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Prevalence and Risk Factors of Congenital Disabilities in China, India, and Indonesia: A *Systematic Review*

Maylan Wulandari[1] and Krisnawati Bantas[2]

[1]Reproductive Health Sciences, Faculty of Public Health, University of Indonesia
[2]Epidemiology Department, Faculty of Public Health, University of Indonesia

Corresponding Author:
Maylan Wulandari
maylan.wulandari@ui.ac.id

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Abstract

Congenital disabilities are one causes of mortality to the neonatal and children under five around the world. Children with congenital disabilities who survive may have a mental, physical, visual or auditory handicapped in their lifetime. Congenital disabilities generally caused by several multifactorial causes which related each other. The purpose of this research to compare prevalence and types of risk factors of congenital disabilities which most frequently researched in China, India, and Indonesia. This research is a systematic review by analyzing the relevant research journals from 2012 – 2017, make an assumption and conclude these journals. The prevalence of congenital disabilities in China, India, and Indonesia is varied. The highest prevalence is in Pune city, India 230,51/10,000 birth. Based on the risk factors which frequently researched is mother factors: gestational age of mother ≥ 35 years old and poor maternal education; environmental factors: mother living in urban area and living in slum area; nutrition factor: folic acid deficiency; child factors : age of fetuses when first detected, low birth weight, prematurity and baby boy; and other factor : genetics. In Indonesia, the risk factors of the congenital disabilities studied are gestational age of mother and the environmental factors where a pregnant woman lives. Identifying risk factors is useful for making intervention programs to decrease the prevalence of congenital disabilities.

Keywords: prevalence, risk factors, congenital disabilities, *systematic review*

1. Introductions

The target of Sustainable Development Goals (SDGs) proposed by the United Nations (2015) offers a great improvement from the target of the Millennium Development Goals (MDGs). One of the main target SDGs in 2030 is the third target, namely to guarantee a healthy life and encourage prosperity for everyone at all ages. One of the eight global targets to be achieved is to end the deaths of newborn babies and children that can be prevented, by lowering Neonatal Mortality at least up to 12 per 1,000 live births and Child Death Rate 25 per 1,000 live births.

According to the data from Neonatal – Perinatal Database And Congenital disabilities Surveillance, globally congenital disabilities be the cause of child mortality at least on 3.3 million children every year. Which estimated 3.2 million of them who survive might have a mental, physical, visual or auditory handicapped lifetime. The magnitude of the social and economic costs due to the poor quality of life, lifelong disability, and reduced productivity, get social stigma and discrimination (1).

According to the World Health Statistics 2012, about 7% child mortality around the world caused by congenital disabilities. Figure on a regional basis ranges 5 % in the African region, 7% in the region of South Asia and East Asia, and 19% in the European region. Estimated 11% of neonatal deaths due to congenital disabilities occurred in China (2). In Indonesia, congenital disabilities became one of the causes of infants and child's deaths which contributes big enough is around 5.7 % of total infant mortality and 4.8% of the total child's mortality. Neonatal mortality age 0-6 days because of congenital disabilities of 1.4%. While neonatal death age of 7-28 days due to congenital disabilities increased to 19% (3)

, but the incidence of congenital disabilities reported in the world is still below the predictions. This condition could be caused by the limited capabilities of early detection by health workers, and weak surveillance and recording data of congenital disabilities. Congenital disabilities generally caused by several interrelated factors. Those factors include genetics, behavior, and environment — almost 50% of the causes of congenital disabilities of unknown cause.

The purpose of this study is to compare the prevalence and types of risk of congenital disabilities in some country in China, India, and Indonesia by using a systematic review based on the research that has been done before by other researchers. A systematic review is a research method that summarizes the results of primary research to present facts that more comprehensive and balanced. The process consists of several steps, firstly is the identification of questions of research, developed a systematic review of research protocols, determine the location of the database research results as the search area (e.g., MEDLINE, PubMed). The second is the selection of the research results that are relevant, choose the research results of quality, the extraction of data from individual studies, a synthesis of the results of the meta-analysis (if possible) or method of narrative (if not possible), and the presentation of results. The advantages of using systematic review is to get a valid and findings can be applied from some previous research on a specific phenomenon (4).

2. Method

2.1. Literature Search Strategic

A search of the relevant literature use journal database ProQuest, Oxford Journals, Google Scholar, The Lancet, and the Journal Airlangga University. The keyword that used is 'congenital disabilities,' ' prevalence of congenital disabilities,' 'risk factors of congenital disabilities,' 'congenital disabilities,' 'Asia.' In searching of data, researchers restrict the year's journals starting the year 2007 to 2017.

2.2. Selection of the literature

Data obtained then analyzed using PRISMA guidelines (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses Statement)*. Researchers got 70969 results from various database journal, which is up of 207 data from Oxford Journals, 43152 data from ProQuest, 20600 data from Google Scholar, 6836 data from The Lancet, and 174 data from Journal Airlangga University. The researcher is manually selecting the data which has the title of suitability, obtained 53 journals with titles that match. Next researchers select a journal which has appropriate abstract, obtained 20 journals with the suitability of the abstract. The next step is to review the entire contents of the journal range from abstract, methods, sampling, research results and conclusions from this stage of research, retrieved eight journals that meet the criteria. For more details can be seen in Figure 1 Flow Chart Data Reduction.
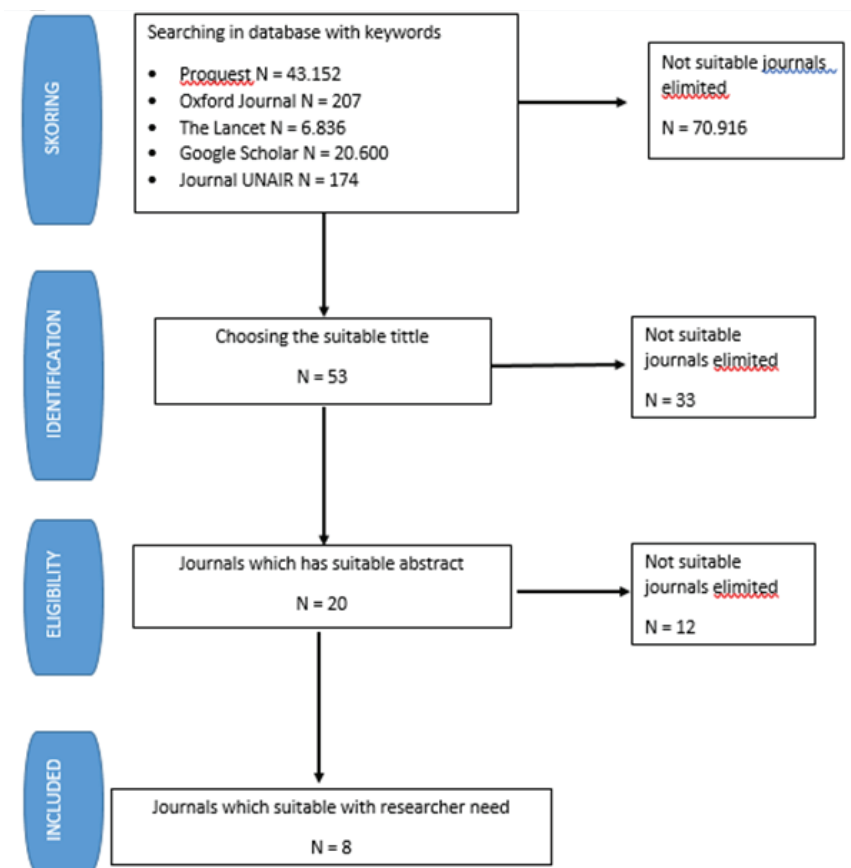

Figure 1: Flow Chart Data Reduction.

There is eight journal which will be conducted by systematic review. Eight journals and the results of the study were collected from the three countries, with the majority from China (n = 5), two from India, and one of the journals from Indonesia. Such studies have a large enough sample.

3. Result

TABLE 1: The Journal Characteristic

NO	TITLE	RESEARCHER	LOCATION	SOURCE JOURNAL	PREVALENCE OF CONGENITAL DISABILITIES	RISK FACTORS OF CONGENITAL DISABILITIES
1	Prevalence of congenital disabilities and risk-factor analysis from a population-based survey in Inner Mongolia, China (5)	Zhang, X., Li, S., Wu, S., Hao, X., Guo, S., Suzuki, K., Yokomichi, H., Yamagata, Z. (2012)	Inner Mongolia, China	BMC Pediatrics Volume 12, 18 August 2012, Article number 125	Many 976 children diagnosed has congenital disabilities. The prevalence of congenital disabilities is 156, 1 per 10000 live births. With the presentation of Neuro Tube Defects (NTD) of 20.1 per 10000 live births anencephaly, some 6.9 per 10000 live births, spina bifida 10.6 per 10000 live births, encephalocele 2.7 per live births and congenital heart abnormalities 17.1 per 10000 live births.	Figures for the incidence of congenital disabilities increased with the age of the mother is less than 25 years, consuming alcohol, having a family history of congenital disabilities, with low-educated, had some pregnancy and live in rural areas. The incidence of congenital disabilities less on Ethnic Mongols rather than ethnic Han Chinese. The population of Inner Mongolia experienced a relatively higher incidence of congenital disabilities.
2	The Association of Maternal Lifestyle withCongenital disabilities in Shaanxi Province, NorthwestChina (6)	Leilei Pei, Yijun Kang, Yue Cheng, Hong Yan (2015)	Shaanxi Province, Northwest China	PLOS ONE I DOI:10.1371/journal. Pone.0139452 September 30, 2015	Sample totaled 29098 babies, 629 of whom (216.17 per 10000 live births) has a congenital disability. Congenital heart abnormalities become a disorder that many found namely of 77.32 per 10000 live births.	The woman who is consuming alcohol while pregnant has a greater risk for giving birth to a child with a neurological disorder, congenital heart abnormalities, and cleft lip. A pregnant woman who became a passive smoker have an increased to birth with defects in the eyes, ears, face, and neck; congenital heart abnormalities; respiratory system disorders. Coffee and tea consumption while pregnant also increase the occurrence of cardiovascular system disorders and abnormalities of the genital organs.

NO	TITTLE	RESEARCHER	LOCATION	SOURCE JOURNAL	PREVALENCE OF CONGENITAL DISABILITIES	RISK FACTORS OF CONGENITAL DISABILITIES
3	Prevalence of Congenital Anomalies in anIndian Maternal Cohort: Health-care,Prevention, and Surveillance Implications (7)	Prajkta Bhide, Pooja Gund, Anita Kar (2016)	India	PLOS ONE I DOI:10.1371/journal. Pone.0166408 November 10, 2016	From a total of 1822 births, the prevalence total of congenital disabilities is 230.51 per 10000 live births. The prevalence of congenital heart abnormalities is 65.86 per 10000 live births. And the prevalence of NTD is 27.44 per 10000 live births.	Pregnant women in urban areas, especially the low-educated and has a low socioeconomic background.
4	Epidemiology of Congenital disabilities Based on a Congenital disabilities Surveillance System from 2005 to 2014 in Hunan Province, China (8)	Donghua Xie, Tubao Yang, Zhiyu Liu, Hua Wang (2016)	Provinsi Hunan, China	Plos One, 2016-journals.plos.org	191,84 per 10000 live births	The trend figures for congenital disabilities increased from year to year. Congenital disabilities occurred in larger urban areas than in rural areas, a baby boy more risk than a baby girl, a mother with age above 35 years.
5	Prevalence of Congenital Anomalies in a Secondary Care Hospital in South India: A Cross-Sectional Study (9)	Anne George Cherian, Dimple Jamlive Birthsandi, Kuryan George,Anuradha Bose, Jasmine Prasad, and Shantidani Minz (2016)	South India	Journal of Tropical Pediatrics, 032016, 62, 361–367 doi: 10.1093/tropej/fmw015 Advance Access Publication Date: 4 April 2016	From 36074 a birth, some 449 infants suffered congenital disabilities. The prevalence of congenital disabilities of 125.3 per 10000 live births.	Folic acid deficiency

NO	TITLE	RESEARCHER	LOCATION	SOURCE JOURNAL	PREVALENCE OF CONGENITAL DISABILITIES	RISK FACTORS OF CONGENITAL DISABILITIES
6	Kejadian Cacat Pada Anak Usia 24 - 59 Bulan Dan Faktor-faktor Yang Berkaitan, Riskesdas 2010(10)	Heryudarini Harahap dan Salimar (2015)	Indonesia	Jurnal Ekologi Kesehatan 2015-ejournal.litbang.depkes	In Indonesia, the prevalence of Down Syndrome (DS), Cerebral Palsy (CP), and other defects is 0.07%, 0.05%, and 0.39%.	The mother who pregnant above 35 years of age are at risk of giving birth to a child with DS 4.8 times greater compared to the mothers who gave birth at the age of 35 years and under. Mothers who live in the slum neighborhoods are at risk of giving birth to a disabled child 2.1 times mothers who live in the slum environment. Factors related to the incidence of DS is the age of the mother, and the factors associated with the incidence of disability is another neighborhood residences.
7	Prevalence of congenital heart disease and its related risk indicators among 90.796 Chinese infants aged less than six months in Tianjin (11)	Xiaocheng Liu, Gongshu Liu, Ping Wang, Yunzhou Huang, Enqing Liu, Dongbei Li, Shutang Ren, Lei Pan, Nan Li, Xilin Yang, Zhijie Yu and Gang Hu (2015)	Tianjin, China	International Journal of Epidemiology, 2015, 884–893	A number of 1817 children identified had congenital heart abnormalities. Congenital heart abnormalities overall prevalence is 164 per 10000 live births in the 47,697 male; 241 per 10000 live births at 43,099 women, and 200 per 10000 live births in 90.796 men and women.	Maternal factors, among others, pregnant women who are too old, the incidence of infection during pregnancy, pregnancy with hypertension, diabetes, family history of gestational by congenital heart abnormalities, low level of education of the mother. While fetal factors include: age of fetuses in the first moments of early detection, low birth weight and prematurity.

NO	TITTLE	RESEARCHER	LOCATION	SOURCE JOURNAL	PREVALENCE OF CONGENITAL DISABILITIES	RISK FACTORS OF CONGENITAL DISABILITIES
8	Screening high-risk clusters for developing congenital disabilities in mothers in Shanxi Province, China: application of latent class cluster analysis(12)	Hongyan Cao, Xiaoyuan Wei, Xingping Guo, Chunying Song, Yanhong Luo, Yuehua Cui, Xianming Hu and Yanbo Zhang (2015)	China	BMC Pregnancy and Childbirth (2015) 15:343	Pregnant women are grouped into three groups namely pregnant women at high risk as much as 6.15%, pregnant women are at risk of being as much as 22.39%, and low-risk pregnant women as much as 71.46%. Of the three groups of pregnant women, retrieved the prevalence of congenital disabilities in each group, i.e., of 14.08%, 0.85% and 0.52% in Group of high, medium and low.	On a group of high-risk pregnant mothers (n: 2258): pregnant too old age (>35 years numerous 2.02%), the presence of genetic factors, health history and the existence of bad nutrition and folic acid deficiency. At the risk of being pregnant mothers Group (n: 8221): the high incidence of pain while pregnant, drug use while pregnant, the danger during pregnancy and unhealthy lifestyles while pregnant. At low-risk pregnant mothers Group (n: 26,237): overall low-risk factors except for factor nutrition and folic acid deficiency that is still going on.

TABLE 2: Type of Risk Factors Studied.

STUDIES	TYPE OF RISK FACTORS																			
	Mother Factors							Enviromental Factors					Nutrition Factors		Child Factors				Other Factors	
	Mother age < 25 years	Mother age ≥ 35 years	Alcohol	Smoking	Maternal lifestyle	Maternal Disease	Teratogen (drugs)	Poor educational women	Multigravida	Rural area	Urban area	Slum environment	Folic acid deficiency	Pregnant woman with nutrition deficiency	Age of fetus when first detected	LBW	Prematurity	Baby boy	Ras	Genetic
X Zhang et al., 2012	v	-	v	-	-	-	-	v	v	v	-	-	-	-	-	-	-	-	v	v
Xie, Donghua et al., 2016	-	v	-	-	-	-	-	-	-	-	v	-	-	-	-	-	-	v	-	-
Harahap, Heryudarini dan Salimar, 2015	-	v	-	-	-	-	-	-	-	-	-	v	-	-	-	-	-	-	-	-
Liu, Xiaocheng et al., 2015	-	v	-	-	-	v	-	v	-	-	-	-	-	-	v	v	v	-	-	v
Cao, Hongyan et al., 2015	-	v	-	-	v	v	v	-	-	-	-	-	v	v	-	-	-	-	-	v
Pei, Leilei et al., 2015	-	-	v	v	v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bhide, Prajkta et al., 2015	-	-	-	-	-	-	-	v	-	-	v	v	-	-	-	-	-	-	-	-
Cherian, G. Anne et al., 2015	-	-	-	-	-	-	-	-	-	-	-	-	v	-	-	-	-	-	-	-
	1	4	2	1	2	2	1	3	1	1	2	2	2	1	1	1	1	1	1	3

Information

- : not studied

v : the risk factor studied

4. Discussion

The higher prevalence of congenital disabilities among the three countries is in India 230.51 per 10,000 live births. The study by Prajkta Bhide et al. (2016) to 2107 pregnant women until they give birth with a miscarriage, pregnancy termination, born life or still-birth, neonatal death, and post-neonatal mortality as well. Such research is India's first cohort study to examine the prevalence and kind of congenital disabilities in babies that will be born by the pregnant mother. As for the types of congenital disabilities are congenital heart abnormalities were dominated by the prevalence of 65.86 persons per 10,000 live births and Neural Tube Defects with the prevalence of 27.44 per 10,000 live births (7).

The risk factors of congenital disabilities studied divided into four factors they are mother factors, child factors, environmental factors, nutrients factors, and the other factors. There are some aspects of the risk factors examined on each factor, for more details can be seen in table 2. From some study, the results of which most risk factors influence on the occurrence of congenital disabilities and the most widely studied is the mother factor, in this case, the aspect of age pregnant women over 35 years old. Mother factor, on aspects of the history of the disease of the mother also examined by several researchers, because mothers who had disease while pregnant, a chance to consume some medicines teratogenic that are harmful to the fetus. Also, pregnant women who are sick can experience a deficiency of nutrients that will be influential for the formation of a fetal organ. According to the researchers, folic acid plays an important role in preventing the incidence of neural tube defects.

The other factor is the most widely studied is the aspect of the history of congenital disabilities in the family or genetic. Genetic aspects are examined by three studies. Genetic factors still play a role in the occurrence of congenital disabilities. The whole study that examines the genetic aspects is done in China. One study by Zhang et al. (2012), which examines the Inner Mongolia ethnic predisposition to having congenital disabilities. As a result, the population of Inner Mongolia experienced a relatively higher incidence of congenital disabilities than the ethnic Han Chinese (5).

The identification of the prevalence and risk factors of congenital disabilities are beneficial to determinate the intervention prevention programs of occurrence congenital disabilities. The limitation of this study is the researchers only analyzed the research in China, India, and Indonesia. It is expected the next can be researched about the risk factors and the prevalence of congenital disabilities in several countries of America, Europe, Africa, and South-East Asian countries more so that data obtained are more comprehensive and equitable. This research did not fund by any party.

5. Conclusions

1. The risk factors of congenital disabilities the most studied by researchers in China, India, and Indonesia are the mother factors, environmental factors, nutritional factors, and other factors. The mother factors are mother age more than 35 years and

a low educational mother. Environmental factors are a mother living in an urban area and a mother living in a slum area. And the other factors are genetic.

2. Need for interventions in family planning programs to limit the age of high-risk pregnancy ($\geq$ 35 years). Counselling, information, and education (CIE) concerning the Movement of Healthy Living Community Programs (in Indonesia, GERMAS) to candidate pregnant women have the responsibility for maintaining health, families, and communities. When pregnant women are healthy, has a pattern of healthy living (not smoking, not drinking alcohol, eating a nutritionally balanced, and consuming vegetable fruit), and live in an environment that is free of heavy metals then the fetus they contain will be free from congenital disabilities.

3. Research using systematic review is useful to see some results of the research together, resulting obtained new findings on specific topics already researched.

Acknowledgment

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