



EFFECTIVENESS OF A HEALTH EDUCATION MODULE ON KNOWLEDGE REGARDING GENETIC DISORDERS RELATED TO CONSANGUINEOUS MARRIAGE AMONG YOUNG ADULTS IN SELECTED URBAN COMMUNITY OF WESTERN MAHARASHTRA

Community Health Nursing

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ABSTRACT

Consanguineous marriage is associated with increased risk of genetic and congenital disorders. This study aimed to assess the effectiveness of a structured health education module on knowledge regarding genetic disorders related to consanguineous marriage among young adults in selected urban communities of Western Maharashtra. A quantitative pre-experimental one-group pre-test post-test research design was adopted. 100 young adults aged 18–25 years were selected using proportionate stratified random sampling from four wards. Data were collected using a structured knowledge questionnaire (Cronbach's alpha = 0.82, test-retest reliability $r = 0.85$). The health education module was delivered via a 15-minute video session. Post-test was conducted after seven days. The mean knowledge score improved significantly from 7.23 ± 3.16 (pre-test) to 12.25 ± 2.39 (post-test), representing a 69.43% increase. The Wilcoxon signed-rank test confirmed statistical significance ($Z = 7.92$, $p < 0.0001$). Good knowledge rose from 1% to 35.79% following intervention. Occupation showed a significant association with knowledge scores ($p = 0.011$), while age, gender, education, religion, family type, and income did not. The study concluded that the structured health education module was highly effective in improving knowledge regarding genetic disorders related to consanguineous marriage.

KEYWORDS

Consanguineous Marriage, Genetic Disorders, Health Education Module, Young Adults, Knowledge, Genetic Counselling, Western Maharashtra

INTRODUCTION

Marriage is one of the most significant social institutions influencing the biological fabric of society. Consanguineous marriage, defined as a union between individuals related as second cousins or closer, has deep cultural, religious, and social roots in many parts of India, including Western Maharashtra. While such marriages help maintain family ties, they carry increased risks of hereditary disorders due to sharing of common deleterious genes from a shared ancestor.

Scientific evidence establishes that consanguinity elevates the risk of autosomal recessive disorders, congenital anomalies, metabolic syndromes, and other hereditary conditions including thalassemia, sickle cell anemia, hemophilia, and congenital heart disease [1]. Globally, the WHO estimates that one-fifth of the world's population lives in regions where 20–50% of marriages are consanguineous [2]. According to the National Family Health Survey-5 (NFHS-5, 2019–21), 10.8% of ever-married women in India were married to a biological relative [3].

Young adults aged 18–25 years form a critical group for intervention as they stand at the threshold of marital and reproductive choices [4]. Equipping them with scientific knowledge about genetic risks empowers informed decision-making and prevents avoidable genetic morbidity. Despite the availability of scientific evidence, awareness and utilization of genetic counselling services remain limited among the general population. This highlights the importance of structured health education programs as an effective, evidence-based strategy to improve knowledge and modify health-related behaviours.

Bittles and Black (2010) analysed data from 2.14 million individuals across 15 countries and reported nearly 3.5% higher mortality among offspring of first-cousin marriages [5]. Hamamy (2012) highlighted that nearly one billion people worldwide live in communities where 20–50% of marriages are consanguineous, with congenital anomaly risk increasing by 2–3% above baseline [6]. Indian studies from Maharashtra by Bondule et al. (2022) and Kolage et al. (2022) confirmed average awareness levels and effectiveness of structured educational interventions in improving genetic literacy [7,8].

The present study therefore aimed to assess the effectiveness of a structured health education module on knowledge regarding genetic disorders related to consanguineous marriage among young adults in selected urban communities of Western Maharashtra.

OBJECTIVES

1. To assess the level of knowledge regarding genetic disorders related to consanguineous marriage among young adults.

2. To develop a health education module on disorders related to consanguineous marriage.
3. To assess the effectiveness of the health education module by comparing pre-test and post-test knowledge scores.
4. To find the association between selected sociodemographic variables and pre-test knowledge scores.

MATERIALS AND METHODS

Research Design

A quantitative pre-experimental one-group pre-test post-test research design was adopted. This design was appropriate to assess the effectiveness of the health education module by comparing pre-test and post-test knowledge scores of young adults.

Study Setting and Sample

The study was conducted in selected urban communities (Solapur Bazar, Pune Cantonment) of Western Maharashtra. 100 young adults aged 18–25 years, both male and female, unmarried and permanent residents of the selected urban community, were enrolled using proportionate stratified random sampling across four wards: Ward I ($n=45$), Ward II ($n=33$), Ward III ($n=22$), and Ward IV ($n=10$). Within each stratum, simple random sampling was applied.

Data Collection Tool

A structured knowledge questionnaire comprising Section A (sociodemographic data) and Section B (20 multiple-choice questions on genetic disorders, consanguineous marriage, causes, risk factors, inheritance patterns, prevention, and premarital genetic counselling) was used. Each correct answer carried one mark. Internal consistency was established using Cronbach's alpha ($\alpha = 0.82$) and test-retest reliability ($r = 0.85$). Content Validity Index at scale level (S-CVI) was 0.97.

Health Education Module

A structured health education module was developed after extensive literature review and expert consultation. It was delivered as a 15-minute video session covering: meaning and examples of consanguineous marriage; genetic concepts including carrier status and inheritance patterns; common genetic disorders (thalassemia, sickle cell anemia, cystic fibrosis, phenylketonuria, intellectual disability, congenital heart disease, muscular dystrophy, hearing difficulties); and preventive measures including genetic counselling and informed marital decisions. Content validity was established by experts in community health nursing, obstetrics and gynecology, pediatrics, and genetics.

Data Collection Procedure

Ethical clearance was obtained from the Institutional Ethical

Committee (IEC), AFMC, and written permission from the CEO, Pune Cantonment Board. Informed written consent was obtained from all participants. A pre-test was conducted to assess baseline knowledge, followed by administration of the health education module on the same day. The post-test was conducted after 7 days using the same questionnaire via face-to-face interview. Data collection lasted four weeks.

Data Analysis

Descriptive statistics (frequency, percentage, mean, standard deviation) described sociodemographic variables and knowledge scores. The Wilcoxon signed-rank test assessed effectiveness of the intervention. Mann-Whitney U test and ANOVA examined associations between knowledge scores and selected sociodemographic variables. Knowledge scores were categorised as: Good (15–20), Average (8–14), and Poor (0–7).

RESULTS
Sociodemographic Profile

The majority of participants were in the 18–19 years age group (38%), predominantly female (77%), graduates (73%), and students (61%). Most belonged to nuclear families (83%) and were Hindu (80%). The majority (88%) reported no prior awareness of genetic disorders related to consanguineous marriage; among the aware, educational institutions were the primary source of information (41.67%).

Table 1: Sociodemographic Profile of Participants (n=100)

Parameter	Category	n (%)
Age (Years)	18–19	38 (38%)
	20–21	17 (17%)
	22–23	12 (12%)
	24–25	33 (33%)
Gender	Male	23 (23%)
	Female	77 (77%)
Education	Secondary	1 (1%)
	Higher Secondary	22 (22%)
	Graduate	73 (73%)
	Post Graduate	4 (4%)
Occupation	Student	61 (61%)
	Employed	37 (37%)
	Unemployed	2 (2%)
Type of Family	Nuclear	83 (83%)
	Joint	17 (17%)
Religion	Hindu	80 (80%)
	Muslim	6 (6%)
	Christian	14 (14%)

Pre-test and Post-test Knowledge Scores

Pre-test results showed that 85% of participants had average knowledge (score 7–13), 14% had poor knowledge (0–6), and only 1% had good knowledge (14–20). Following the health education intervention, among the 95 participants who completed the post-test (5 lost to follow-up), poor knowledge reduced to 2.10%, average knowledge was 62.11%, and good knowledge improved significantly to 35.79%.

Table 2: Distribution of Pre-test and Post-test Knowledge Scores (n=100)

Knowledge Level	Pre-test n (%)	Post-test n (%)
Poor (0–7)	14 (14%)	2 (2.10%)
Average (8–14)	85 (85%)	59 (62.11%)
Good (15–20)	1 (1%)	34 (35.79%)
Total	100 (100%)	95 (100%)*

* 5 participants lost to follow-up

Table 3: Comparison of Mean Pre-test and Post-test Knowledge Scores

Parameter	Pre-test Mean ± SD	Post-test Mean ± SD	Z Value	p Value
Knowledge Score	7.23 ± 3.16	12.25 ± 2.39	7.92	< 0.0001

The mean knowledge score increased from 7.23 ± 3.16 to 12.25 ± 2.39 — a statistically significant improvement (Z = 7.92, p < 0.0001) with a percentage change of 69.43%, confirming the effectiveness of the health education module. The null hypothesis H₀₁ was rejected.

Association of Sociodemographic Variables with Pre-test Knowledge

Table 4: Association between Sociodemographic Variables and Pre-test Knowledge Score

Variable	Test	Value	p Value	Significance
Age	ANOVA	F=1.09	0.36	NS
Gender	Mann-Whitney	Z=0.47	0.64	NS
Education	Mann-Whitney	Z=1.13	0.26	NS
Occupation	ANOVA	F=4.73	0.011	S*
Monthly Income	ANOVA	F=2.48	0.066	NS
Type of Family	Mann-Whitney	Z=0.17	0.87	NS
Religion	ANOVA	F=0.83	0.44	NS

S* = Significant (p < 0.05)

Occupation showed a statistically significant association with pre-test knowledge scores (F = 4.73, p = 0.011). Employed participants demonstrated higher mean knowledge (7.89 ± 3.54) compared to students (6.85 ± 2.79) and unemployed individuals (1.50 ± 0.71). All other sociodemographic variables showed no significant association with baseline knowledge.

DISCUSSION

The present study demonstrated limited baseline awareness regarding genetic disorders related to consanguineous marriage, with 88% of participants reporting no prior knowledge. This aligns with Sasi et al. (2024), who found only 34% awareness among married women in Northern Karnataka [9], and Palaniammal (2024), who noted moderate awareness but poor preventive practices in rural Tamil Nadu [10]. However, comparatively higher baseline awareness was reported by Yousef et al. (2024) in Saudi Arabia and Chin and Tham (2020) in Malaysia, which may be attributed to differences in educational access, regional context, and cultural background [11,12].

The health education module produced a significant improvement in knowledge, with mean scores increasing by 69.43% (p < 0.0001). This is consistent with Aswitha et al. (2025), who reported a rise in adequate knowledge from 1.7% to 66.7% following a structured teaching programme [13]; Veena et al. (2025), who found knowledge improvement from 37.52% to 82.28% using a structured teaching programme among pre-adults [14]; and Kolage et al. (2022), who documented improvement from 42.3% to 76.6% after structured intervention among undergraduates in Ahmednagar, Maharashtra [8]. Laxmi et al. (2020) similarly confirmed the effectiveness of health education on consanguinity-related genetic awareness among college students in Delhi [15].

The significant association between occupation and knowledge scores (p = 0.011) in the present study is consistent with findings suggesting that occupational exposure to health-related information enhances awareness. In contrast, the absence of significant association with age, gender, education, religion, family type, and income is consistent with findings from Pathan and Sonawane (2019) and Laxmi et al. (2020), who also reported no significant association between demographic variables and baseline knowledge in similar interventional studies [16,17].

CONCLUSION

The structured health education module was highly effective in improving knowledge regarding genetic disorders related to consanguineous marriage among young adults. The significant pre-test to post-test improvement (69.43%, p < 0.0001) demonstrates that community-based video-assisted educational interventions are practical, engaging, and impactful tools for promoting genetic literacy. The findings highlight the need for early health education, integration of genetic awareness into academic curricula and premarital counselling programs, and community health nursing initiatives. Larger multicentric and longitudinal studies are recommended to evaluate long-term retention and behavioural outcomes.

IMPLICATIONS

Genetic health education should be integrated into undergraduate nursing and health science curricula. Community health nurses can conduct awareness programs in educational institutions and urban communities in collaboration with ASHA workers. The health education module may be adapted for premarital counselling sessions and school health programs. Policymakers may use these findings to

design region-specific, culturally appropriate educational programs targeting hereditary disorder prevention.

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