CASE REPORT

Medical device: e-health services

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ABSTRACT

The delivery of health care is shifting from the hospital to the community and the home; e-health services, remote monitoring technologies, and self-management are replacing hospitalization, while trips to the doctor's office and specially formulated medications are displacing standard treatments. The breadth and design of home health care equipment are greatly impacted by these advances. Electronic medical gadgets are now an essential component of contemporary healthcare. Currently, a wide range of electronic medical gadgets are utilized to treat patients, monitor bodily physiological parameters, provide therapy, and augment or even replace intricate biological processes. Such medical equipment includes cardiac pacemakers, cardioverter defibrillators, and cochlear implants, to name a few. The continual provision of adequate electricity to these devices is essential for their proper operation. In this regard, having a dependable, secure, and practical means of energy delivery is highly important. To meet the complex and varying energy requirements of medical equipment, several strategies have been devised.

Keywords: Medical device; Energy source; Health; Medical gadgets; Medical equipment

INTRODUCTION

The market for medical supplies and equipment is expanding globally. Modern technology is enhancing healthcare capabilities, and the tremendous economic opportunities that result are what spur innovation. In addition to hospital technology becoming more specialized and sophisticated, a variety of medical items are leaving hospitals and clinics and entering the community and residual settings for use by the general public. The growing demand for home health care equipment and services is mostly attributed to changes in the world's population and advancements in the health care system. As a result of longer life expectancies and a higher death rate, society is becoming older, and chronic diseases like diabetes, heart disease, hypertension, COPD, arthritis, osteoporosis, and depression are on the rise. The transition of healthcare services from hospitals to the community and home care settings has been made easier by advancements in e-health and telemedicine. The shift from institution centric treatment and care to patient-centric treatment and care at the point of need has been made possible by advances in Information Communication Technology (ICT), computing, remote home monitoring, electronic medical records, sensing technologies, wireless technology, virtual reality, and robotics. Together with advancements in technology, the idea that "health is a condition of complete physical, psychological, and social well-being, not merely the absence of illness," has increased the range and variety of home health care equipment and services [1].

The consistent provision of adequate energy to electronic medical equipment is crucial for their proper operation. In this perspective, a discrete energy source that allows for the requisite portability and energy independence for a long lifetime is greatly needed. A medical device's energy supply must meet several tidal requirements, the most crucial of which are dependability and operational predictability. The energy source needs to be able to reliably and constantly supply the gadget with an adequate amount of energy. Any fault or failure in the device's operation could have unintended consequences, including patient death or severe physical harm. The energy source shouldn't harm or poison bodily tissues, interfere with the body's vital signals like the heartbeat, or otherwise have any unintended effects on the body. Regulations should not be exceeded by heat dissipation brought on by device operation or energy transmission. Critical organ damage may ensue from the surrounding body tissues' rise in temperature as a result of the heat that was once contained in them. To maximize energy delivery efficiency and reduce energy dissipations, special measures must be made. Among other beneficial qualities, an energy source must have a high energy density and a large power capacity. A device with a higher energy density lasts longer and doesn't need to be replaced or recharged as often. Implantable energy sources must meet the requirements listed above as well as be hermetically sealable [2].

The three regulatory classifications I, II, and III are given to each of the generic device types recognized by the FDA. The classes are determined by the degree of control required to guarantee a device's effectiveness and safety; the greater the risk, the higher the class. For instance, a premarket approval procedure must be used to approve class III devices. These include artificial hearts and automated external defibrillators, which are implanted into humans permanently and may be required to maintain life. A gadget is categorized based on the risk it poses to a patient or user. Devices in class I have the lowest risk, while those in class III have the highest risk. The government, the manufacturer, the importer/vendor, the user, and the general public must all work together to manage the risk for medical devices to operate as safely and effectively as possible. The international standard ISO 14971: 2007 offers a structure for medical device producers that include risk analysis, risk evaluation, and risk control for risk management in a device's design [3].

Depending on whether the process or communicate sensitive information and whether they process or communicate safety-critical information, medical devices are given a security classification. Our recommended levels for devices that are security relevant are listed in the accompanying table. Note that this categorization is just the beginning. It is a starting step toward creating a more complete taxonomy of security levels even though it hasn't been fully developed yet. With the aid of mobile medical applications, healthcare workers are enhancing and facilitating patient care more and more. These applications are being used by more and more patients to monitor their wellbeing and health. These apps might encourage healthy behavior and give users access to helpful medical data. There are numerous applications for mobile medical apps. By connecting to them, they can increase the functionality of medical equipment by displaying, storing, processing, or transferring patient specific data. Not all medical apps for mobile devices offer a security risk. However, security measures must be adopted as soon as it processes, transmits, or even manages the medical device's critical information [4].

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Both types of devices make it easier to contract an illness. In the beginning, they cause harm to or invade epithelial and mucosal barriers to infection, giving microorganisms easy access to the deeper tissues and bloodstream. Second, these products frequently promote the growth of microorganisms while in use, acting as reservoirs from which bacteria can be later transmitted to other patients or infect the patient with the product (in-use or extrinsic contamination). Devices can occasionally offer bacteria a safe location that is largely inaccessible to phagocytes and other defensive mechanisms, especially when inserted into deeper tissues. Finally, even medical equipment that is designed to be sterile can occasionally become contaminated during manufacturing, which could then cause a patient to come into contact with germs. Less frequently used medical gadgets frequently put patients at risk for fatal, deep-seated infections [5].

These include intraocular lens prostheses, hemodialysis (linked to hepatitis, bacteremia, and shunt site infections), cerebrospinal fluid shunts (linked to ventriculitis, bacteremia, and local subcutaneous infection), orthopedic prostheses (linked to joint or bone infections), artificial heart valves (linked to endocarditis), vascular prostheses (linked to graft infection and bacteremia), and prosthetic heart valves (associated with endophthalmitis). Because hospital-to-hospital variation in utilization makes it impossible to extrapolate expected nationwide usage patterns from data recorded from a few institutions, it is unclear how many illnesses are linked to these devices. A significant cause of morbidity and mortality in hospitalized patients is device related infections. More descriptive research should be done in order concisely identify the incidence and prevalence of these infections. Despite the currently advised control methods, device related infections have persisted, which suggests that each prospective preventative approach needs to be thoroughly evaluated to determine its genuine usefulness. These research projects must follow a case-control design. Multicenter trials may be preferable in some circumstances to gather a sufficient number of infected individuals. It is important to conduct more research on the pathogenesis of these illnesses to determine whether present preventive strategies are being applied correctly. Finally, different methods for applying control measures should be researched, as well as the degree of compliance with advised preventive measures in busy hospitals [6].

REFERENCES

1. Klatzky RL, Kober N, Mavor A, et al. Safe, Comfortable, Attractive, and Easy to Use: Improving the Usability of Home Medical Devices, Committee on Human Factors National Research Council (U.S.). Washington: D.C.: Academic Press; 1996.
2. Demiris G, Afrin LB, Speedie S, et al. Patient-centered applications: Use of information technology to promote disease management and wellness. A white paper by the AMIA knowledge in motion working group. J Am Med Inform Assoc. 2008;15(1):8-13.
3. IEEE Standard for Safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz. IEEE Std C95.1-2005 (Revision of IEEE Std C95.1-1991), 2006; 1-238.
4. Denning T, Borning A, Friedman B, et al. Pacemakers, and implantable defibrillators: Human values and security for wireless implantable medical devices. In Proceedings of the SIGCHI conference on human factors in computing systems 2010;917-26.
5. Skorobogatov S, Woods C. Breakthrough Silicon Scanning Discovers Backdoor in Military Chip. In: Prouff E, Schaumont P. (eds) Cryptographic Hardware and Embedded Systems. Lecture Notes in Computer Science, Berlin, Heidelberg: Springer, 2012.
6. BAUER H, Ozols L, Poley B, et al. Endophthalmitis associated with implantation of intra-ocular lens prosthesis united states. Morbid Mortal Weekly Rep; 1976.