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RESEARCH ARTICLE

KNOWLEDGE REGARDING PREVENTION OF FETAL CONGENITAL ANOMALIES AMONG MOTHERS RESIDING IN RURAL AREAS OF BANGALORE DISTRICT – A STRUCTURED EDUCATION PROTOCOL

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ABSTRACT

Introduction: Around the world, 6% of infants are said to be born with a congenital abnormality, which causes countless fatalities. However, since statistics sometimes do not take aborted pregnancies and stillbirths into account, the actual number of cases may be significantly greater. With 753,000 neonatal fatalities reported in 2013, the nation's neonatal mortality rate was 29 per 1000 live births. As there are limited data available on fetal congenital anomalies it is important to educate mothers and women. ***Objectives:*** This study was conducted to determine the knowledge of the prevention of fetal congenital anomalies. ***Methodology:*** A pre-experimental study with one group pre-test and post-test design was undertaken to conduct this study from 20 august to 30 October using a convenience sampling technique. A total of 60 mothersparticipated in the study through a structured knowledge questionnaire. Data was collected through pen and paper and exported to SPSS version 20.0 for further analysis.The descriptive statistics were presented with mean ± standard deviation, frequency, and percentage. The data were analyzed using a paired t-test. The chi-square analysis was used to check the association. ***Results:*** Results of the study revealed that at the pre-test level 47(78.3%) of the study participants had inadequate knowledge, 13(21.7%) of them had moderate knowledge, and none of the study participants were having adequate knowledge. Whereas after the intervention majority 43(71.7%) had moderateknowledge, 17(28.3%) of them had adequate knowledge, and none of the study participants had inadequate knowledge regarding congenital anomalies. The paired "t" test was carried out and it was found significant at $p<0.05$ level inage and knowledge level (χ^2=6.60, df=2). Furthermore, the association between type of family (χ^2=12.11, df=2), family history of congenital anomalies (χ^2=17.17, df=1), and source of health information(χ^2=8.52, df=3) werealso found to be statistically significant. ***Conclusion:*** Our data suggest that the mothers who are residing in the rural districtsof Bengaluru have significantly less knowledge regarding prevention of congenital anomalies. so, it is very important to make sure that women and mothers should know about congenital anomalies and how to manage and prevent it. Our findings will support the stakeholders, nurses, community health workers, public health professionals, and government policymakers to make a significant decision to improve public knowledge related to congenital anomalies.

INTRODUCTION

Pregnancy is a natural event that happens to women. The real wealth of every community is a healthy mother and child. Women of childbearing age make up 19% of the population in India (Rashmi Singh, 2009). As each group made its way to a region of productive land, the idea of the child's value to society gradually took shape. Instead of being a liability, the youngster gradually turned into a resource for society. The newborn kid in our world is vulnerable. From the moment of conception itself, we must use the utmost caution to deliver a healthy kid into the world.

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Even today, despite all the advances in technology and medicine, a significant number of babies are still born with abnormalities (Dorothy, 2010). Children are the most priceless resource in the world and the future of the planet. Babies announce the good news that the human race is still thriving despite all of its differences and complexity. Although the joy that a newborn provides to those around them is immeasurable, some unfortunate children have birth defects1 that, depending on the type of congenital abnormality, manifest either right away after birth or over time, making the parents unhappy and concerned (Thilaka Ravi, 2010). Regardless of the cause, a congenital disease or disorder is a condition that manifests at birth, frequently prior to birth, or during the first month of life (neonatal disease). Congenital abnormalities are those illnesses that affect a developing fetus and are marked by structural malformations. Heart problems, neural tube defects, and down syndrome are the three most prevalent severe congenital malformations. Congenital disorders can also be caused by genetic anomalies, the uterine environment, morphogenesis errors, infections, epigenetic changes on a parental gene, or chromosomal anomalies. The relationship between the prenatal impairment and the postnatal environment will have a significant impact on the disorder's outcome (Nelson, 1989). Each year, 3.2 million people become disabled as a result of congenital malformations, often known as birth defects, which impact an estimated 1 in 33 infants. Congenital abnormalities are thought to be the cause of 270 000 baby deaths within the first 28 days of life per year (Birth defects, 2022). Globally, congenital abnormalities contributed to around 510,000 deaths in 2010 (Lozano, 2010). According to estimates, there are between 30 and 70 congenital abnormalities for every 1000 live births worldwide. These infants die in about half of the cases. Around 2.5 to 4 percent of children in India have congenital abnormalities. It ranks as the third most prevalent and significant cause of perinatal mortality. These are also regarded as one of the major contributors to the mental and physical disabilities that survivors experience. In India, disorders of the central nervous system are the most prevalent type of birth defect. It is responsible for 22% of all birth flaws. While musculoskeletal problems are frequent throughout the rest of India, neural tube anomalies are more common in the northern section of the country.[7]According to a study, the various treatments used to treat epilepsy increase the incidence of congenital abnormalities in the children of epileptic women. The US Food and Drug Administration (FDA) has categorized several medications, such as Prostegestronens, Thalidomide, Phenobarbitone, Chloramphenicol, etc., according to the risks of birth abnormalities if used during pregnancy (Kathy, 2007).

Congenital abnormalities can often be avoided. The keys to prevention, for instance, include immunization, a sufficient intake of folic acid and iodine, and good prenatal care. Certain congenital defects are less common as a result of preventative public health initiatives implemented through preconception, periconception, and prenatal care services (Piyush Gupta, 2009). So, in developing countries like India, there are many underdeveloped communities wherepeople are ignorant about the prevention of congenital anomalies. Nurses play a major role inpreventing fetal congenital anomalies since they are the ones who can create awareness in the population through constant touch through health education, treatment, and care in the hospital as well as community settings. Therefore, this study was planned to assess the knowledge regarding fetal congenital anomalies among mothers in rural areas of Bengaluru districts, India. The findings of the study will help the community and midwives' nurses to have a better health education protocol to educate mothers to deliver a healthy baby as a mother has an overall role since from the conception to delivery of a healthy baby and also this research will serve as a valuable reference material for future investigations.

Objectives of the study

- To assess the existing knowledge among mothers regarding the prevention of fetal congenital anomalies.
- To develop and administer STP regarding the prevention of fetal congenital anomalies among mothers.
- To assess the effectiveness of STP regarding the prevention of fetal Congenital anomalies among mothers.
- To determine the association betweenthe knowledge score with selected demographic variables in the prevention of fetal Congenital anomalies among mothers.

MATERIALS AND METHODS

A pre-experimental one group pre-test and post-test design with a quantitative approach were used. A total of 60 mothers between the age group of 15 to 45 years were selected using convenience sampling technique who were willing to participate in the study. The data collection instrument was developed by the investigator. The validity of the tool was done with the help of nursing experts and bio-statistician. The reliability of tool was computed by using split half technique with the Karl Pearson's method. The reliability co-efficient found to be on knowledge is 0.88 revealing the tool is feasible for administration for the main study.Pre-testing was completed before structured instruction began, and after a short period of instruction, a post-test was given.Descriptive and inferential statistics were used to analyze the gathered data. In the study, demographic information includes their age, education, occupation, religion, type of family, size of family, family monthly income, family history of congenital anomalies and sources of information.Furthermore, the knowledge questionnaires include the questions related to knowledge, causes,types, prevention, and management (40 questions).Each item carries 1 mark for the correct answer and the wrong answer was given 0. The total score of the knowledge questionnaire was 40 and each items carries 1 mark for the correct answer and 0 for the wrong answer. To complete the data a master data sheet was prepared by the investigator. Demographic data containing sample characteristics were analyzed using frequency and percentage. Paired "t" test was used to find out the significance of pre and post-test knowledge scores. A chi-square was computed to find out the association between pre-test knowledge regarding fetal congenital anomaly with their selected demographic variable. Institutional research committee approval was taken. Formal approval was also taken from the institutional authority of research area. The investigator introduced the self to the participants and the purpose of the study was explained to ensure better cooperation during the data collection period.

RESULTS

Table 1 depicts the frequency, and percentage distribution of demographic variables of the mothers. majority of the participants (46.7%) falls in the age group of 25 to 34 years, and many of them are belongs from Hindu community (36.7%). Furthermore 28 (46.7%) of the mothers have primary school education and working as a home maker (45%). With regards to family monthly income majority (60%) of them earn with an income of 4000 Rs/months and residing as a nuclear family (48.3%). In addition to the family size majority (60%) of the participants have more than five or above members at home. Fifty-three (88.3%) of them does not have a family history of congenital anomalies, and most of the source of information (45.0%) was form the health care professionals. Table 2 depicts the pre-test, and post-test level of knowledge towards congenital anomalies among mothers which was assessed by general information regarding congenital anomalies, causes, symptoms, prevention and the management. According to the total score obtained by subjects, awareness was classified into adequate knowledge (>75%), moderate

Table 1. Description of socio demographic variables of mothers in selected rural areas at Bengaluru district (n=60)

Sl No.	Demographic variables	Frequency (f)	Percentage (%)
1	**Age in years**		
	a. 15 - 24 years	17	28.3
	b. 25 – 34 years	28	46.7
	c. 35 – 45 years	15	25.0
2	**Religion**		
	a. Hindu	22	36.7
	b. Christian	18	30.0
	c. Muslim	20	33.3
	d. Others	-	-
3	**Education**		
	a. No formal education	7	11.7
	b. Primary school	28	46.7
	c. High school	17	28.3
	d. PUC	8	13.3
4	**Occupation**		
	a. Home maker	27	45.0
	b. Private employee	12	20.0
	c. Govt employee	6	10.0
	d. Self-employee	15	25.0
5	**Family monthly income (Rs/month)**		
	a.Below 2000 Rs/month	4	6.7
	b. 2001 – 3000 Rs/month	5	8.3
	c.3001 – 4000 Rs/month	15	25.0
	d. 4001 Rs/month and above	36	60.0
6	**Type of family**		
	a. Nuclear	29	48.3
	b. Joint family	21	35.0
	c. Extended family	10	16.7
7	**Size of family**		
	a. Three	7	11.7
	b. Four	17	28.3
	c. Five and above	36	60.0
8	**Family history of congenital anomalies**		
	a. Yes	7	11.7
	b. No	53	88.3
9	**Source of health information**		
	a. Mass media	10	16.7
	b. Peer group	10	16.7
	c. Health care professional	27	45.0
	d. No information	13	21.6

knowledge (50–75%), and inadequate knowledge (>50%). Our study indicates that in the pre-test level 47(78.3%) of the study participants had inadequate knowledge, 13(21.7%) of them had moderate knowledge and none of the study participants were having adequate knowledge. Whereas after the intervention majority 43(71.7%) had moderateknowledge, 17(28.3%) of them had adequate knowledge and none of the study participants had inadequate knowledge regarding congenital anomalies. Paired "t" test was performed to determine the significance of pre and post-test knowledge regarding congenital anomalies. The table shows the mean, standard deviation, and mean score percentage of improvement in knowledge and statistical significance where out of a maximum score of 40, the mean score was found to be 12.83, with a standard deviation of 4.33, mean score percentage of 32.1 and paired "t" test value was 22.76 at the level of P<0.05. Table 4 depicts the association between pre-test knowledge and their selected demographic variables. The findings of the study show that the majority of the participants 18 (38.3%) were Hindu and 20 (42.5%) of them had inadequate knowledge under the age group between 25-34 years with 21 (44.7%) primary school education. However, the association between age and knowledge level was found to be statistically significant (χ^2=6.60, df=2). Regarding occupation 27 (45%) mothers were homemakers and had a family income of 36 (60%) of 4000Rs/month or above. It was observed that the majority of 36 (60%) of the participants are having a minimum of five members in their family and are living as a nuclear family 29 (48.3%). In addition to a family history of congenital anomalies, majority 46 (97.9%) of the months have inadequate knowledge and 27 (45%) of them have some inadequate 20 (46.8%) knowledge regarding congenital anomalies which were explained by healthcare professionals. Furthermore, the association between type of family (χ^2=12.11, df=2), family history of congenital anomalies(χ^2=17.17, df=1), and source of health information(χ^2=8.52, df=3) were found to be statistically significant at 5% level. It can be concluded that the association between age, type of family, family history of congenital anomalies, and source of health information was found to be statistically significant (p<0.05%) whereas five variables i.e., education, occupation, family income, religion, and size of family found to be statistically non-significant (p>0.05).

DISCUSSION

Most birth defects are caused by complex mix factors. For some births defects we know the cause, but for some of them we don't know the cause.And we don't fully comprehend how several elements combine to create birth abnormalities.It can cause lifelong problem with health, growth and development as well as learning. So, we want the way to prevent the birth defect. To do this we need to focus regarding the preventive measures of congenital anomalies.[10] Mothers are the important member of the family who is responsible in creating awareness and practicing the healthy behaviors for the health promotion and prevention of risk factors as well as diseases. Our results show that in the pre-test level 47(78.3%) of the study participants had inadequate knowledge, 13(21.7%) of them had moderate knowledge and none of the study participants were having adequate knowledge. Whereas after the intervention majority 43(71.7%) had moderateknowledge, 17(28.3%) of them had adequate knowledge and none of the study participants had inadequate knowledge regarding congenital anomalies. The first objectives of the study were to assess the pretest knowledge on prevention of fetal congenital anomalies among mothers and the results shows that a majority 47(78.3%) of the participants had inadequate knowledge, 13(21.7%) of them had moderately adequate knowledge and none of them had adequate knowledge before STP. The mean value before STP is 14.63. The SD before STP is 3.94 and the mean percentage is found to be 36.6%. The findings of the study were supported by the study done in Sangli, Maharashtra regarding the planned teaching program on knowledge regarding the prevention of congenital anomalies involving 70 respondents. the results show that in the pre-test 69% of the study participants has poor knowledge, 31% of them had average knowledge and none of the study participants had good knowledge. the pre-test mean score was 5.3, the standard deviation was 1.963, the standard error mean was o.235, t-value was -12.689 and p-value was 0.00001.[11]Another similar study was done in Sri Lanka on knowledge and attitude on fetal anomalies among pregnant women where 150 women have participated. the results show that a higher proportion of the participants; 93(62%), 88(56.7%), and 123(82%) had good knowledge of the risk factors, pre-conception care, and preventive actions but a significant proportion (26.3%) of the study participants had poor knowledge when it came regarding birth defects.

Table 2. Frequency and percentage distribution of pre and posttest knowledge on congenital anomalies among mothers residing in rural areas of Bangalore district n = 60

Slno.	Level of knowledge	Pre-test		Post-test	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
1	Inadequate knowledge (<50%)	47	78.3	-	-
2	Moderately adequate knowledge (50-75%)	13	21.7	43	71.7
3	Adequate knowledge (>75%)	-	-	17	28.3
Over all		**60**	**100**	**60**	**100.0**

Table 3. Paired t-test analysis for efficacy of STP by comparing the pre and post-test knowledge regarding congenital anomalies n = 60

SL.no	Variable	Max score	Enhancement Paired t-test difference			Paired t-test value	P-value
			Mean	SD	Mean%		
1	knowledge	40	12.83	4.33	32.1	22.76*	P<0.05

Note: *Significant at p<0.05 level, 59df

Table 4: Association between pre-test knowledge with selected demographic variables (n=60)

Slno.	Demographic variables	Sample(n=60)		Pretest knowledge				χ^2- value	p-value
				Inadequate		Moderate			
		F	%	F	%	F	%		
1.	**Age in years**								
	a.15-24 years	17	28.3	16	34.0	1	7.7	6.60, df=2, S	p<0.05
	b.25-34 years	28	46.7	20	42.5	8	61.5		
	c.35-45 years	15	25.0	11	23.1	4	30.8		
2.	**Education**								
	a.No formal education	7	11.7	6	12.8	1	7.7	0.839, df=3, NS	p>0.05
	b.Primary school	28	46.7	21	44.7	7	53.8		
	c.High school	17	28.3	13	27.7	4	30.8		
	d.PUC	8	13.3	7	14.9	1	7.7		
3.	**Occupation**								
	a.Home maker	27	45.0	23	48.9	4	30.8	1.528, df=3, NS	p>0.05
	b.Private employee	12	20.0	9	19.1	3	23.1		
	c.Govt. employee	6	10.0	4	8.5	2	15.4		
	d.Self-employee	15	25.0	11	23.4	4	30.8		
4.	**Family income**								
	a.Below Rs2000	4	6.7	3	6.4	1	7.7	1.768, df=3, NS	p>0.05
	b.Rs2001-3000	5	8.3	4	8.5	1	7.7		
	c.Rs 3001-4000	15	25.0	10	21.3	5	38.5		
	d.Rs 4001& above	36	60.0	30	63.8	6	46.2		
5.	**Religion**								
	a.Hindu	22	36.7	18	38.3	4	30.8	0.292, df=2, NS	p>0.05
	b.Muslim	18	30.0	14	29.8	4	30.8		
	c.Christian	20	33.3	15	31.9	5	38.5		
	d.Others	-	-						
6.	**Type of family**								
	a.Nuclear	29	48.3	27	57.4	2	15.4	12.11, df=2, S	P<0.05
	b.Joint family	21	35.0	11	23.4	10	76.9		
	c.Extended family	10	16.7	9	19.2	1	7.7		
7.	**Size of family**								
	a.Three	7	11.7	4	8.5	3	23.1	2.11, df=2, NS	p>0.05
	b.Four	17	28.3	14	29.8	3	23.1		
	c.Five and above	36	60.0	29	61.7	7	53.8		
8.	**Family history of congenital anomalies**								
	a.Yes	7	11.7	1	2.1	6	46.2	17.17, df=1, S	p<0.05
	b.No	53	88.3	46	97.9	7	53.8		
9.	**Source of health information regarding prevention of congenital anomalies**								
	a.Mass media	10	16.7	9	19.1	1	7.7	8.52, df=3, S	p<0.05
	b.Peer groups	10	16.7	5	10.7	5	38.5		
	c.Healthcare professionals	27	45.0	20	46.8	7	53.8		
	d.No information	13	21.7	13	27.7	0	0		

Note: S-significant (p<0.05); NS-Not significant (p>0.05).

The discrepancyinthe pre-test knowledge percentagemight be due to the study settings, characteristics of the study participants, sampling techniques used in the study, and the techniques of data collection. In regards of the second objective which was to find out the effectiveness of the STP in terms of pre and post-test. the result shows that out of maximum score of 40, mean score were found to be 12.83, with standard deviation of 4.33, mean score percentage of 32.1 and paired "t" test value was 22.76 at the level of P<0.05. This indicates that STP was effective. The findings are consistentwith the study done in Maharashtra[11] where the pretest mean score was 5.3, standard deviation was 1.963, and the post-test mean score was 11.14, standard deviation was 2.736, t = -12.689 which is significant as p<0.05.

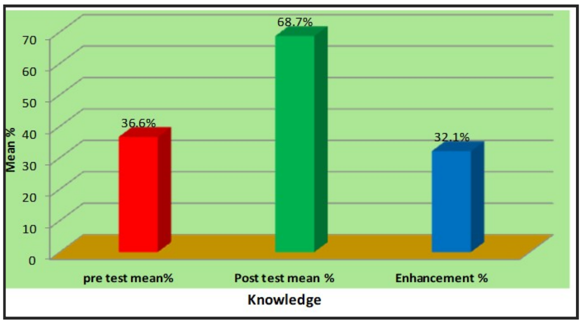

Figure 1. Percentage of mean knowledge before and after STP

With reference to the association between pre-test knowledge and demographic characteristics there was a significant association found in age and knowledge level (χ^2=6.60, df=2). Furthermore, the association between type of family (χ^2=12.11, df=2), family history of congenital anomalies (χ^2=17.17, df=1), and source of health information (χ^2=8.52, df=3) were found to be statistically significant at 5% level. The findings were supported by the study done in Krishna hospital karad, Maharashtra where the significant association found in type of the family (χ^2 = 14.6119, P<0.05), No of children (χ^2 = 4.4178, P<0.05), family income (χ^2 = 13.0047, P<0.05), information source (χ^2 = 37.9514, P<0.05), and residence (χ^2 = 14.1034, P<0.05).[13] similar association was also found in a study done in Iran and their result shows the significant association with age (p =0.001) and the level of education (p = 0.000). our study was conducted at rural district at Bengaluru, in a state of Karnataka with only few mothers. So, it is very difficult to generalized the result with other states as India is a very big country and there are many states sin India. Furthermore, the health services and availability of information vary in different parts of the country. Therefore, it is very important to create an awareness regarding congenital anomalies, health risk problems and prevention among women's and mothers.

Limitations

The study was conducted at Hessaraghatta PHC of Bengaluru which is situated in a small rural area which leads to a small, sample size, and hence the findings of the study cannot be generalized to all the mothers who are living in Bengaluru rural areas. In addition, this study is limited to only rural community areas and did not make any comparison between urban versus rural community areas.

Conclusion and Recommendation

Most birth defects are caused by complex mixed factors. For some birth defects, we know the cause, but for some of them, we don't know the cause. And we don't understand well, how factors work together to cause birth defects. It can cause a lifelong problem with health, growth, and development as well as learning. Therefore, the main focus of the study was to check the mother's knowledge about congenital anomalies who is residing in rural areas of Bengaluru districts. We have found that in the pre-test level 47(78.3%) of the study participants had inadequate knowledge, 13(21.7%) of them had moderate knowledge and none of the study participants were having adequate knowledge. Whereas after the intervention majority 43(71.7%) had moderateknowledge, 17(28.3%) of them had adequate knowledge and none of the study participants had inadequate knowledge regarding congenital anomalies. The outcome of paired "t" test analysis was significant where the maximum score was 40, the mean was 12.83, the standard deviation was 4.33, the mean percentage was 32.1%, and paired "t" test value was 22.76 that shows that there is a significant effect on the level of knowledge before and after administration of structured education program regarding congenital anomalies. The authors hope that these findings will support the stakeholders, nurses, community health officers, social workers, government authorities, and public health researchers to make a significant decision to educate mothers and girls about congenital anomalies.

Ethical considerations

Institutional ethical committee approval and medical officer approval were taken before the research and actual data collection. A consent sheet was prepared in kannada language with descriptions of the impact of the study on the responders and attached the tool on a separate page. furthermore, the subjects were also informed that their participation was voluntary and have the freedom to withdraw from the study at any time.

Authors Contributions

All authors made a significant contribution to the work reported. B.B made the study conception, design and acquisition of data and R.S did execution, analysis and interpretation of the data. Finally, all the authors read, revised and drafted the manuscript for publication and also give final approval of the version to be published based on the selected journal to which the article has been submitted.

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