such as alcohol, drugs, medicines and lead interfere with embryonic development, triggering major CA[21,31]. In epidemiological study of China, women who gave birth to infants with CA, showed that almost 3% contracted viral infection, almost 10% used drugs in pregnancy, and almost 4% approached of harmful substances[26].

Diagnostic Variables

The diagnosis of CA is commonly done by Ultrasound prenatal (USGPN), and one of the additional tests include: Fetal Magnetic Resonance Imaging, Fetal Echocardiography

and Fetal Karyotype of amniotic fluid[24]. At the time of birth the newborn must be evaluated by an expert, for planning the necessary interventions[32].

In two studies in Colombia (Cali and Bogota) 31.5% of CA have been identified in prenatal care, ultrasound examination. The survey recommends that pregnant women be directed as to the importance of the examination, for subsidies for decision-making on confirmation of CA, with respect for their beliefs and decisions[25].

Another study, in Cali, despite the obligation of ultrasonography, one in four mothers of newborns with CA admitted to NICU, not held, 43% of newborns have not had the diagnosis on prenatal care, these almost 60% of moms failing the exam.The non-realization of the USGPN was associated with maternal age between 25-34 years and 35-47 years; low educational level; do not have health insurance. The sensitivity of the uterine ultrasound in prenatal exam after 19a gestational week was 79.2%, your absence will indicate poor quality prenatal care, making early diagnosis and appropriate arrangements[23]. In Brazil, this technological breakthrough allows the termination of pregnancy planning, eugenics, abortion in cases of anencephaly[16], allows the routing reference services, enables the preparation of family and encourages the planning of delivery in a timely manner.

Retrospective study analyzed DNA samples from 35 newborn babies with wide variety of BC of unknown cause and used comparative genomics in microarray hybridization (CGH-Array). The authors present the tool as first line, favoring the precise diagnosis, and benefiting families emphasize that should be employed in CA monitoring programs[17].

And yet, a research pioneer in the USA with cadaveric samples maintained with paraffin during 12 years, concluded the importance of autopsies for the investigation of rare malformations[30].

Variables related to Public Policies and Health Information

The Brazilian research carried out with data from the Information System of Live Births (SINASC), the Ministry of Health, points to the importance of correct and accurate filling of the live births declaration (LBD). To this end, training strategies are needed for professionals that render this document[20], for Standardization of minimizing deficit records of local resources for the diagnosis of CA, reducing to low specificity of CA identified[22].

Another aspect addressed as to studies with secondary data regarding stillbirths, with high prevalence of CA bass which are included only in the mortality information system (MIS) and not on birth certificates. In this way, the intersection of information for quality results, looking for information in charts[22,26], notification and monitoring strategies should be implemented[26], for knowledge of the real scenario of the CA.

It is recommended that immunization against rubella as routine for men and women aged 20 to 39 years of age; prenatal tests for identifying risk for toxoplasmosis, rubella Teratogens and sexually transmitted diseases (STD); structuring a service network for the detection/genetic counseling in the SUS; active search for primary health care to women who have genetic counseling[16]; protection of women of childbearing age to radiation exposure[24].

Facing the growing problem of CA as a cause of the MI Brazilian authors consider the contrast with your lack of policies, programmes and actions directed at the problem. Consider also in addition to mortality, other consequences such as: deformities, surgery needs, sequels, commitment on development, social discrimination, high government spending and the potential years of life lost[16].

It is necessary the establishment of national policies to ensure prenatal examinations access to identify possible risks Teratogens, as acute toxoplasmosis, rubella and DST[20,23], with the early identification of hypertensive pregnant women through strengthening the home visits in primary health care[21]; use of scientific evidence-based guidelines for the treatment of chronic diseases, such as asthma moderate, important, healthy pregnancies[18]. Reiterates the need for studies to quantify, describe and identify the risk factors to the CA and I seek identification or presumption of risk factors[16]; as well as, the need for decentralized national program that monitors the occurrence of CA, not only with the universal systems record, but with the outbreak of an agile system for collecting maternal and family information[18-19,26], with utilization of diagnostic technology resource.

It is important to stress the need for the consolidation of the monitoring and surveillance of the newborn up to one year after birth, in

order to reduce the number of births with CA, and strengthen the comparability with other countries and regions[26]. In this regard, stresses the need for the valuation approach in the training of all professionals, in particular, health care, and particularly of nurses, whereas the same acts directly in patient care, both in primary care as in secondary and tertiary. Nursing fulfills the user the primary structures, since the family planning, prenatal and host of the binomial, on return to the health unit, to the puerperium, and monitoring the growth and development of the child. And yet, in secondary and tertiary sphere, nursing remains present in clinics and hospitals, providing care during labor, childbirth, the birth, and the puerperium, as well as in the neonatal intensive units.

Finally, there are also incentive for systematic registration of prenatal ultrasound examination results, in the sense of obtaining population records that can subsidize the development of health strategies for the service to the born with CA[25].

It appears that the authors have pointed out that the knowledge by nurses and other members of the team, about the congenital anomalies and conduct to be adopted in the face of this birth, are indispensable for the guidance of parents and family members, to encourage active listening questions about the CA, and the clarification that target for encouraging the search for quality of life, within the limits imposed on child[33].

FINAL THOUGHTS

The search for scientific evidence in national and international articles made possible the expansion of the spectrum of risk factors for birth with CA, due to the different scenarios, methodological approach and analysis of the studies.

The risk factors identified as maternal variables were the extremes of age, advanced paternal age, low educational level, absence of mate, unfavorable socioeconomic conditions, rural housing, pre-existing or developed diseases in pregnancy established treatments without clinical evidence, prior history of abortion or child with CA, teratogênicas, prenatal substance exposure onset, twin pregnancy and parity. With respect to the variables of the newborn: the male. One of the most common CA highlights: cardiovascular, musculoskeletal and urogenital, musculoskeletal/with CA neurological decline, after the folic acid supplementation.

How much welfare variables: prenatal-onset. In relation to the diagnostic variables: access to USGPN and stands CGH-array as a gold standard for the diagnosis of BC. In relation to the political need for improvement of data from Information System of Live Birth (SINASC), with adequate training to professionals that render this document.

It highlights the need for policies aimed at improving the quality and early access to prenatal care, as well as support families who have children with diagnoses of CA and this new clientele, providing expert care centres and rehabilitation whenever possible for those patients under the health systems.

There is also the need for qualification of health professionals, especially nurses, because of the spaciousness of their actions in front of the life cycle of a human being, being, often base and reference to the parents and family, responsible for the child with CA.

On this it is concluded that there is a need for other studies in this area to highlight a very important solutions and global relevance. CA come growing in recent decades, health systems and health professionals should be prepared to answer them properly.

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Nota: Este artigo de revisão integrativa é parte integrante de uma dissertação desenvolvida em Programa de Pós-graduação em Enfermagem da Universidade Federal do Paraná.

Received in: 18/02/2017
Final version resubmitted on: 25/09/2017
Approved in: 27/09/2017

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