Effectiveness of Pre-Operative Education on Post-Operative Anxiety Outcome in Parents Having Children Undergoing Cardiac Surgeries in Peshawar

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Abstract

Around the globe, 1.3 million babies are born with congenital heart defects (CHD); among them, 70% of the patients go for medical or surgical intervention. Parents of children undergoing any intervention usually experience psychological stress and anxiety. Preoperative education can improve patient outcomes and satisfaction with surgical procedures. Unfortunately, preoperative education is not a common practice in Pakistan. In order to decrease parental anxiety, they should be properly informed about upcoming surgical procedure of their child. To evaluate the effectiveness of pre-operative education on post-operative anxiety outcome in parents having children undergoing cardiac surgeries in Peshawar. quantitative study was conducted in Peshawar, Pakistan, on the parents of children undergoing cardiac surgeries. Data was collected from 50 parents using the State Anxiety Inventory pre- and postoperatively, which was composed of 20 questions. All the participants were included in the study following convenient sampling. The mean scores of postoperative anxieties (μ= 29.3) were much lesser than preoperative anxiety (μ= 69.7); it implied that preoperative education had a positive impact on reducing anxiety postoperatively. The results showed that almost two-thirds (62%) of the participants were female, while only 38% were male. Two-fifths (40.0%) of the parents were literate, (60%) of the participants were employed, and more than four scores (82.0%) had lower income levels of less than 50,000 PKR a month. Preoperative education was having a positive impact on reducing post-operative anxiety. Parents could be facilitated by extending educational support through meaningful programs and to ensure speedy recovery of both children and their parents.

Keywords: Effect, pre-operative education, parents, children, cardiac surgeries, post-operative anxiety

Introduction

The findings of the study concluded that preoperative education had a positive impact on reducing post-operative anxiety. Parents could be facilitated by extending educational support through meaningful programs to ensure children's and their parents' speedy recovery.[1] is caused by Different conttributing factorsin Cardiovascular disease like tobacco smoking, hypertension, processed food, low quality food, and oily food, but it can be prevented through

proper treatment. Heart diseases in children have two different categories: one is the diseases present at the time of birth, which are called congenital heart diseases, and the other is the diseases developed in the later phase of life, such as rheumatic heart diseases, cardiomyopathies, pericardial diseases, and others. Heart diseases affecting children are categorized as first, by birth heart defects, which are called congenital heart diseases, and second are the diseases that emerge in the later stages of life, like rheumatic heart diseases, cardiomyopathies, pericardial diseases, and others.[2] The most common of them are congenital heart diseases, which are considered congenital disabilities and account for approximately one-third of total congenital disabilities. However, with innovations and advances in pediatric cardiology and cardiac surgery, it is now relatively more straightforward to repair or palliate most congenital heart diseases, despite their high complexity level.[3] Many factors contribute to eventually determining the possibility of survival of a newborn suffering from CHD, including the types of medical facilities he receives and where he lives. Survival percentage can reach 95 percent if the baby is diagnosed accurately and timely, given access to screening, and provided quality treatment. These babies generally survive up to adulthood with better health outcomes. It is more common in in poor income countries like Pakistan, with approximately 80% of the total healthcare burden.[4] Among those at the baseline of this illness, individuals suffering from cardiovascular diseases are more likely to develop anxiety as an additional disease, and this tendency is also common in people recovering from cardiac interventions..[5]

According to reports, the rate of CDH during birth ranges between 8 and 12 percent per 1000 live births. The prevalence rate of this disease differs between regions, with Asia having the highest prevalence at 9.3 percent per 1000 live births and Africa having the lowest at 1.9 percent per 1000 live births. The reason for the low prevalence of CHD in Africa is attributed to a lack of credible data, limited access to health care, the lack of trained health experts, and the rapid death caused by the disease.[12] Experts believe that the high birth rate of CHD in poorer nations like Pakistan is a result of higher rates of maternal infections such as rubella and a higher risk of infection by teratogens. The development of congenital disabilities is significantly influenced by altitude. As altitude increases, the prevalence of CHD increases significantly, and the risk can be up to five times higher than the usual occurrence. Studies conducted worldwide show almost uniform prevalence rates for CHD internationally, including studies conducted in pakistan.[13] more than 5000 pediatric cardiac surgery procedures are performed in the united kingdom every year and a massive improvement in early survival rate has been witnessed since a comprehensive national audit commenced.[12,13] according to the vast majority of stakeholders, such as clinicians, commissioners, and users, while early survival rates have immense importance in suggesting safety, it also emphasizes the necessity of exploring more viable and practical measures for better outcomes in this complex field of practice. historically, research has been focused on measuring, understanding, and minimizing preoperative mortality for pediatric cardiac surgery without investigating surgical morbidities.[14]

Methodology
Introduction
The general procedure for conducting research is covered in this chapter. This study employed a quasi-experimental study design to evaluate the effect of preoperative education on postoperative anxiety. Study duration, sample size, and sampling technique were covered in this chapter. This chapter also covered inclusion and exclusion criteria. Procedures for gathering data and analyzing it were also briefly covered.

Study Design
A quasi-experimental study design was used for this study. Similar to an actual experiment, a quasi-experimental study aimed to establish a cause-and-effect relationship between an independent and dependent variable.

Study Duration
The time duration for the current study was approximately 6 months following approval of GC and AS&RB. Quasi-experimental research design was the most relevant used research approach to evaluate the outcomes of pre and post-operative anxiety levels among patients to carry out the current study.

Sample Size
The sample size (n=50)of any study is the total number of observations used to determine the estimations of the studied population.

Sampling Technique
The convenient sampling technique as one of the types of non-probability sampling was used to take the sample in the study conducted.

Sample Selection
Inclusion Criteria
- Parents who had children of 16 or less than 16 years of age and they advised to go for cardiac surgery were the part of research. Parents with Under 18 years children were selected for data collection.
- Children scheduled to undergo heart surgery in the next 24 hours were included.
- Parents who had no prior experience of hospitalization of their children in ICU

Exclusion Criteria
- Cognitively impaired Parents were excluded from this study.
- Children with other diseases were not a part of this research. Only heart patients dealing with anxiety disorders were a part of this research.

Data Collection Procedure
The preoperative patients and their parents were identified 24 hours before surgery. They were assessed for their pre-anxiety state in an educational session, and a pamphlet was given to them which contained information about their child illness. The preoperative education consisted of oral education, which further included a detail of Pre and postoperative care, length of Hospital stay, quality of Medical care, possible complications and phase of Rehabilitation. After the surgical procedure, the anxiety level was measured by the State Anxiety Tool. An adopted and structured state inventory contains 20 items, which had been translated into Urdu so that the participants understood it, living in Pakistan, particularly Peshawar.

Data Analysis Procedure
Data was analyzed statistically with the help of SPPS version 25. Fundamental statistical analysis was conducted by calculating frequencies, mean and standard deviations. The result was summarized and presented as tables and graphs. SPSS version 25 was used to analyze data, followed by other procedures to conduct comprehensive data research in tables and charts. In the first stage, the data was sorted and organized for analysis.

Ethical Considerations
Ethical approval was obtained from the Ethical Review Committee (KMU) of Peshawar. Formal approval was taken from hospital director. Before data collection a brief introduction was given to the respondents about the purpose of the research. It was explained that there was no risk involved in the study conducted. Research information and purpose were fully disclosed to the participants before to take the written and voluntary consent. After having an agreement, a written consent was taken from the study participants(parents).

Results and Analysis
Socio-Demographic Analysis

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Gender of the Study Participants

A total 50 parents participated in the study. Among which almost two-third (62%) were female and almost two-fifth (38%) of the participants were male as shown in figure 4.1.
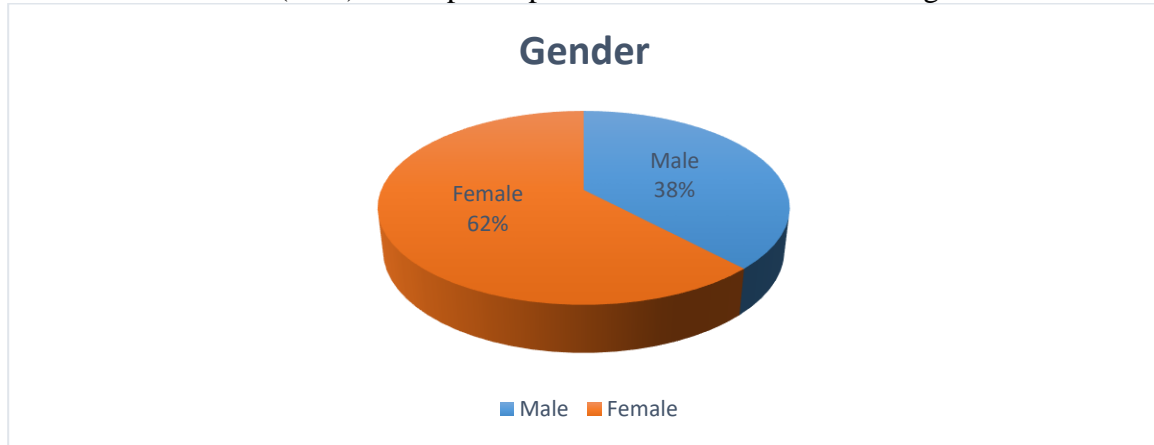
Fig 4.1: Gender Distribution

Age of the Study Participants

As age was continuous variable in the study therefore mean $\pm$ standard deviation were calculated to measure it as reflected in table 4.1. The minimum age was 19 while the highest age was observed as 37 among the participants. The study participant's mean age was 30.12, with a standard deviation of ± 6.47 as shown in table 4.1

Table 4.1 Age of Study Participants

Age of the Study Participants				
Maximum Age	**Minimum Age**	**Range**	**Mean**	**Standard Deviation**
37	19	18	30.12	6.47

Table 4.1 Age of Study Participants

Education Status of the Study Participants

Among the participants, 60% were identified as literate, while the remaining 40% were categorized as illiterate based on the collected data as shown in figure 4.2
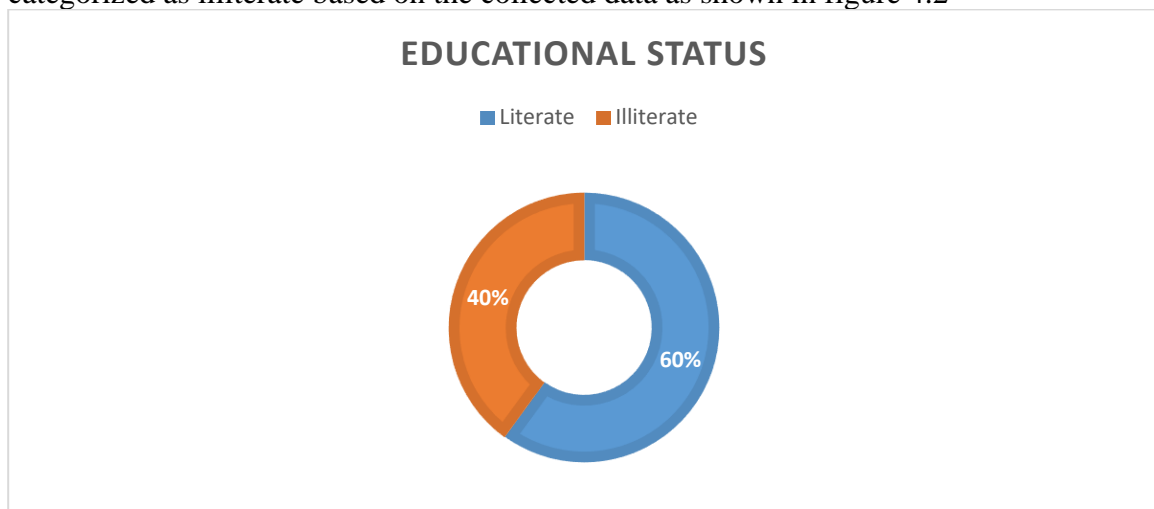
Fig 4.2: Educational Status

Employment Status of the Study Participants

Among the participants majority (62%) parents were employed either in the form of salary or having their own business, while remaining (38%) were unemployed based on the collected data as shown in figure 4.3.
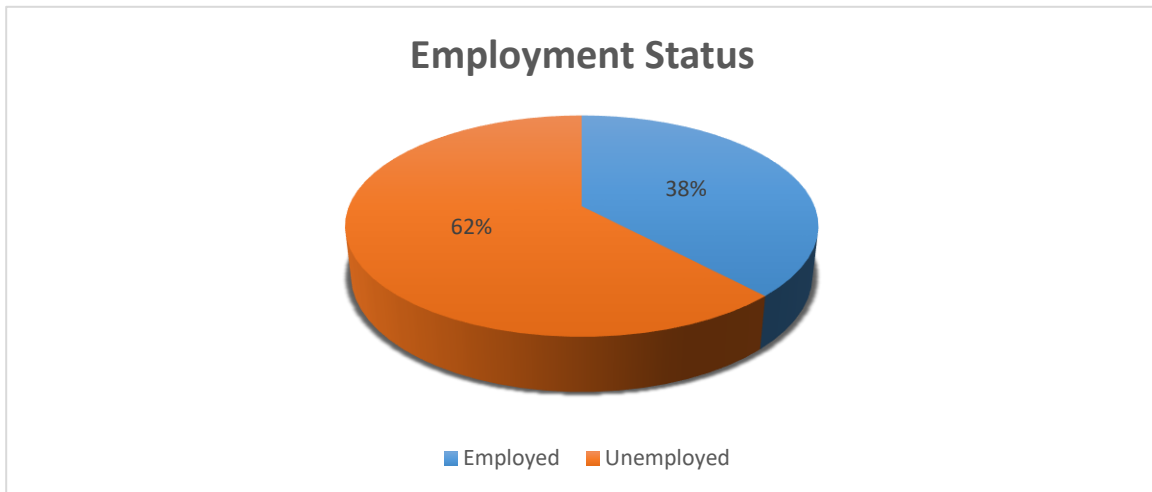
Fig 4.3: Employment Status

Financial Status of the Study Participants

Based on the income, the participants were allocated into three different categories: 30000 to <40000, 40000 to <50000 and 50000 and above, in ascending order. As shown in figure 4.4, 22 of the parents in total had incomes under Rs. 40,000/-, while 19 had incomes between PKR 40,000 and PKR 50,000, and 9 of the participants had incomes more than PKR 50,000.

Fig 4.4: Income Level

Table 4.2 Socio-Demographic Overall Analysis

Gender of the Study Participants		
Gender	**Frequency**	**Percentage**
Male	19	38%
Female	31	62%

Age of the Study Participants				
	Minimum age	**Maximum age**	**S.D**	**Mean Score**
Age	19.00	37.00	6.47330	30.1200

Education Status of the Study Participants			
Categories	Literate	30	60.0 %
	Illiterate	20	40.0%
Employment Status			
Categories	Employed	19	38.0%
	Unemployed	31	62.0%
Financial Status			
Categories	30000 to <40000	22	44.0%
	40000 to <50000	19	38.0%
	50000 and above	9	18.0%

Table 4.2 Socio-Demographic Overall Analysis

Table 4.2 summarizes the analysis regarding all the selected demographic variables including Gender, educational status, employment, and income status of the participants. Educational status was categorized in two groups including literate and illiterate. The study participants were analyzed based on various variables such as gender, educational status, employment status, and income. The results showed that 38.0% of the participants were male, 62.0% were female, 40.0% were literate, 60.0% were employed, and 82.0% had an income below 50,000 PKR.

Association of Demographics with State Anxiety in Post Phase of Intervention

The below table 4.3 presents a comprehensive view of the state of anxiety post data, segmented by three crucial demographic variables: gender, education, and employment status. Notably, females exhibit a higher mean anxiety score (M = 71.3226) compared to males (M = 66.2105), indicating a potential gender-related disparity. Among the literate individuals, a relatively high mean anxiety score (M = 31.7500) coupled with a substantial standard deviation (SD = 7.58027) suggests considerable variability in anxiety levels within this group. Conversely, illiterate individuals have a lower mean (M = 28.3333) and a smaller standard deviation (SD = 2.97499), implying more uniform anxiety scores among the illiterate subsets. In terms of employment status, employed individuals have a higher mean anxiety score (M = 31.6842) with significant variability (SD = 7.78212), while the unemployed group displayed a lower mean (M = 28.4839) and a smaller standard deviation (SD = 3.04271). These findings underscore potential nuances in anxiety levels based on demographic factors, providing valuable insights for further exploration and analysis.

Table 4.3 Post Phase Data Analysis and its Association with Demographics

Variables	N	Mean	SD	SE Mean
Male	19	66.2105	.41885	.09609
Female	31	71.3226	3.77171	.67742
Literate	20	31.7500	7.58027	1.69500
Illiterate	30	28.3333	2.97499	.54316
Employed	19	31.6842	7.78212	1.78534
Un-employed	31	28.4839	3.04271	.54649

SD = Standard Deviation, SE= Standard Error

Independent Sample T-test on Post Data (State of Anxiety)

The table 4.4 provides insights from three independent samples t-tests, each assessing the variations in state anxiety scores based on different demographic variables. Initially, a significant gender difference emerged, where females exhibited notably higher state anxiety scores than males (t = -5.86, df = 48, p < 0.001), with a 95% confidence interval for the mean difference ranging from -6.865 to -3.359. Subsequently, educational levels unveil a significant impact, revealing that literate individuals experience elevated anxiety levels compared to their illiterate counterparts (t = 2.23, df = 48, p = 0.030). The corresponding 95% confidence interval for the mean difference spans from 0.340 to 6.493. Lastly, employment status indicates a

significant difference, with employed individuals reporting higher state anxiety scores than their unemployed counterparts (t = 2.06, df = 48, p = 0.045), and the 95% confidence interval for the mean difference ranged from 0.073 to 6.328. These outcomes underscore the nuanced influence of gender, education, and employment on state anxiety, providing valuable insights supported by robust statistical measures and confidence intervals. The results of Levene's test for equality of variance was reported for three independent sample t-tests conducted on different demographic variables: gender, education, and employment status in relation to state anxiety post data. The non-significant p-values for each variable (0.235 for gender, 0.130 for education, and 0.114 for employment) indicated that there was no significant departure from the assumption of equal variances. Therefore, the variances of state anxiety scores are deemed comparable between the subgroups within each demographic category. This implied that the conditions necessary for the validity of the subsequent independent sample t-tests, which assume equal variances, were satisfied. Researchers can thus proceed with confidence in interpreting the results of these t-tests without concerns about unequal variances compromising the validity of their findings.

Table 4.4 Independent Sample T-test on State of Anxiety Post Data

State Anxiety (Post Data)	F (P-Values)	t (df)	P-Value	MD	SED	CI 95%	
						Lower	Upper
Gender	1.45(0.235)	-5.86(48)	.000	-5.112	0.8720	-6.865	-3.359
Education	2.38(0.130)	2.23(48)	.030	3.417	1.5300	0.340	6.493
Employment	2.59(0.114)	2.06(48)	.045	3.200	1.5553	0.073	6.328

MD=Mean Differences, SED=standard Error of Differences, CI=Confidence Interval

In conclusion, the research findings suggest that preoperative education was an effective intervention in reducing post-operative anxiety outcomes in parents having children undergoing cardiac surgeries in Peshawar. This implies that implementing such educational programs may help to improve the overall well-being and recovery of both the children and their parents during and after the surgical procedure.

Discussion, Conclusion and Recommendations
Study Findings and Comparison with Previous Studies
These findings support the effectiveness of preoperative education in reducing parents' anxiety about their children's upcoming cardiac surgery. The substantial drop in mean state anxiety scores after the education intervention indicates that it had a strong positive impact on alleviating parents' worries and fears. This aligns with previous research demonstrating the benefits of preoperative education and preparation in improving psychosocial outcomes for parents and families in the pediatric surgery setting.[131] The results of the data analysis showed that there was a significant difference in preoperative and postoperative state anxiety scores among parents of children undergoing cardiac surgery, with mean state anxiety decreasing from 69.38 preoperatively to 29.70postoperatively. The paired t-test found this difference of 39.68 points to be highly statistically significant (p<0.001). In conclusion, this study evidently demonstrates that implementing a multifaceted preoperative education intervention for parents of children who require cardiac surgery leads to significantly lower state anxiety compared to baseline. Preparing parents for their children's surgery and hospitalization through informational resources, emotional support, and environmental orientation substantially alleviates anxiety levels. Literature showed that preoperative education was not limited to providing information and explanations about the process of surgery but also works as an interactive process offering psychological support and assurance to the patients of surgery. For patients it was critical to know how the surgical process works and what should be expected because this positively affects their mental and physical health and improves the outcome of surgery by helping them understand the role of individual care and fighting the misinformation regarding surgery.[128] Previous research showed that patients who were more vulnerable against

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anxiety can seek preoperative education to overcome the psychological effects of surgery. The Pre operative educational needs of all the patients were not the same but the majority of surgical patients preferred to achieve the necessary information during the preoperative period.[125] Poor economic condition was associated with degenerating anxiety disorders. Heart surgery patients' anxiety disorders are significantly related to financial costs in developing countries and poor quality of life for the affected children and parents.[134] The positive correlation coefficient of 0.159 suggested a weak positive linear relationship between Age and State of Anxiety Post Data. However, since the p-value is 0.270, which exceeds the 0.05 threshold, we failed to reject the null hypothesis. This implied that the observed correlation is not statistically significant, and we cannot confidently conclude that there is a meaningful association between age and state anxiety scores in the post data of the study.

Conclusion
Congenital heart diseases have the highest prevalence rate, which are considered congenital disabilities and comprised one-third of total congenital disabilities. Multiple factors determine the chances of survival of a newborn suffering from CHD, including the quality of health services and location. Early and accurate diagnosis and ideal treatment can dramatically increase the survival rate by 95 percent. Such babies are likely to survive until adulthood with better health outcomes. Studies found a strong association between anxiety and cardiac conditions or mortality in individuals with a history of coronary heart disease and among those at baseline of this disease. Patients dealing with cardiovascular diseases also develop anxiety as a secondary health condition, and this also affects individuals undergoing the recovery phase from cardiac interventions. Acute coronary syndrome can result in further cardiac complications after admission. Few studies have been conducted to investigate anxiety as a health hazard, which also limited the knowledge of healthcare providers on the subject. The various educational components included in the intervention, such as procedural information, tours of hospital facilities, coping techniques, and question/answer sessions, likely each contributed to lowering anxiety. Allowing parents to learn details about the surgery and recovery, engage in discussions, and familiarize themselves with the environment appears to provide reassurance and give them greater confidence in managing their children's care.

Data was statistically analyzed with the help of SPPS version 25. Fundamental statistical analysis was conducted by calculating frequencies, mean, and standard deviations. The findings are demonstrated in the form of tables and graphs. For the analysis of data, SPSS 25 version will be used along with other effective methods to carry out sophisticated data research in tables and charts. Data is sorted and arranged, which is considered critical for data assessment with descriptive statistics, a data set overview is obtained, and the key traits are summarized. In most cases, descriptive statistics are used for quantitative data analysis and can be conveniently performed in Excel. For data analysis, Excel is used as a statistical analysis software. Especially, in this case, the quality of knowledge has been analyzed quantitatively. Different statistical techniques are used for data processing and presenting data in the form of tables including frequencies and response percentages for every category of viewpoint. Data has been analyzed by applying descriptive and inferential statistics. Frequencies and percentage will be calculated for categorical variables. Calculation of mean and standard deviation have been done for continuous variables. In descriptive analysis, the frequencies, means, and standard deviation are calculated and in inferential analysis, regression and correlation tests have been applied.

The level of anxiety is well demonstrated with the help of a descriptive table that segments three important demographic variables namely sex, education, and employment status. The study highlighted that females show a higher mean anxiety score (M= 71.3226) compared to males (M=66.2105), which suggests a major gender-based disparity. Among the literate people, a comparatively high mean score (M=31.7500) paired with a significant standard deviation (SD= 7.58027) which shows varying anxiety levels within this group. On the other

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hand, illiterate individuals have a lower mean (M= 28.3333) and a smaller standard deviation (SD= 2.97499), which indicates more uniform anxiety scores among the illiterate subset. With respect to employment status, individuals with an occupation have a higher mean anxiety score (M=31.6842) with substantial variability (SD= 7.78212), while individuals in the unemployment category show a lower mean (M= 28.4839) and a smaller standard deviation (SD= 3.04271). On the basis of these findings, nuances in anxiety levels can be shown which are determined by demographic factors and provide useful information for further research.

Recommendations

- Generally, the health professionals transfer information to guide patients about the events that they will experience during the entire surgical process and the experts have classified this information into 3 categories namely, procedural, sensory and coping information.
- Standard health care facilities can dramatically reduce the risk of premature deaths originating from cardiovascular disease.
- Sufficient funding for the health care sector can improve the ability to introduce modifications and preventive strategies for ensuring the better health of children suffering from CHD.
- Preoperative education should be considered an integral, standard element of family-centered care for children undergoing major surgery. Finding ways to further strengthen education programs may produce even greater reductions in parent anxiety. Additional research is also needed to determine which specific educational strategies have the greatest impact.
- Routine provision of such family-centered education could improve psychosocial outcomes and satisfaction with the pediatric cardiac surgery experience. Further research optimizing educational components and formats warrants consideration as hospitals aim to fully support parents throughout the surgical journey.

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