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Original Research Article

Knowledge regarding consanguineous marriage and its effects on pregnancy outcome among the adolescents of village in Bagalakote district

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ABSTRACT

Introduction: Consanguineous marriages are more common in south India primarily because of social and cultural factors. Possibility of a child of consanguineous married couple, suffering from genetic diseases, congenital deformities and auto recessive disorder is more than offspring of non-consanguineous married couple. Consanguineous marriages are more prevalent in rural area because of lack of awareness about consequences. Hence the aim of the study was to educate adolescents regarding consanguineous marriage and its consequences and also to assess their knowledge before and after the intervention.

Methodology: Interventional cross-sectional study was conducted using self-administered questionnaires to assess the knowledge before and after the intervention. Complete enumeration of the students studying in selected schools was done. Lecture method was used with power point presentation to educate the children. Immediate post-test and after two months of intervention follow up test was conducted to assess the retained knowledge.

Results: Total 121 students participated in the study. Initially the students had no knowledge about consanguineous marriage and its effect on pregnancy outcome. Increase in knowledge was found to significant immediately after intervention ($P=0$). After two months of intervention significance was found with increase in the knowledge regarding effects of consanguineous marriage on women's health ($P<0.05$). Before intervention only 8.3% and 14% of students knew about association between consanguineous marriage and certain disorders and deafness, after intervention it increased to 90.9%, 91.7% respectively. Retention of knowledge regarding association between consanguineous marriage and congenital heart disease, sickle cell anaemia, haemophilia and genetic disorder was observed.

Conclusion: Knowledge regarding consanguineous marriage and its effect on pregnancy outcome was poor among the school students. Structured teaching program about consanguineous marriage and its consequences increased the student's knowledge.

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1. Introduction

In India, marriages are considered as the most important ritual and social institution, which establish a strong relationship between two families. Most of the marriages in India are arranged by the parents because it is considered

as the success rates of these marriages are high. Especially in rural areas of south India consanguineous marriage are widely in practice and it is still a huge challenge¹. Parents only consider the benefits of consanguineous marriage but they neglect the consequences.

According to Bittel (2005) "a consanguineous marriage is defined as a union between two individuals who are related as second cousins or closer, with the inbreeding

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coefficient (F) equal or higher than 0.0156, where (F) represents a measure of the proportion of loci at which the offspring of a consanguineous union is expected to inherit identical gene copies from both parents".¹⁻⁴

Globally, in some countries like Western Europe, North America, Australia, and Russian societies consanguineous marriage is lesser than 1%. In societies of the Iberian Peninsula, Japan, South American countries the consanguineous marriages are about 1 to 10% of all marriages and comparatively consanguineous marriages are more in countries like Iran, India, Sub Saharan Africa, Central and South Asia i.e. about 20%-50% of all marriages.³⁻⁵

Consanguinity is seen widely practised in South India than in Northern India.¹⁻⁵ It is practised in Muslims, Hindus, Buddhism and Parsi religions, however in Christianity it is considered as taboo. Again, different religions follow the different types of consanguinity or degree of consanguinity according to their tradition.⁴ In Islam religion marriages between a man and his father's brother's daughter which is first cousin marriage are accepted, however they oppose the marriage between man and mother's brother's daughter. Where as in Hindu's it is vice versa, they prefer marriages between a man and a mother's brother daughter pattern of first-cousin marriage.¹⁻⁵

Genuine reason for consanguineous marriage in the community is primarily social and cultural.^{2,3,6} Several social studies indicated that reasons for consanguinity are: Stability in marriage due to high Compatibility between husband, wife, and between couples and Family. Who shares the same social relationship before the marriage and after the marriage, it is considered favorable for Status of women who will have a better relationship with her in-laws, reduces the possibility of a hidden uncertainty in health and financial issues, strengthens the financial ties and provides solidarity. It helps in transmission of cultural values and cultural continuity. It reduces the burden of a dowry or less costly marriages and also to avoid the "Dowry Death".⁵ Girl's parents prefer to have their daughter living near them and to enjoy the presence of their grandchildren, and lastly the family wants to keep their wealth or property within the family.^{1-3,6}

Socially, consanguineous marriages may provide strength to relationships, the economic condition in families.^{3,5} But many health-care providers and genetic scientists consider consanguineous marriage as the risk to health.^{2,4} The major risk of consanguineous marriage is increasing genetic disorder of the offspring.³⁻⁷ Due to the expression of Autosomal recessive genetic mutation inherited from common ancestors, the children born by the consanguineous union are at increased risk for the recessive disorder and other congenital disorders like Neural tube defect, congenital heart disease, recessive hearing loss

disorder, retrieval dystrophies.^{2,3,6-8} However, because of less or no national or state-level data for all genetic disorders makes the derivation of credible prevalence rates virtually impossible.³ Studies state there is a significant association between consanguineous marriage and cystic fibrosis, Alzheimer's disease.¹ Previous studies show that in consanguineous marriage, fertility rates are high.^{1,2,4}

As populations progress in economic terms, there is a significant increase in the total burden of disease increase with the upgraded treatment of formerly lethal genetic disorders placing an ever-increasing demand on family resources.^{1,3} In the current situation, probably because of urbanization and trending nuclear family patterns, consanguineous marriage in urban areas may be less in numbers.^{2,6} However, it remains culturally a major shift in the balance between social and economic benefits associated with the consanguineous marriage and health consequences which can be attributed to the effectiveness of a community education program and increased level of education and awareness among urban population regarding the consequences of consanguinity.^{1,3,9} Previous studies conducted to assess the knowledge regarding consanguineous and its effects among youth of Iran¹⁰ and Turkey indicated that youth had very poor knowledge and negative attitude toward consanguineous marriage.¹¹

Many studies reports that consanguineous marriage do take place in younger ages, in comparison with non-consanguineous marriage.^{7,9} It has been demonstrated that this can result in lower maternal age at first child-birth, higher pregnancy-related risk, and higher number of children.¹⁻⁶

Hence, the aim of present study was to assess the knowledge about consanguineous marriage and its effect on pregnancy outcome and to investigate the effect of structured teaching program on high school students' knowledge.

2. Materials and Methods

The present interventional cross-sectional study was conducted in government high school in rural village of Nagur, Bagalkot District, Karnataka. Complete enumeration of the students in the village studying in the high school was done. Total 121 students participated in survey. Pre-tested structured questionnaire was used to collect data from the students and questionnaire was translated in to Kannada language for their easy understanding. For intervention, lecture method with PowerPoint presentation was adopted. To assess the knowledge after intervention immediate post-test results were collected and to assess the retained knowledge follow up test was conducted after 2 months of intervention with the same questionnaire. Before collecting data, informed consent was taken from their parents, school authorities and from respondents. The questionnaire included three parts first socio-demographic information,

second knowledge regarding consanguineous marriage and consisted questions like meaning of consanguineous marriage and types of consanguineous marriage, third part consisted of effects of consanguineous marriage on women's health, children's health, association with certain disorder like deafness etc. Statistical analysis was done using IBM SPSS 26th version. Simple frequency distribution was used for socio-demographic data. Inferential statistics were performed by marginal homogeneity test to assess the knowledge after intervention. P value less than 0.05 was considered significant.

3. Results

Socio-demographic findings- Among 121 respondents 56.20% students were in the age of 15 years, 40.50% and 3.31% were in the age group of 14 and 13 years respectively. 59.5% were female and 40.5% were male. Most of them 62.8% were studying in 9th standard 36.6% were in 10th standard. Majority 97.5% students belonged to Hindu religion. 48.8% and 52.9% of respondent's father's and mother's education was till primary school respectively. 69.2% and 43.8% of respondents reported that their fathers' occupation was daily wager and mother's occupation was farmer respectively. 52.1% of respondents were living in joint family.

Knowledge of respondents regarding consanguineous marriage before intervention, immediately after intervention and after two months of intervention.

Before intervention only 42% of respondents knew the true meaning of Consanguineous marriage i.e marriage between two family member who are second cousin or closer than them. Significant association was found in knowledge about true meaning and types of consanguineous marriage ($P=0$), immediately after intervention and after 2 months of intervention.

3.1. Knowledge regarding effects of consanguineous marriage on pregnancy outcomes

Before intervention only 27.3% of respondents said, because of consanguineous marriage there is an effect on women's health and 39.7% of students said there is no effect on children's health because of consanguineous marriage. Immediately after intervention significant increase in knowledge was found ($p=0$) i.e, 89.3% and 95% respectively. At follow up significance was observed ($P=0.02$) in knowledge regarding effects on women's health because of consanguineous marriage. Before intervention Students had very negligible knowledge (8.3%) about association between consanguineous marriages and certain disorders, (deafness 14%, sickle cell anaemia 9.9%, congenital heart disease 5.8%, haemophilia (11.5%). Immediately after intervention significant increase in knowledge was observed ($p=0$). At follow up test significant

result was found in knowledge about association of consanguineous marriage and certain disorder ($P=0$), deafness ($P=0.016$) was observed. At follow up test the retention of knowledge was found regarding association of consanguineous marriage and sickle cell anaemia (90.1%), congenital heart disease (90.1%), haemophilia (92.6%) however it was not statistically significant. Majority 58.7% of students had no knowledge about genetic diseases and only 28.9% of students had knowledge about treatment of genetic disorder, before the intervention. At follow up test 90.1% students' knowledge about genetic disease and 90.9% of students' knowledge about treatment of genetic disorder was increased. Only 9.5% of respondents said that there is higher possibility that consanguineous couple may have diseased offspring than the non-consanguineous couple. After intervention 90.1% respondents' retention of knowledge was observed.

3.2. Aspects about consanguineous marriage

Before intervention 72.7% of respondents heard about the consanguineous marriage, majority 46.3% respondents heard from their parents, and only 33.9% of respondents had previous information/incidence about negative consequences of consanguineous marriage. Before intervention 44.6% of respondents had reported the history of their parents' marriage as consanguineous marriage after intervention it decreased to 28.9% and 43.8% of respondents had choose consanguineous marriage as their preference at initial assessment. In pre-test 74.4% of respondents gave their opinion on education regarding effect of consanguineous marriage for adolescents is necessary.

4. Discussion

In rural areas of India, consanguineous marriages are culturally accepted, socially benefited and these marriage alliances are fixed by the elders of the family, before the children attain the legal age to get married. Lack of knowledge and awareness regarding the consequences of consanguineous marriage on health is a major predictor for the increasing number of consanguineous marriages in the rural area of South India.¹² Because of consanguineous marriage the load of genetic disorder in community becomes relatively high.

Hence, the present school-based study to assess the knowledge regarding consanguineous marriage and its effect on pregnancy outcomes was done for the first time among young adolescents aged 13-15 in the rural areas of South India. The present study highlighted the effectiveness of structured teaching program to improve the knowledge among adolescents. There are no previous studies done among young adolescents of aged 13-15 years.

Table 1: Socio-demographic characteristics of respondents

Demographic Characteristics		Frequency (N)	Percentage (%)
Age of the respondents in year	13	4	3.31
	14	49	40.5
	15	68	56.2
Gender of respondents	Male	49	40.5
	Female	72	59.5
Religion of Respondents	Hindu	118	97.5
	Muslim	3	2.5
Class Standard of Respondents	8th standard	44	36.4
	9th standard	76	62.8
	10th standard	1	0.8
	Illiterate	32	26.4
Educational status of Father	Primary School	59	48.8
	Secondary school	16	13.2
	Graduate	9	7.4
	Post-graduate	5	4.1
Educational status of Mother	Illiterate	42	34.7
	Primary school	64	52.9
	Secondary school	13	10.7
	Graduate	2	1.7
Occupation of Father	Daily Wager	74	61.2
	Farmer	33	27.3
	Government employee	5	4.1
	Business	8	6.6
	Unemployed	1	0.8
	Daily wager	48	39.7
Occupation of Mother	Farmer	53	43.8
	Government employee	3	2.5
	Business	4	3.3
	House Wife	13	10.7
Type of Family	Joint Family	63	52.1
	Nuclear Family	58	47.9

Table 2: Comparison of knowledge consanguineous marriage between pre-test, immediate post-test and at follow-up test

Knowledge about effect of consanguineous marriage		Before Intervention		Immediately after intervention		p	After 2 months of intervention		p
		N	%	N	%		N	%	
On women's health	Yes	33	27.3	108	89.3	0*	93	76.9	0.02*
	No	35	28.9	5	4.1		9	7.4	
	May be	28	23.1	4	3.3		12	9.9	
	Don't know	25	20.7	4	3.3		7	5.8	
On children's health	Yes	19	15.7	115	95	0*	106	87.6	0.053
	No	48	39.7	2	1.7		3	2.5	
	May be	26	21.5	3	2.5		11	9.1	
	Don't know	28	23.1	1	0.8		1	0.8	
Certain disorder	Yes	10	8.3	113	93.4	0*	110	90.9	0*
	No	23	19	3	2.5		2	1.7	
	May be	36	29.8	4	3.3		8	6.6	
Deafness	Don't know	52	43	1	0.8	0*	1	0.8	0.016*
	Yes	17	14	119	98.3		111	91.7	
	No	24	19.8	1	0.8		2	1.7	
	May be	31	25.6	1	0.8		8	6.6	
	Don't know	49	40.5	0	0	0	0		

*Indicates P<0.05 which is statistically significant

Table 3:

Knowledge about consanguineous marriage and below		Before Intervention		Immediately after intervention		P	After 2 months of intervention		P
			%		%			%	
Sickle cell anemia	Yes	12	9.9	117	96.7	0*	109	90.1	0.096
	No	26	21.5	0	0		4	3.3	
	May be	36	29.8	4	3.3		8	6.6	
	Don't know	47	38.8	0	0		0	0	
Congenital heart disease	Yes	7	5.8	117	96.7	0*	109	90.1	0.083
	No	18	14.9	1	0.8		4	3.3	
	May be	37	30.6	2	1.7		8	6.6	
	Don't know	59	48.8	1	0.8		0	0	
Hemophilia	Yes	14	11.6	112	92.6	0*	112	92.6	0.052
	No	19	15.7	2	1.7		2	1.7	
	May be	27	22.3	7	5.8		7	5.8	
Aware about genetic disease	Yes	50	41.3	113	93.4	0*	109	90.1	0.317
	No	71	58.7	8	6.6		12	9.9	
Knowledge treatment for genetic disease	Yes	16	13.2	7	5.8	0*	7	5.8	0.705
	No	35	28.9	111	91.7		110	90.9	
	May be	51	42.1	3	2.5		3	2.5	
Possibility that consanguineous couple may have diseased offspring higher than non-consanguineous couple	Don't know	19	15.7	0	0	0*	1	0.8	0.101
	Yes	11	9.1	115	95		109	90.1	
	No	25	20.7	1	0.8		2	1.7	
	May be	45	37.2	5	4.1		10	8.3	
Don't know	40	33.1	0	0	0	0			

*Indicates P<0.05 which is statistically significant

Table 4: Distribution of aspects of respondents regarding consanguineous marriage:

Respondents	Aspects about consanguineous marriage	N	%
Heard about consanguineous marriage	Yes	88	72.7
	No	33	27.3
Source of information	Parents	56	46.3
	Friends	23	19
	Relatives	17	14
	Teachers	17	14
Previous information about the negative consequences of consanguineous marriage.	TV/Radio/Internet	8	6.6
	Yes	41	33.9
	No	37	30.6
History of Parents marriage	Consanguineous marriage	54	44.6
	Non-Consanguineous marriage	52	43
	Don't Know	15	12.4
Opinion on education regarding effect of consanguineous marriage for adolescents	Yes	90	74.4
	No	31	25.6

The overall results of the present study show that the initial knowledge of students on consanguineous marriage and its effect was low. Taking consideration of age and other social aspect very superficial knowledge was given through the PPT presentation. A significant level of knowledge increased among the students after the education program. This result was expected because immediately after intervention students recalling capacity likely to be high. Hence, to assess the retention knowledge among students follow up test was conducted after 2 months. At follow up, results showed that in few categories significant level was observed. It could be because educational program was conducted only once. Hence this result can be attributed to that.

This study demonstrated initially, students had poor knowledge regarding consanguineous marriage (42%) and its types (14%), even though majority (72.7%) of students heard the word consanguinity. Pre-test results also showed that school students had a low level of knowledge about the effects of consanguineous marriage on pregnancy outcomes. 28.9% and 39.7% of students thought that there is no effect on women's and children's health because of consanguineous marriage.

4.1. Genetic disorders

Only 9.1% of students thought that there is a possibility that the consanguineous couple may have diseased offspring higher than a non-consanguineous couple and only fewer numbers (33.9%) of students said they had previous information about the negative consequences of consanguineous marriage. Similar result was reported in Riyadh Study that poor knowledge regarding consanguineous marriage (53.2%) was seen among respondents, however the Study sample were adults and only 25.1% of respondents were students.¹⁰

The present study showed that a Very smaller number of students had knowledge on the association of consanguineous marriage and certain disorder like deafness (14%), sickle cell anaemia (9.9%), congenital heart disease (5.8%), and haemophilia (11.6%). Before intervention, only 41.3% of the students knew about genetic diseases and only 28.9% of the students knew that there is no treatment for genetic disorders. Results of the study conducted in Riyadh showed that majority of respondents (>50%) had no knowledge regarding the association of consanguineous marriage and certain diseases like Congenital anomalies, Congenital heart diseases, Sickle cell anaemia, Thalassemia, haemophilia and genetic disorders. It is also seen that more than half of (68.9%) them had no idea about the possibility of consanguineous couple will be having diseased offspring is more than in the non-consanguineous couple and a smaller number of (16.6%) participant had no previous information about negative consequences of consanguineous marriage.¹² Similarly, Iran's study the

couples who were married in consanguineous marriage had low level of knowledge regarding consanguineous marriage.¹⁰

Current study results indicate that in rural areas lack of education and awareness regarding effects of consanguineous marriage, parent's lower education level, or people in rural have widely accepted the culture of consanguineous marriage could be a factor for the low level of knowledge among adolescents.

The study results indicate the effectiveness of the lecture method for educating children. It was found that the comparison between before and immediately after structured teaching program, there was significant in increased knowledge about consanguineous marriage and its effect on pregnancy outcome among school students ($p < 0.05$). The knowledge regarding the possibility that the consanguineous couple may have diseased offspring higher than non-consanguineous couples was also significant ($p < 0.05$). Possibility of this result could be because there was no periodic gap; the post-test was conducted immediately after the structured teaching program.

Similar results were found in the Turkey study done among three group of high school students, significant increase in the knowledge regarding ill effect of consanguineous marriage on health was seen among intervened high school students.¹¹

At follow-up (after 2 months of intervention), only knowledge regarding consanguineous marriage and its types, consanguineous marriage effect on women's health, and its association with certain disorder items showed significant results ($p < 0.05$). The result of the study indicates that there was the retention of knowledge regarding consanguineous marriage and its types, consanguineous marriage effect on women's health, and its association with a certain disorder, deafness was present. And there was no significance observed in the retention of knowledge regarding the association of consanguineous marriage and congenital heart disease, sickle cell anaemia, haemophilia, and knowledge regarding genetic diseases. The results may indicate that the periodic gap between intervention and follow-up was 2 months or it could be because a structured teaching program was being conducted only once. Hence there is an average knowledge gain among students, if a structured teaching program could have conducted more than one time, probably more significant knowledge gained can be observed among students.

5. Conclusion

The present study showed that school students had low level of knowledge regarding consanguineous marriage and its effects on pregnancy outcome before the educational program. And results also showed that, structured teaching education program about consanguineous marriage increased the students' knowledge about the topic. Hence,

more such educational program should be planned in the schools to educate adolescents about consequences of consanguineous marriage and these educational programs should be performed community level more focusing on problems associated with consanguineous marriage and genetic disorders. However, while performing these educational programs among young adults, should consider all the limits to transfer the knowledge regarding consanguineous marriage and also social aspects.

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7. Conflict of Interest

The authors declare that they have no conflict of interests

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