

Quality of life of individuals with implantable electronic cardiac device

Qualidade de vida de indivíduos portadores de dispositivo cardíaco eletrônico implantável

Calidad de vida de las personas con dispositivo cardíaco electrónico implantable

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ABSTRACT

Objective: to evaluate the quality of life of individuals with implantable electronic cardiac devices. **Method:** descriptive and cross-sectional study conducted with 50 individuals in 2018. SF-36 and AQUAREL were used. **Results:** the most frequent comorbidity was systemic arterial hypertension – 39 (78%), baseline heart disease bradycardia – 18 (36%) and complaints of palpitation and pre-syncope. Individuals with electronic cardiac device time of up to 5 years 24 (48%) predominated, without changing the generator – 31 (62%). The majority denied alcohol consumption – 47 (94%), cigarettes – 44 (88%) and regular physical activity – 34 (68%). In the SF-36 the lowest score was in the physical aspects domain (15) and the highest in pain (88.8). In AQUAREL the lowest score was in the domain dyspnea (78.98) and the highest in discomfort (86.54). **Conclusion:** reduced symptomatology was observed. There was a significant association between males and physical activity. Individuals have improved quality of life after implantation of the cardiac device.

Descriptors: Quality of life; artificial pacemaker; artificial cardiac stimulation; electrical cardioversion.

RESUMO

Objetivo: avaliar a qualidade de vida de indivíduos portadores de dispositivo cardíaco eletrônico implantável. **Método:** estudo descritivo e transversal realizado com 50 indivíduos em 2018. Utilizou-se o SF-36 e AQUAREL. **Resultados:** a comorbidade mais frequente foi a hipertensão arterial sistêmica – 39 (78%), a cardiopatia de base a bradicardia – 18 (36%) e queixas de palpitação e pré-síncope. Predominaram indivíduos com tempo do dispositivo cardíaco eletrônico de até 5 anos – 24 (48%), sem troca de gerador – 31 (62%). A maioria negou o consumo de bebida alcoólica – 47 (94%), de cigarros – 44 (88%) e não realiza atividade física regular – 34 (68%). No SF-36, o menor escore foi no domínio aspectos físicos (15) e o maior em dor (88,8). No AQUAREL o menor escore foi no domínio dispneia (78,98) e o maior em desconforto (86,54). **Conclusão:** constatou-se sintomatologia reduzida. Houve associação significativa entre sexo masculino e atividade física. Os indivíduos apresentam melhora da qualidade de vida após a implantação do dispositivo cardíaco.

Descritores: Qualidade de vida; marca-passo artificial; estimulação cardíaca artificial; cardioversão elétrica.

RESUMEN

Objetivo: evaluar la calidad de vida de las personas con dispositivos cardíacos electrónicos implantables. **Método:** estudio descriptivo y transversal realizado con 50 individuos, en 2018. SF-36 y AQUAREL se utilizaron. **Resultados:** la comorbilidad más frecuente fue la hipertensión arterial sistémica – 39 (78%), las cardiopatías subyacentes, bradicardia – 18 (36%) y quejas de palpitación y presíncope. Predominan los individuos con tiempo de dispositivo cardíaco electrónico de hasta 5 años – 24 (48%) sin cambiar el generador – 31 (62%). La mayoría negó el consumo de alcohol – 47 (94%), cigarrillos – 44 (88%) y actividad física regular 34 (68%). En el SF-36, la puntuación más baja estaba en el dominio de aspectos físicos (15) y la más alta en dolor (88.8). En AQUAREL, la puntuación más baja estaba en el dominio disnea (78,98) y la más alta en malestar (86,54). **Conclusión:** se observó una sintomatología reducida. Hubo una asociación significativa entre los varones y la actividad física. Los individuos han mejorado la calidad de vida después de la implantación del dispositivo cardíaco.

Descriptores: Calidad de vida; marcapasos artificial; estimulación cardíaca artificial; cardioversión eléctrica.

INTRODUCTION

Morbimortality due to heart disease is high worldwide, which has a strong impact on public health, particularly as a result of ischemic diseases and cardiac arrhythmias¹. Arrhythmias are ailments that can manifest themselves in different health scenarios and in the social context with highly variable symptomatic fluctuation that occurs over time, thus increasing their complexity².

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The biggest economic expenses are related to their treatment, such as drug therapy, tests, cardiac procedures, hospitalization and surgeries, which use increasingly sophisticated technology¹. Among the risk factors related to arrhythmias are inflammatory conditions, such as myocarditis, coronary and valve disease and ventricular dysfunction³. The treatment aims to control heart rates with drug therapy, electrical cardioversion or catheter ablation. However, due to low effectiveness in controlling heart rates and adverse effects, the use of cardiac stimulation devices may be indicated⁴. The most frequent arrhythmias are the dysfunction of sinoatrial node, supraventricular tachyarrhythmias, atrial fibrillation, atrioventricular block, ventricular tachycardia and ventricular fibrillation⁵.

Implantable electronic cardiac devices (IECDs), such as pacemakers, resynchronizers and cardiofibrillators, are indicated for the treatment of more complex dysfunctions, being fundamental for the survival, hemodynamic functioning and quality of life of individuals⁶. A pacemaker has the main capacity of stimulation/sensitization as a therapeutic function for bradyarrhythmias; a cardiofibrillator can perform cardioversion/defibrillation by shock or rapid stimulation as a therapeutic function for tachyarrhythmias; and a cardiac resynchronizer is capable of multi-site (biventricular) stimulation aimed at ventricular resynchronization. The use of a cardiac device leads to change in an individual's daily life, which can interfere in some aspects of his or her life. The objective of this study was to evaluate the quality of life of individuals with IECDs.

LITERATURE REVIEW

Generally, the electrical activation of the heart appears at the sinoatrial node. In the case of arrhythmias, other subsidiary pacemakers can initiate the electrical impulse. This disorder in the functioning of the cardiac impulse is frequent in the general population, especially in individuals with cardiac arrhythmias, who can go through life without clinical manifestations or have a significantly compromised quality of life⁷.

Clinical conditions vary, and the symptoms frequently observed are palpitation, pre-syncope, syncope and precordialgia. The diagnosis is based on clinical history, physical examination and electrocardiographic records. Some arrhythmias have specific characteristics on the electrocardiogram, and it is essential to choose the electrocardiographic recording method, often using a holter (an event recorder) and the tilt test (orthostatic inclination). It is noteworthy that arrhythmias are often not approached or cared for as required⁸.

Due to the low effectiveness in controlling heart rates and adverse effects, the use of cardiac stimulation devices, such as a pacemaker, can be indicated⁴. Atrial fibrillation, bradyarrhythmia, atrioventricular block and supraventricular tachyarrhythmia constitute severe arrhythmias that compromise an individual's hemodynamic conditions, often requiring cardiac devices⁹.

IECDs, such as pacemakers, cardioverter defibrillators and resynchronizers, must be preceded by a clinical evaluation, electrocardiogram, echocardiogram, holter, laboratory tests and preoperative procedures. As to periodicity of evaluation, it is usually performed at hospital discharge, thirty days after implantation and every 3 or 6 months, depending on the type of stimulation, or whenever necessary, if complications occur⁷.

Individuals with IECDs may have been victims of a recovered cardiac arrest (secondary prevention) or considered to be at high risk for presenting it (primary prevention) with partial or total loss of consciousness, which raises concerns about safety while carrying out daily activities or about harming others¹⁰.

METHODOLOGY

This is a cross-sectional study carried out from June to November 2018. The sample consisted of 50 individuals of both sexes, with a medical diagnosis of cardiac arrhythmia who attended the Cardiology Outpatient Clinic of the University Hospital (UH), a tertiary-care referral hospital for the State of Maranhão, Brazil.

Sociodemographic, clinical and lifestyle data were collected. Two data collection instruments were used: the Medical Outcomes Study 36-item Short-Form Health Survey (MOSSF/SF-36) and the Assessment of Quality of Life and Related Events (AQUAREL). SF-36 assesses physical health in eight dimensions (functional capacity, physical aspects, pain, general health status, vitality, social aspects, emotional aspects and mental health)¹¹. AQUAREL, comprising 20 questions, assesses three domains (chest discomfort, arrhythmias and discomfort in exertion). Both instruments were translated and validated in Brazil¹². For the assessment of physical activity, an individual who practiced any physical activity twice a week for at least 60 minutes was considered active, and one who did not perform any activities or did it less often than twice a week was considered inactive or sedentary¹².

Data were analyzed by the Stata software, version 14.0 for Windows. Descriptive statistics was applied, with measurements of absolute frequencies, percentages and variability (mean and standard deviation).

To evaluate the association between the dependent variable (quality of life) and the independent variables, logistic regression was used; and to analyze the strength of such association, the odds ratio with a 95% confidence interval (CI) was applied. A variable composed of the SF-36 and AQUAREL scales was created as an outcome (dependent) - quality of life - and categorized into good and bad quality of life. The variables were selected using the stepwise backward method and adjustment was evaluated using the Hosmer-Lemeshow (HL) test. For all analyses, $p \leq 0.05$ was considered statistically significant. The research project was approved by the Research Ethics Committee of the Federal University of Maranhão as shown by approval document no. 2.605.937.

RESULTS AND DISCUSSION

Male individuals predominated - 29 (58%), with a mean age of 63 (± 18.93) years, *pardos* - 24 (48%), with a common-law partner - 23 (46%), unfinished elementary school - 20 (40%), minimum-wage income - 24 (48%), Catholics - 42 (84%), rural workers - 17 (34%), from the inner regions of the state - 28 (56%). Systemic arterial hypertension was common as a comorbidity - 39 (78%) and bradycardia as a basic heart disease - 18 (36%). The time elapsed since IECI implantation was up to 5 years - 24 (48%), without a generator change - 31 (62%). The majority of participants denied the consumption of alcoholic beverages - 47 (94%), cigarettes - 44 (88%) and the performance of regular physical activity - 34 (68%). Based on knowledge about the health-disease process, life habits can change and improve quality of life¹³. The change in the behavior and lifestyle of patients with IECI depends mainly on how the disease is interpreted and understood. The greater the knowledge deficit, the greater the difficulty to return to one's lifestyle existing prior to the disease, which negatively affects quality of life¹⁴.

In this study, a significant number of individuals reported not being an alcoholic and/or a smoker, which may be associated with cultural, social and religious factors. It is recognized that in recent years there has been an increase in campaigns to fight these habits, as it is known that such diseases can be etiological of arrhythmias, culminating in the implantation of a device.

The sedentary lifestyle of most individuals in the sample draws attention. The benefits of regular physical activity are well documented, as it improves blood flow and endothelial function, and its positive effects on physical, social and mental aspects are unquestionable¹⁵, which suggests a positive influence on quality of life¹⁶. The importance of an active lifestyle in individuals with IECIs¹⁷ as well as the monitoring by a multidisciplinary team, and by a physical educator in particular, for adequate programming of the device's cardiac rate are emphasized¹⁸.

Individuals with an IECI of up to 5 years who had not required a generator change predominated in the study. The time of implantation of the device is associated with better vitality, that is, the longer the implantation time, the greater the reduction in quality of life. Therefore, monitoring by an electrophysiologist is necessary in order to check the functioning of the device, and when necessary, after a few years, replace its generator¹⁹.

The subjects described *faster heart beating* (palpitation) or *a sensation of feeling faint* (pre-syncope) as a sensation of arrhythmia perception. As regards IECI, pacemakers were predominant - 41 (82%). Only nine (18%) individuals used an implantable cardioverter defibrillator. No individuals used a resynchronizer. As for the findings obtained by the SF-36 instrument, it was observed that the lowest scores were for domains physical aspects (15) and emotional aspects (38.66), and the highest ones were for domains pain (88.8), mental health (71.92) and social aspects (64.54). The lower scores emphasized that the individuals had an aggravated perception of health, suffering more impact and vice versa. There were significant results in the domains physical and emotional aspects, as shown in Table 1.

TABLE 1: Values obtained for the domains in the SF-36 questionnaire. São Luís, Maranhão, 2018

Domain	Mean	Standard Deviation	Minimum	Maximum
Functional capacity	40.4	15.11	15	95
Physical aspects	15	29.88	0	100
Pain	88.8	16.35	52	100
General health status	40.52	14.49	15	77
Vitality	51.7	9.77	30	75
Social aspects	64.54	18.88	25	100
Emotional aspects	38.66	45.86	0	100
Mental health	71.92	10.67	36	88

It is considered that the use of any prostheses can cause reactions and emotional manifestations, since it changes lifestyle. Improving physical conditions does not always mean a similar improvement in psychological well-being; therefore, it is important to assess the limitations and possibilities offered, since a person with an IECED will be permanently connected to a biomechanical mechanism^{20,21}.

As for the results shown by the AQUAREL instrument, it was found that the lowest score was for the dyspnea domain (78.98) and the highest for discomfort (86.54). Although the low score was for the dyspnea domain, the individuals showed a better perception of symptoms and of quality of life after the implantation of an IECED, as shown in Table 2. The lower scores in the domains physical and emotional aspects in the study emphasized that the individuals had an aggravated perception of health and did not adequately assess such aspect. The domain functional capacity and general health status also showed low results with reports of difficulties in activities that require more effort and a bad perception related to their health, which points out that the quality of life is above average, being perceived by the participants as good in general.

TABLE 2: Values obtained for the domains in the AQUAREL quality of life questionnaire. São Luís, Maranhão, 2018.

Domain	Mean	Standard Deviation	Minimum	Maximum
Discomfort and pain	86.54	18.62	22	100
Dyspnea	78.98	22.09	18	100
Arrhythmia	84.50	15.12	45	100

It is noteworthy that the psychosocial dimensions revealed the importance of interpersonal relationships and of a social support network to guarantee better levels of quality of life, especially in chronic health conditions, which involves stigma, prejudice and exclusion as major challenges to be faced²².

The variables directly associated with the individuals' quality of life were sex and physical activity, according to Table 3.

Table 3: Logistic regression model of variables sex and physical activity with potential influence on the outcome quality of life. São Luís, Maranhão, 2018

Variable	Odds Ratio	p value(*)	Confidence Interval(**)
Sex	5.83	0.011	1.508523 - 22.5324
Physical activity	4.60	0.034	1.126508 - 18.85908

(*) Level of significance $p \leq 0.05$

(**) Confidence interval - 95%

The other variables were not associated with the outcome. Male individuals were more likely (OR: 5.83) to have a better quality of life than females. Likewise, those who practiced some physical activity obtained a better quality of life when compared to those who did not (OR: 4.60). The logistic regression model adjusted well to the observed data. In the Hosmer-Lemeshow (HL) test, $p=0.6814$ was obtained. There was a significant result for the variables male gender and physical activity, showing that both are related to quality-of-life improvement. The female gender variable was inversely associated with quality of life after using an IECED. Variable physical activity, on the other hand, was directly associated with quality of life; therefore, men who performed regular physical activity showed better quality of life.

Careful assessment of an individual with an IECED becomes essential, as there may be electromagnetic interference or dysfunction, thus causing unpredictable risk situations, such as shock shots²². As to this aspect, health professionals can reinforce the motivation for self-care development, which will imply better quality of life and adherence to treatment²³.

The broad spectrum of presentation of arrhythmias and related risks represents a major challenge for health professionals and services, which often do not offer the necessary approach and care to clients. The importance of training the health care team in order to ensure quality care is emphasized²⁴, as there is risk for sudden death, frequent hospitalizations and intraoperative and postoperative complications²⁵. Nurses, when prioritizing appropriate care for IECD patients, prevent complications and health problems²⁶.

CONCLUSION

Individuals have improved quality of life after implantation of a cardiac device, which results from reduced symptoms in the dyspnea and discomfort domains and changes in some lifestyle habits (AQUAREL). There was a significant association between the male gender and physical activity.

As limitations, the small sample and the site where the study was developed, a specialized service, are pointed out. It is suggested, therefore, that the study proposal be extended to other realities and services.

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