

Effect of Instructional Guidelines regarding Early Ambulation on Knowledge, Attitude, and Anxiety among Mothers of Children with Congenital Heart Diseases post Cardiac Catheterization

1Maha Elsayed Elaraby, 2OhoudYoussef El-Sheikh, 3Manal Fahmy Hussein, 4Fathia El-Sayed El-Ghadban

1Lecturer of Pediatric Nursing, Faculty of Nursing, Tanta University, Egypt

2Assistant Professor of Pediatric Nursing, Faculty of Nursing, Mansoura University

3Lecturer of Pediatric Nursing, Faculty of Nursing, Sohag University, Egypt

4Assistant Professor, Pediatric Nursing, Faculty of Nursing, Fayoum University

Abstract

The whole family experiences stress when a child is diagnosed with heart disease. Families are currently concerned about their child's health. During this period, nurses are crucial in informing parents or other caregivers about the child's condition, the procedure, and the care provided before and after the procedure. **This study aimed to** evaluate the effect of instructional guidelines regarding early ambulation on knowledge, attitude, and anxiety among mothers of children with congenital heart diseases post-cardiac catheterization. **Research design:** A quasi-experimental research design was used to achieve the aim of this study. **Setting:** This study was conducted at the Department of Pediatric Cardiology at Sohag University. **Subjects:** A convenience sample of 50 mothers of children with congenital heart disease was enrolled in the study after cardiac catheterization. **Tolls of data collection:** **Tool I** Interviewing Questionnaire Sheet **Tool (II)** Nurses' Attitude toward Early Ambulation **Tool (III):** The state-trait anxiety inventory. **Results:** The results showed a positive and significant relationship between mothers' knowledge scores and their performance after one month of implementing the educational guidelines. There were highly significant improvements in mothers' knowledge and attitude regarding early ambulation post-instructional guidelines implementation ($P=0.001$). Statistically significant differences and reductions were detected between anxiety mean scores after one month of implementing the instructional guidelines. **Conclusion:** The introduction of instructional guidelines for early ambulation improved the knowledge and attitude of mothers of children with congenital heart disease, as well as their anxiety levels. **Recommendations:** Instructional guidelines for mothers of children with congenital heart disease should be conducted, discussed, and integrated into rehabilitation programs.

Keywords: Anxiety, Early ambulation, Cardiac catheterization, Congenital heart diseases, Knowledge and attitude.

Introduction:

Congenital heart disease (CHD) is a prevalent congenital heart and great vascular disease in children. CHD is divided into two types: cyanotic and (A)-cyanotic lesions. Pediatric outcomes have improved due to the greater availability of pediatric echocardiograms (ECHO) and skill in the surgical and percutaneous management of children with CHD. Furthermore, children with CHD are surviving longer because of improved healthcare. Open heart surgery, cardiopulmonary bypass, and cardiac catheterization have all been available

treatments in the last two decades (O'Byrne et al., 2020).

Approximately 9 people in 1000 are born with these abnormalities. Incidence of significant CHD is 8 per 1000 live births, this does not include minor defects, which often present later in childhood or adult life (e.g. bicuspid aortic valves occur in 1/100 of the population). The incidence of congenital heart disease among Egyptian children has been estimated to be 5-6/1000 live birth (Bellsham-Revell & Burch, 2018). CHD alone accounts for almost 10% of infant deaths (Wu et al., 2020). Although the exact

cause of CHD is unknown, most cases are influenced by genetics and family history. Down syndrome and other chromosomal issues (Trisomy 21 and Turner syndrome) affect about 5–8% of newborns with congenital heart disease. Fetal and maternal infections including German measles, teratogenic drugs, alcohol use by the mother, radiation exposure during the first trimester of pregnancy, fetal hypoxia, and birth asphyxia are other factors that have been related to an increased risk of congenital heart disease (Wang et al., 2019).

Pediatric cardiology is a specialization that has seen fast breakthroughs in the detection and treatment of CHDs in recent decades, including echocardiograms, electrocardiograms, cardiac catheterization, and cardiovascular magnetic resonance imaging. Pediatric cardiac catheterization is a very helpful technique for the identification and treatment of heart abnormalities (Moustafa et al., 2022).

Even though children are the most vulnerable group in society, parents or other caregivers may find it frightening and stressful to have their child admitted to the hospital for CHD diagnostic and intervention procedures because they are unaware of the condition and the investigative procedures that must be carried out there. They are also worried about the care they will receive before and after surgery, both at home and in the hospital, to prevent problems (Graziano Eda S, Bianchi, 2024).

Early ambulation is a nursing intervention that encourages physical exercise, enhances independence during or after surgery, and mitigates the effects of inactivity (Baqal & Mahmood, 2022). Cardiology is a specialized and difficult subject, thus providing high-quality nursing care to children in these settings necessitates professional knowledge and skills. Early ambulation following CC has recently been an intriguing and challenging topic for nurses. This is a nursing practice that is commonly used in intensive care units. As a result, primary care nurses must provide

early intervention for pediatric cardiac care (Bulut and Calik, 2020).

Nurses play an important role in parent education, and various studies have shown that they are crucial in detecting caregivers' educational and training needs. Parental education minimizes the risk of problems during postoperative care and disease treatment (Mannarino et al., 2020).

To provide parents and their children with congenital heart disease with a thorough and scientifically supported educational intervention, pediatric nurses are essential (United Nations Development Program, 2023). Nurses play a crucial role in educating mothers about their children's condition, and early detection, supportive management, and counseling are crucial in reducing the anxiety associated with the diagnosis and enhancing the well-being of the child (Sjostrom-Strand & Terp, 2019).

Significance of the study:

Cardiac catheterization (CC) is a significant event that is widely recognized as a stressful operation for children and families. The global prevalence of CHDs is 9.410 per 1000. It indicated a possible rise over the previous fifteen years (Liu et al., 2019). At the national level, Egypt reported 796 instances (79.2%) were (A)-cyanotic and 209 cases (20.8%) of cyanotic CHD (Al-Fahham & Ali, 2021). CC nursing care standards are a crucial concern for all healthcare teams in terms of providing high-quality care to pediatric patients and reducing post-CC problems. Few studies on nursing care, particularly early ambulation of children after cardiac catheterization, have yet been conducted in Egypt.

The current study investigated the effect of enhancing mothers' knowledge, attitude, and anxiety of children with congenital heart abnormalities after cardiac catheterization. The new study's findings will improve mothers' understanding of how to care for children after cardiac catheterization. This study has two advantages for mothers' in the CC specialization and pediatrics doing CC. Furthermore, it provides evidence-based data

for post-CC treatment, assisting in the prediction and prevention of post-CC problems while reducing hospital resource consumption.

Research hypothesis:

- H1:** Mothers' knowledge mean scores regarding **early ambulation** will be improved post-instructional guidelines implementation than pre-implementation.
- H2:** Mothers' attitude mean scores regarding **early ambulation** will be improved post-instructional guidelines implementation than pre-implementation.
- H3:** Mothers' anxiety mean scores will be reduced post-instructional guidelines implementation than pre-implementation.

Aim of the study:

To evaluate the effect of instructional guidelines regarding early ambulation on knowledge, attitude, and anxiety among mothers of children with congenital heart diseases post-cardiac catheterization through:

- Assessing mothers' knowledge regarding early ambulation.
- Assessing mothers' attitudes regarding early ambulation.
- Assessing anxiety level among mothers of children with congenital heart diseases post cardiac catheterization.
- Designing and implementing the instructional guidelines regarding early ambulation concerning mothers' needs.
- Determining the effect of instructional guidelines regarding early ambulation on knowledge, attitude, and anxiety among mothers of children with congenital heart diseases post-cardiac catheterization

Subjects and Method

Research design:

A quasi-experimental research design was used to achieve the aim of this study. This design is important to the nature of the study issue, subjects observed on pre and

post-manipulations (Creswell, 2012).

Setting:

This study was conducted at the Department of Pediatric Cardiology at Sohag University.

Subjects:

A convenience sample of 50 mothers of children with congenital heart disease was enrolled in the study after cardiac catheterization within six months from the previously mentioned setting.

Data collection tools:

Three instruments were used as follows:

Tool (I) Interviewing Questionnaire Sheet: The researcher developed it after reviewing relevant literature (Baqal & Mahmood, 2022; Al-Fahham & Ali, 2021; Bulut and Calik, 2020) to assess mothers' knowledge of early ambulation. It is written in Arabic language and is divided into the following parts:

Part I: Characteristics of the **studied mothers** which include age, education, residence, and previous training on early ambulation.

Part II: Characteristics of the **children** included age, gender, and child's age when the disease was discovered.

Part III: Mothers' knowledge regarding early ambulation (**pre/post**): It consisted of thirty-two (32) questions designed to assess mothers' knowledge of early ambulation, which encompassed three primary sections of knowledge. The **first section** covered congenital heart defects, including meaning, causes, symptoms, types, investigations, complications, treatment, and prevention. The **second section** focused on cardiac catheterization, covering meaning, indications for diagnostic and therapeutic catheters, the most common site of insertion, benefits, kinds, contraindications, problems, and interventional procedures (tests) performed during cardiac catheterization. The **third section** covered early ambulation knowledge, such as meaning, time, number of evaluations during early ambulation, criteria for initiating early ambulation, types

of exercise, levels of activity performed, benefits, contraindications, criteria for terminating early ambulation, barriers, complications of immobility, and facilitators for implementing early ambulation.

Scoring system:

The mothers were given 1 when the answer was correct and if the answer was incorrect the score was given 0. A mother was considered to have ($\geq 60\%$) satisfactory knowledge and those who were unsatisfactory knowledge ($< 60\%$).

Tool (II) Mothers' Attitude toward Early Ambulation It was adopted from (Lin et al., 2020; Dweekat, 2020) Using a 5-point Likert scale of 1-5 as; (1) strongly disagree, (2) disagree, (3) undecided, (4) agree, (5) strongly agree. This tool contained (17) items that reflected the mothers' attitude regarding early ambulation of their children with cardiac catheterization.

Scoring system:

Positive attitude were defined as those that were equal to or more than 60%, while negative attitude were defined as those that were less than 60%.

Tool (III): Anxiety traits state: The psychological questionnaire was updated and used to gauge the anxiety levels of the caregivers (Julian et al., 2011). Twenty points were allotted to it. The scores were in the range of 20 to 80. While low scores suggested mild anxiety, the median score suggested moderate anxiety and high values indicated severe anxiety. So, the level of anxiety was categorized as mild anxiety ($< 60\%$) was < 48 point, moderate anxiety (≥ 60 and $< 75\%$) was > 48 - < 60 point, and severe anxiety ($\geq 75\%$) was ≥ 60 point.

Methods

The study was conducted through the performing the subsequent steps:

Administrative design:

To carry out this study, administrative authorization was obtained from the Dean of the Faculty of Nursing at Sohag University

and provided to the Director of the selected Department linked with Sohag University Hospital by letter.

A- Ethical considerations:

The Ethical Scientific Research Committee of the Faculty of Nursing at Sohag University received ethical permission for this study on February 5, 2023, under reference number 17. The researchers visited with the selected setting's medical and nursing directors to describe the study's goal and obtain their agreement. Mothers provided written consent to gain their cooperation. To secure authorization for data collection, the purpose of the study was described, as well as the expected outcomes of the study implementation. Mothers were informed about the study's purpose. The mothers were advised by the researchers that the study was optional and that they might refuse to participate. Mothers have the right to withdraw from the study at any moment, with no explanation. Mothers were told that their information would be kept strictly confidential and utilized solely for research purposes.

Developing study tools:

The researchers had collected data using three tools

Validity of the tools:

The content validity of the tools and the instructional guidelines, their clarity, comprehensiveness, appropriateness, and relevance were reviewed by five expert professors in the field of pediatric surgery nursing, and pediatric cardio-thoracic surgery to test the content and face validity. No modifications were made according to the panel judgment to ensure sentence clarity and content appropriateness.

Reliability of the tools:

The reliability of the tools was estimated by Cronbach's alpha. The Cronbach's alpha was 0.953 which indicates a high level of internal consistency of the tool.

A pilot study

A pilot study was done on 10% (5 mothers) of the entire sample to assess the research process's clarity and feasibility. The tools'

ultimate form was developed without any alterations. The mothers who participated in the pilot study were included in the research study.

Fieldwork:

The instructional guidelines was conducted with the aim of the current research through stages of assessment, planning, implementation and evaluation from the beginning of February 2023 to the end of July 2023, a period of six months data was gathered.

Data was gathered from mothers who attended pre-selected settings two days a week, from 9 a.m. to 2 p.m. (Sunday and Monday). Each interview question took about 30 to 35 minutes to complete.

Assessment, planning, implementation, and evaluation phases comprised the current study.

A- Assessment phase:

Assessment stage required conducting interviews with mothers of children with congenital heart disease for gathering initial data. The researchers were present every week for two days on rotation between researchers: Sunday and Monday, from 9:00 am until 2:00 pm, the researchers greeted every mother, outlined the study's purpose, duration, and activities, and obtained written consent. Researchers gathered information from the medical records of Pediatric Cardiology patients, spending approximately 10 minutes on each child's data collection. The researchers provided the mothers being studied with a questionnaire to evaluate their knowledge, which required 15 minutes to complete. Every mother was individually monitored while performing tasks to evaluate their level of competencies, with duration of 30-35 minutes.

B- Planning phase

After analyzing the initial data from the assessment stage and conducting a thorough review of existing literature, the researchers created the simplified booklet was used as supportive material and given to mothers of

children with congenital heart diseases The Instructions was customized to match the comprehension level of mothers in basic Arabic language. Different teaching techniques were employed, including lectures, posters, scenarios, and discussion. Various teaching materials such as handouts and educational films were used to help mothers grasp the content effectively.

C- Implementation phase:

The implementation phase was achieved through sessions, each session started by a summary of the previous session and objective of the new one. Taking into consideration the use of Arabic language that suits the mothers' educational level. Motivation and reinforcement during sessions were used to enhance motivation for the sharing in the study.

Data collection tools (tool I (part, III), tool II and III) were given to the mothers of children with congenital heart problems who were the subjects of the study: (1) a pre-test to assess their level of anxiety, attitude, and knowledge before the implementation of instructional guidelines. (2) Post-test to evaluate their knowledge, attitude, and anxiety level following a month of implementing the instructional guidelines.

Instruction guidelines for early ambulation was designed and implemented by the researchers for mothers to improve their knowledge, attitude and anxiety level. The developed educational sessions was conducted for the studied sample at pediatric cardiology department during the morning shift. The participants were classified into 10 groups; each group involved five mothers and took 3 sessions, each session lasted for 25-30 minutes. **The theoretical component took two hours in total.**

The instruction guidelines sessions covered the subsequent topics:

The first session covered congenital heart defects, including meaning, causes,

symptoms, types, investigations, complications, treatment, and prevention.

The second session focused on cardiac catheterization, covering meaning, indications for diagnostic and therapeutic catheters, the most common site of insertion, benefits, kinds, contraindications, problems, and tests performed during cardiac catheterization

The third session covered early ambulation knowledge, such as meaning, time, number of evaluations during early ambulation, criteria for initiating early ambulation, types of exercise, levels of activity performed, benefits, contraindications, criteria for terminating early ambulation, barriers, complications of immobility, and facilitators for implementing early ambulation.

Evaluation phase:

After one month, each mother was re-interviewed to evaluate the effect of instructional guidelines regarding early ambulation on knowledge, attitude, and anxiety among mothers of children with congenital heart diseases post-cardiac catheterization. Re-assessment of the mothers was done using the same tools (I, II, and III).

Statistical analysis:

The data was entered and processed using SPSS version 25. McNemar's Test determined the difference between qualitative variables when the data was paired, dichotomous, and nonparametric. A marginal homogeneity test was applied. The association between the independent categorical characteristics was evaluated using the chi-squared (χ^2) and Fisher exact tests. The Spearman correlation coefficient (γ) test was developed to assess the strength and direction of the connection between two parameters. P-values less than 0.05 were considered statistically significant.

Results:

The demographic data of the mothers and their children under study is shown in Table 1. More than three-quarters (76%) of mothers were unemployed, and more than half

(56%) had completed secondary school. Additionally, 80% of mothers reside in urban area. It was clear that 50% of the children were under two years old, girls made up (54%) of the children, and the mean **child age when the disease was discovered among them was 2.7 ± 5.2** .

The result found in **Figure 1** reveals that none of the studied mothers had previously received any training regarding early ambulation.

Table 2 illustrates that there were statistically significant differences and improvements in all knowledge items following instructional guidelines implementation regarding congenital heart defects, cardiac catheterization, and early ambulation ($P < 0.001$). Where, pre-instructional guidelines, the total knowledge mean score was 12.33 ± 1.15 , but for post-instructional guidelines implementation, the score improved to 27.78 ± 2.33 .

As seen in **Figure 2**, 88% of the mothers **of children with congenital heart diseases** had satisfactory knowledge post-instructional guidelines implementation, while 94% had unsatisfactory knowledge in the pretest.

Following **instructional guidelines implementation**, all items of attitude showed a statistically significant improvement ($P < 0.001$), as seen in Table 3. Pre-instructional guidelines implementation, the total **attitude** score was 8.03 ± 2.03 , but post-instructional guidelines implementation, the score improved to 15.45 ± 1.88 .

Figure 3 demonstrates that **25%** of the mothers had a positive attitude towards **early ambulation** pre-instructional guidelines, compared to 80% of them who had a positive attitude as a result of **post-instructional guidelines implementation**.

Table (4) shows that following **instructional guidelines implementation**, mothers' overall mean anxiety score (33.55 ± 3.38) decreased compared to 67.3 ± 3.1 pre-guidelines implementation, indicating a highly statistically significant change at $P = < 0.001$.

Figure 4: According to the current study, 83% of mothers had severe anxiety pre-instructional guidelines implementation

compared to (40%) of them reported experiencing moderate anxiety following the **instructional guidelines implementation**, indicating a considerable decrease.

Table (5): Portrays that a significant difference was detected between mean scores. Where, knowledge mean difference score was less post-implementation than pre-implementation.

Figure 4 illustrates that there was a significant reduction in the level of anxiety among the studied mothers post- instructional guidelines implementation. At pre-instructional guidelines implementation anxiety level was severe among (36%) compared to no one (0%) had severe anxiety level post- instructional guidelines implementation.

The total mothers' knowledge and **attitude** scores pre and post-**instructional guidelines implementation** were correlated in table (6). The results showed a positive correlation between knowledge and **attitude** pre and post-**instructional guidelines implementation**, with a highly statistically significant at $P = 0.001$.

Table 7 shows the correlation found between the mothers' total knowledge, attitude, and anxiety level pre and post-instructional guidelines implementation has a very negative correlation. Additionally, there is a statistically significant difference in the anxiety levels and mothers' attitudes pre and post-instructional guidelines implementation.

Table (1): Percentage distribution of studied mothers and their children regarding socio demographic characteristics (N=50)

Variables	No.	%
Mothers' Age		
<30	35	70.0
≥ 30	15	30.0
Mothers' education		
Illiterate	6	12.0
Write & read	9	18.0
Secondary	28	56.0
University	7	14.0
Mothers' Occupation		
Working	12	24.0
Not working	38	76.0
Residence		
Urban	40	80.0
Rural	20	20.0
Children age in years		
< 2yrs.	26	52.0
> 2yrs.	24	48.0
M ± SD 2.82 ± 1.33		
Gender		
Boys	23	46.0
Girls	27	54.0
Child age when the disease discovered		M± SD = 2.7 ±5.2

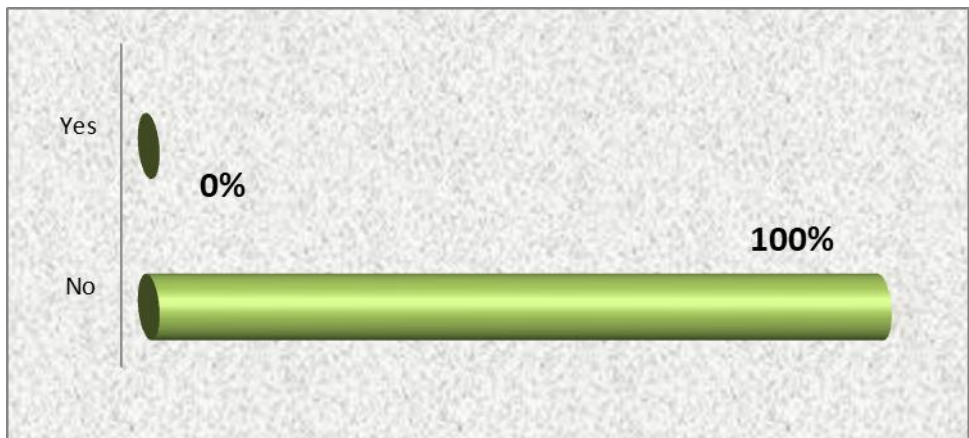
**Figure 1: Distribution of Previous training program regarding early ambulation among mothers of children with congenital heart diseases (N=50)**

Table (2): Distribution of the studied mother's knowledge pre and post – instructional guidelines implementation regarding congenital heart defects, cardiac catheterization, and early ambulation of their children with congenital heart diseases (N=50)

Items	Pre instructional guidelines (n / %)	Post instructional guidelines (n / %)	X ²	P
Meaning of congenital heart defects	8 (16)	43 (86)	75.77	<0.001*
Causes of congenital heart defects	13 (26)	44 (88)	85.88	<0.001*
Symptoms of congenital heart defects	12 (24)	46 (92)	83.22	<0.001*
Types of congenital heart defects	11(22)	41(82)	77.44	<0.001*
Investigations of congenital heart defects	14 (28)	45 (90)	88.34	<0.001*
Complications of congenital heart defects	9 (18)	47 (94)	67.76	<0.001*
Treatment and prevention of congenital heart defects	14 (28)	43 (86)	87.22	<0.001*
Meaning cardiac catheterization	13 (26)	46 (92)	89.54	<0.001*
Indications for diagnostic and therapeutic catheters	14(28)	43(86)	93.44	<0.001*
The most common site of insertion	12 (24)	46 (92)	66.34	<0.001*
Benefits of cardiac catheterization	9 (18)	47 (94)	95.76	<0.001*
Kinds of cardiac catheterization	12 (24)	44 (88)	96.22	<0.001*
Contraindications and problems	13 (26)	46 (92)	68.22	<0.001*
Interventional procedures (tests) performed during cardiac catheterization	14(28)	43(86)	99.44	<0.001*
Meaning of early ambulation	16(32)	48(96)	78.22	<0.001*
Time, criteria for initiating, and number of evaluations during early ambulation,	15(30)	46 (92)	136.55	<0.001*
Types of exercise	7 (14)	44 (88)	157.77	<0.001*
Levels of activity performed	12 (24)	43 (86)	149.88	<0.001*
Benefits	11 (22)	45 (90)	157.22	<0.001*
Contraindications	11(22)	42(84)	162.44	<0.001*
Criteria for terminating early ambulation	13 (26)	47 (94)	106.34	<0.001*
Barriers	8 (16)	45 (90)	158.76	<0.001*
Facilitators for implementing early ambulation	13 (26)	44 (88)	168.22	<0.001*
Complications of immobility	12 (24)	45 (90)	147.54	<0.001*
Total mean score	M± SD	M± SD	t-test	P
Knowledge	12.33±1.15	27.78±2.33	12.22	0.001*

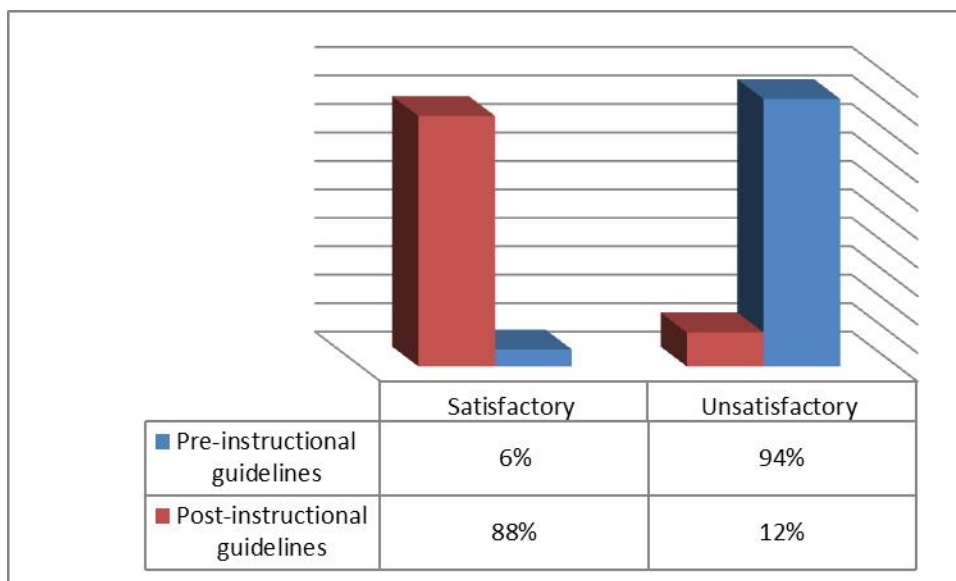
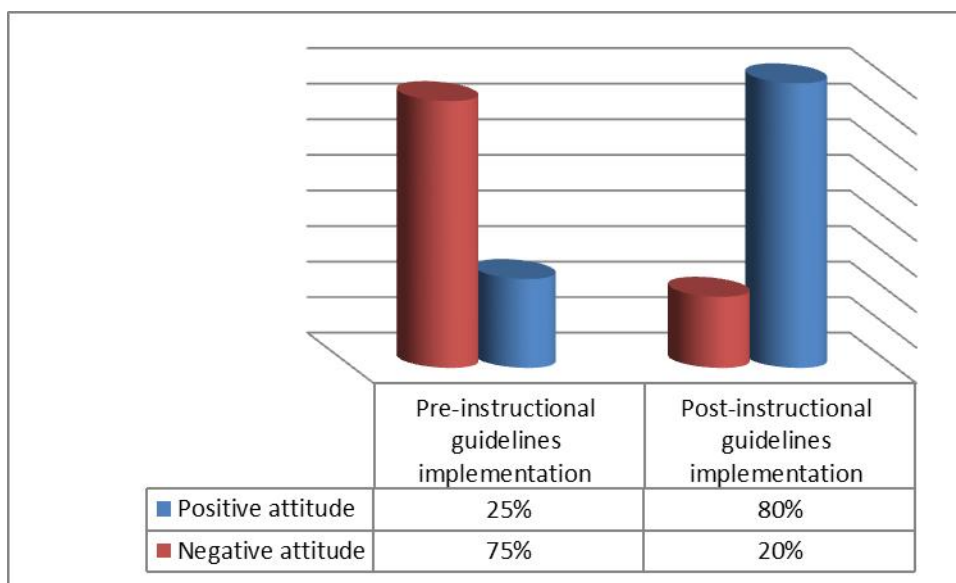
(*) Statistically significant at $P \leq 0.05$ **Figure (2): Total knowledge level regarding early ambulation among the studied mother's pre and post-instructional guidelines implementation (N = 50)**

Table 3: Comparison between the studied mother's attitude mean scores regarding early ambulation pre and post-instructional guidelines implementation (N = 50)

Mothers attitude	Pre instructional guidelines	Post instructional guidelines	t-test	P
	M± SD	M± SD		
Attitude	8.03±2.03	15.45±1.88	14.33	0.001*

(*) Statistically significant at $p \leq 0.001$, (**) Paired t- test

**Figure (3): Total attitude level towards early ambulation among the studied mother's pre and post-instructional guidelines implementation (N = 50)****Table 4: Comparison between the studied mother's anxiety mean scores regarding early ambulation pre and post-instructional guidelines implementation (N = 50)**

Items	Pre instructional guidelines	Post instructional guidelines	t-test	P
	M± SD	M± SD		
Anxiety	67.3±3.1	33.55±3.38	12.4	<0.001*

(*) Statistically significant at $P \leq 0.05$

Table (5): Relation between post-instructional guidelines implementation knowledge and anxiety median difference scores among study mothers (N=50)

Items	Pre instructional guidelines	Post instructional guidelines	P-value
Total mothers' knowledge level	8 (4–9.25)	19 (19–20)	58.00 <0.001*
Total mothers' anxiety level	5.50 (0.25–9.25)	12 (6.75–18.25)	222.50 <0.001*

(*) Statistically significant at $P \leq 0.05$

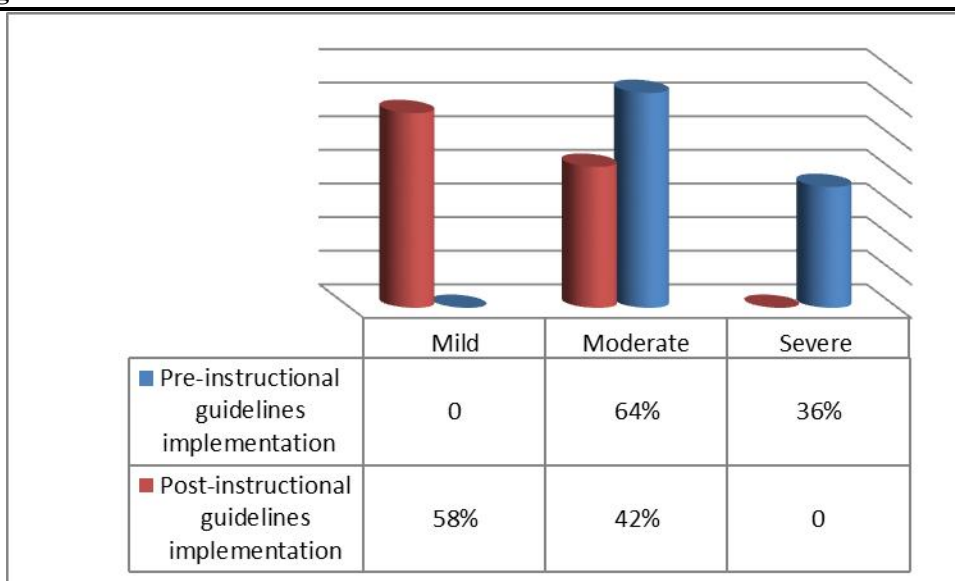


Figure 4: Total anxiety levels among the studied mothers pre and post-instructional guidelines implementation (n=50)

Table (6): Correlation between the studied mothers' total knowledge and attitude score pre and post-instructional guidelines implementation (N=50)

Items	Total attitude level			
	Pre instructional guidelines		Post instructional guidelines	
	r	P	R	P
Total knowledge level	1.00	0.001*	0.742	0.001*

(*) Statistically significant at $P \leq 0.05$

Table (7): Correlation between the studied mothers' total knowledge level, attitude, and anxiety level pre and post-instructional guidelines implementation (N=50)

Items	Total anxiety level			
	Pre instructional guidelines		Post instructional guidelines	
	r	P	R	P
Total knowledge level	-0.537**	0.004	-0.625**	0.000
Total attitude level	-0.349*	0.028	-0.422**	0.006

**Correlation is significant at < 0.01 level

Discussion:

Globally, cardiovascular abnormalities are the leading cause of severe morbidity and mortality and the most common form of birth abnormality. When a congenital heart problem is diagnosed, parents may experience agony anxiety, the family and their children often face severe emotional and financial difficulties as a result of the

consequences. To help parents of children with congenital heart disease in clinical settings, pediatric nurses work in tandem with parents to offer intervention options (Roberts et al., 2020).

A congenital heart defect is the most frequent congenital disability, affecting almost one newborn in every 120-166 births (Findley et al., 2024), with advances in both palliative

and corrective surgeries, the survival of children with CHD to adulthood has increased. Nevertheless, CHD is still the leading cause of death among children with congenital malformations (Kiraly, 2022). Early ambulation is an efficient and safe approach to reduce the adverse impacts of bed rest and functional disabilities affecting children after cardiac catheterization. Early ambulation in children is shown to improve outcomes after cardiac catheterization (Cho et al., 2023). Hence, the study was conducted to evaluate the effect of instructional guidelines regarding early ambulation on knowledge, attitude, and anxiety among mothers of children with congenital heart diseases post-cardiac catheterization.

The current study found that more than three-quarters of mothers were unemployed, and more than half had completed secondary school. Additionally, the majority of them reside in urban areas.

This is not in line with Elshazali et al., (2018) findings, which showed that vast minority of mothers finished university and nearly half of mothers finished secondary school. In the current study, more than three-quarters of the mothers were unemployed. This is similar to Berik (2019) who stated that three-quarters of the studied mothers were unemployed. This may be explained by the fact that it is anticipated that the stress of raising these children with congenital heart disease will affect the mothers' ability to attend work. Additionally, El-Mahdi, (2019) reported that the majority of the mothers were from urban areas.

The current study found that half of the children were less than two years old, girls made up more than half of the children, and the mean child age when the disease was discovered among them was 2.7 ± 5.2 . This supports the conclusion drawn by Elshazali et al., (2018) that around 25% of the children in the study were children less than five years. Furthermore, girls made up more than half of them. In contrast, Ibrahim et al., (2022) found that there were boys more than girls.

The result found that none of the studied mothers had previously received any training regarding cardiac catheterization and early ambulation. This earlier result is consistent with that of Omer (2020), who discovered that most of the studied samples had no training

sessions for pediatric cardiac catheterization. From the researchers point of view, These findings confirmed that the mothers needed to be trained in early ambulation of children following cardiac catheterization.

The result illustrated that there was a statistically significant differences and improvement in all knowledge items following instructional guidelines implementation regarding early ambulation. **From the researchers' point of view, it reflected the positive effects of instructional guidelines implementation which help in improving mothers' knowledge.** This improvement demonstrates the impact of the **implementation** of the guidelines and highlights the willingness of the majority of mothers to learn more about their children's diseases. Results of another study conducted among caregivers in Saudi Arabia reported similar findings during the post-intervention period (Azhar et al., 2019).

The result illustrated that the majority of the mothers of children with congenital heart diseases had satisfactory knowledge of instructional guidelines implementation. **From the researcher's point of view, it confirmed the success of instructional guidelines implementation which met the mothers' needs.** The findings supported the results of Abdel Salam and Mahmoud (2018) who discovered that more than half of the sample under study had unsatisfactory knowledge and improved their knowledge scores after the instructional guidelines. The study was supported by Animasahun, et al., (2019) who found that parents know very little about the causes, symptoms, management, prevention, and complications of congenital heart disease.

The result illustrated that following instructional guidelines implementation, all items of attitude showed a statistically significant improvement. Also, illustrated that one-quarter of the mothers had a positive attitude towards early ambulation pre instructional guidelines implementation, compared to the majority of them having a positive attitude as a result of post-instructional guidelines implementation. It might be because the mothers had negative attitudes or feelings regarding early ambulation pre-instructional guidelines implementation. The result was in the same

line with **Elfeky et al., (2023)** who demonstrated that the instructional guidelines implementation for mothers was successful and effective in raising the attitude levels of mothers

According to the current study, the majority following **instructional guidelines implementation**, mothers' total mean anxiety score decreased compared to **pre-guidelines implementation**, indicating a highly statistically significant change. There may be a relationship between the usage of these **guidelines** that led to anxiety score reduction. Similar results were mentioned by **Aranha et al., (2020)**, who found caregivers received nursing guidelines showed a decrease in anxiety levels, suggesting that health education actions in the preoperative period of cardiac surgery offered by the nurse contribute to the reduction of anxiety. Therefore, this instructional tool was a successful way to help parents feel less anxious during pediatric procedures. Accurate knowledge of the disease condition, symptoms, short- and long-term repercussions is essential for caregivers to provide effective care for their children.

According to the current study, the majority of mothers had severe anxiety **pre-instructional guidelines implementation** compared to two-fifths of them reported experiencing moderate anxiety following the **instructional guidelines implementation**. This suggests that **instructional guidelines implementation** was effective in helping caregivers in reducing anxiety among the studied mothers. Similar results were obtained by **Pomicino et al., (2019)** who investigated the anxiety levels of parents of children undergoing surgery before and after the operational procedure. From the researchers' point of view, this might be connected to the study participants' eagerness to learn as much as possible about congenital heart disease.

The result is in the same line with **Rahimianfar et al. (2019)** who stated that a mean score of 50.90 ± 10.80 indicated that mothers' anxiety about infants with congenital heart disease was higher than usual. In addition, mothers were very anxious about having their children operated on. This conclusion may be due to the effectiveness of the study's instructional sessions, the

researchers found. These findings align with those of **Lesch et al. (2024)**, who found that parents who are more informed about their children's cardiac illness are more likely to comply with their medication and experience less anxiety.

The result illustrated that a significant difference was detected between mean scores. **Post-instructional guidelines implementation**, knowledge mean difference score was higher **post-implementation** than **pre-implementation** and the anxiety mean difference score was less. From the researchers' point of view, it confirmed adequate explanation that helped mothers in improving their knowledge and anxiety reduction.

Results showed that post-instructional guidelines implementation, mothers had significantly higher levels of knowledge and lower levels of anxiety. Also, this reflected the main goals of the implementation of the instructional guidelines were achieved. Similar, results were stated by **Ibrahim et al., (2022)** who found that educational program improved knowledge that associated with reducing knowledge.

The result illustrated that a positive correlation was found between knowledge and **attitude pre and post-instructional guidelines implementation**, with a highly statistically significant. According to the researcher, this outcome showed that **instructional guidelines** provided for mothers successfully raised the level of awareness and reflected on their **attitudes** positively. The study's conclusions confirmed that mothers' knowledge of early ambulation had risen and that they had a more positive attitude toward it, both of which attributed to the guidelines' efficacy. It emphasizes how crucial knowledge influences mothers' attitudes about early ambulation. **Similarly, Aranha et al., (2020)**, stated that improved knowledge that associated with attitude improving.

The result illustrated that there was a correlation found between the mothers' total knowledge, attitude, and anxiety level pre and post-instructional guidelines implementation. The mothers' knowledge and anxiety level pre and post-instructional guidelines implementation has a very negative correlation.

Additionally, there is a statistically significant difference in the anxiety levels and mothers' attitudes pre and post-instructional guidelines implementation. This result was in line with that by **Huang et al. (2021)**, **Parveen et al. (2024)**, and **Elfeky et al. (2023)**, who reported a potential positive association between the overall knowledge and total attitude scores at the pre-and post-implementation phases of the program.

These results are in line with those of (**Yilmaz et al., 2021**), who found that providing parents with sufficient information is essential to the effective treatment of children since it lowers stress and anxiety and enables parents to be involved in their child's upbringing. This suggests that raising mothers' total knowledge led to a highly statistically significant drop in their anxiety level. These results align with the findings of (**Yilmaz, et al., 2021**), who found that providing parents with sufficient information is essential to the effective treatment of children since it lowers stress and anxiety and enables them to be involved in their child's care.

Conclusion:

Based on the results and hypotheses of the present study, the study findings concluded that the results support the research hypothesis that the implementation of the introduction of instructional guidelines for early ambulation improved the knowledge and attitude of mothers of children with congenital heart disease, as well as their anxiety levels. There was a significant positive correlation ($P=0.001$) between mothers' knowledge, attitude, and their anxiety post-one-month of instructional guidelines implementation.

Recommendations:

Based on the current study results, the following recommendations are proposed:

- Instructional guidelines for mothers of children with congenital heart disease undergoing cardiac catheterization should be conducted, discussed, and integrated into rehabilitation programs.
- Mothers of children with congenital heart diseases should be given a booklet and illustrated pamphlets to improve their information and reduce their anxiety levels.

- Establish services, such as support groups for mothers, to assist them cope with the negative psychological effects of CHD.
- The current study should be replicated with a larger sample in different settings to generalize the results.

References:

- Abdel-Salam, A., & Mahmoud, F. (2018). Effect of Educational Program on The Self-Efficacy and Quality of Life for Mothers Caring Children With Congenital Heart Disease, *IOSR Journal of Nursing and Health Science*, 7(4), 68-78.
- Al-Fahham, M., & Ali, A. (2021). Pattern of congenital heart disease among Egyptian children: a 3-year retrospective study. *The Egyptian Heart Journal*, 73(1), 1-8. <https://doi.org/10.1186/s43044-021-00133-0>.
- Animasahun, B. (2019). The Relationship Between Parents' and Caregivers' Demographics and Their Knowledge about Congenital Heart Disease. Doctorate thesis, Walden University
- Aranha, P., Sams, L., & Saldanha, P. (2020). Impact of a preoperative education program on parental anxiety: A pilot project. *Arch Med Health Sci*;4:30-4.
- Azhar, A., Zaher, Z., Abu-Ouf, N., Al-Ata, J., & Alsheblie, S. (2019). Determinants of successful medical education of caregivers of children with congenital heart diseases. *J Saudi Heart Assoc*; 30:28-39.
- Baqal, A., & Mahmood, F. (2022). Effect of Ice-Bag with Direct Pressure on Early Ambulation and Prevention of Urinary Retention, Low Back Pain, and Catheter Site Pain in Patients after Cardiac Catheterization. *NeuroQuantology*, 20(6), 8008. DOI:10.14704/nq.2022.20.6.NQ22796.

- Bellsham-Revell, H., & Burch, M. (2018): Congenital heart disease in infancy and childhood medicine; 46 (11): 690–697.
- Bulut, H. K., & Calik, K. Y. (2020). Doctors and nurses' views on the participation of parents in invasive procedures of hospitalized children. *J Pak Med Assoc*, 70(2), 231-5. Doi: 10.5455/JPMA.293926.
- Cho, E., Jang, R., Moon, R., Kim, J., Kim, M., An, Y. J., & Song, J. (2023). Effects of time of bed rest on vascular complications after cardiac catheterization in pediatric patients with congenital heart disease: A randomized controlled trial. *Heart & Lung*, 60, 52-58. <https://doi.org/10.1016/j.hrtlng.2023.02.023>
- Creswell, W. (2012). Educational research: Planning, conducting, and evaluating quantitative and qualitative research (4th Ed.). Boston, MA: Pearson.
- Dweekat, A. (2020). Introducing Early Mobility to Intensive Care Unit Nurses (Doctoral dissertation, Azusa Pacific University). Retrieved from <https://www.proquest.com/openview/aca3e0e632d7f76708b2631a8b3393eb/1?pq-origsite=gscholar&cbl=18750&diss=y>.
- El Mahdi, M. (2019). Parental knowledge, attitudes, and practice towards their children's congenital heart disease and its impact on their growth in Sudan Heart Centre. Doctoral thesis, University of Khartoum.
- Elfeky, M., Mourad, M., Ismail, S., & Zaki, A. (2023). The effect of the psychoeducational program on coping patterns of mothers having children newly diagnosed with cancer. *Helwan International Journal for Nursing Research and Practice*, 2(2), 13–43.
- Elshazali, H., HOHEI, S., & Yousif, M. A. (2018). Parent's knowledge about diagnosis and management of their children with congenital heart diseases in Khartoum, Sudan. *J Pediatr Neonatal Care*, 8(6), 262-266.
- Findley, O., Crain, K., Mahajan, S., Deniwar, A., Davis, J., Solis Zavala, A. S., & Rodriguez-Buritica, D. (2024). Congenital heart defects and copy number variants associated with neurodevelopmental impairment. *American journal of medical genetics Part A*, 188(1), 13-23. <https://doi.org/10.1002/ajmg.a.62484>
- Grazziano, E., da, S., & Bianchi, E. (2024). Caregivers and patient's anxiety levels during cardiac catheterization. *Rev Lat Am Enfermagem*;12:168-74. <https://doi.org/10.1016/j.jcin.2020.09.002>.
- Huang, S., Huang, Y., & Hu, J. (2021). Current practices of peripheral intravenous catheter fixation in pediatric patients and factors influencing pediatric nurses' knowledge, attitude and practice concerning peripheral intravenous catheter fixation: a cross-sectional study. *BMC Nursing*, 20, 1-9. <https://doi.org/10.1186/s12912-021-00758-1>.
- Ibrahim, A., Abdelrahman, H., & Elshazali, H. (2022). Pattern and diagnosis of congenital heart disease in patients attending Ahmed Gasim Cardiac Centre. *Sudan Journal of Medical Sciences*, 7(4), 249-254.
- Julian, L. (2011). Measures of anxiety: State-trait anxiety inventory (STAI), Beck anxiety inventory (BAI), and hospital anxiety and depression scale-anxiety (HADS-A). *Arthritis Care Res (Hoboken)*; 63 Suppl 11:S467-72.

- Kiraly, L. (2022). Current outcomes and future trends in pediatric and congenital cardiac surgery: a narrative review. *Pediatric Medicine*, p. 5. Doi: 10.21037/pm-21-47.
- Lesch, W., Specht, K., Lux, A., Frey, M., Utens, E., & Bauer, U. (2024). Disease-specific knowledge and information preferences of young patients with congenital heart disease. *Cardiology in the Young*, 24(2), 321.
- Lin, F., Phelan, S., Chaboyer, W., & Mitchell, M. (2020). Early mobilization of ventilated patients in the intensive care unit: a survey of critical care clinicians in an Australian tertiary hospital. *Australian Critical Care*, 33(2), 130–136. <https://doi.org/10.1016/j.aucc.2019.02.002>
- Liu, Y., Chen, S., Zühlke, L., Black, G. C., Choy, K., Li, N., & Keavney, D. (2019). Global birth prevalence of congenital heart defects 1970–2017: updated systematic review and meta-analysis of 260 studies. *International journal of epidemiology*, 48(2), 455-463. <https://doi.org/10.1093/ije/dyz009>.
- Mannarino, C., Michelson, K., Jackson, L., Paquette, E., & McBride, M. (2020). Post-operative discharge education for parent caregivers of children with congenital heart disease: A needs assessment. *Cardiol Young*; 30:1788-96.
- Mattie-Luksic, M., Javornisky, G., & DiMario, F. (2019). Assessment of stress in mothers of children with severe breath-holding spells. *Pediatrics*; 106: 1–5.
- Moustafa, G., Kolokythas, A., Charitakis, K., & Avgerinos, D. (2022). Diagnostic cardiac catheterization in the pediatric population. *Curr Cardiol Rev*; 12:155-62.
- O'Byrne, M. L., Huang, J., Asztalos, I., Smith, C. L., Dori, Y., Gillespie, M. J., & Glatz, A. (2020). Pediatric/congenital cardiac catheterization quality: an analysis of existing metrics. *Cardiovascular Interventions*, 13(24),2853-2864.
- Omer, Y. (2020). Quality of Pre-Cardiac Catheterization Nursing Care at Surgical Specialty Hospital-Cardiac Center in Erbil City. *Erbil Journal of Nursing and Midwifery*, 3(1), 75–81. <https://doi.org/10.15218/ejnm.2020.09>.
- Parveen, S., Bashir, M., Akhtar, S., Perveen, S., & Ullah, S. (2024). Evaluation of Practices about Pediatrics Cardiac Catheterization among Nurses at District Head Quarter Hospital: Pediatrics Cardiac Catheterization Practices. *NURSESEARCHER (Journal of Nursing & Midwifery Sciences)*, 51-56. DOI: <https://doi.org/10.54393/nrs.v4i01.80>
- Pomicino, L., Maccacari, E., & Buchini, S. (2019). Levels of anxiety in parents in the 24 hr before and after their child's surgery: A descriptive study. *J Clin Nurs*;27:278-87.
- Rahimianfar, A. A., Forouzannia, S. K., Sarebanhassanabadi, M., Dehghani, H., Namayandeh, S. M., Khavary, Z., ... & Aghbageri, H. (2019). Anxiety determinants in mothers of children with congenital heart diseases undergoing cardiac surgery. *Advanced biomedical research*, 4 (255)1-4.
- Roberts, K., Richard, B., Hal, J., & Bonita, S. (2022). Congenital heart disease. *Nelson Textbook of pediatrics*, Philadelphia, Saunders Co., 1499-1502.
- Sjostrom-Strand, A., & Terp, K. (2019). Parents' experiences of having a baby with a congenital heart defect and the child's heart surgery. *Comprehensive child and adolescent nursing*, 42(1), 10-23.
- United Nations Development Program UNDP data (2023). Retrieved from

<http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-3-good-health-and-well-being/targets/>.

- Wang, T., Chen, L., Yang, T., Huang, P., Wang, L., & Zhao, L. (2019). Congenital heart disease and risk of cardiovascular disease: A meta-analysis of cohort studies. *J Am Heart Assoc*; 8:e012030.
- Wu, W., He, J., & Shao, X. (2020). Incidence and mortality trend of congenital heart disease at the global, regional, and national level, 1990-2017. *Medicine (Baltimore)*; 99:e20593.
- Yimaz, B., Kavlak, O., Isler, A., Liman, T., & Van Sell, S. L. (2021). A study of maternal attachment among mothers of infants with congenital anomalies in Turkey. *Infants & Young Children*, 24(3), 259-266.