Project Statement

Accessible Home Vitals Signs Monitoring System

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Statement of Need

An accessible home vital signs monitoring system would be an affordable, easy to use alternative medical facility monitoring. Due to the increasing number of chronic illnesses, along with the shortage of nurses, home monitoring is becoming more and more of a necessity. Our design appeals to such patients who require frequent medical supervision while saving time, eliminating the expense of traveling to a doctor’s office, and reducing health-care costs. In addition to monitoring the patient’s current ailment, other medical irregularities will be able to be detected before they become problematic. Patients become more aware of their condition and how diet, physical activity, and other factors affect their medical state.

Our design will function as a noninvasive blood pressure, blood oxygen (SpO2) level, heart rate, and body temperature monitor, which will be displayed on an LCD screen. With time permitting, we would also like to add the weight and respiratory rate options. An audio and visual alarm will also be integrated into this design to alert the patient or care provider of irregular and dangerous vital sign values. The patient or care provider with then be able to transmit the data to their healthcare provider or healthcare facility via a USB flashdrive on a secure, password protected website to maximize patient privacy. In case of a power failure, a backup battery system will be installed thus increasing the reliability of this home monitoring system. Since this product will be predominately used in the home, we will design it to ensure that users of all ages will be able to operate the monitor with no difficulty.

Basic Preliminary Requirements

- The device must be able to read vital signs including: heart rate, temperature, weight, breathing rate, blood pressure, and blood oxygen level.
- Since there are already similar devices available, it is important to design this one as cost efficient as possible.
- This device must be easily accessible and light weight so it can be used by people of all ages.
- The device must be easy to use so all types of people could use it.
- The device must be able to store vital signs and transmit them directly to a local health care center.
- The device should be wear resistant and durable so the device will have a long life span.
- The device must be easily transportable and compact so it is more practical for home use.
- The device must have an easy to read display screen allowing for vital signs to be easily read by the visually impaired and have audible output.
- Interface buttons should be large and textured so as to be accessible by people with various handicaps.
Basic Limitations

This device must be accessible, safe, and suitable for home use. Because this device is being designed for clients of different ages with various disabilities, the use of the device, from the biosignal transducers to the interface, should be simple, easy, and friendly. Home vital signs monitoring devices come in direct contact with patients during use, so safety is very important. The patient needs to be isolated from any feedback that may occur through the biosignals transducers (thermometer, blood oxygen level monitor, etc.). Also, the device should be relatively lightweight and portable, as it will be used in the home environment. It should be durable (able to withstand falls off a nightstand or being knocked over) and unobtrusive. Not many people like for their homes to look like hospitals, so when not being used, the device should blend into the room as another piece of electronics.

Other Data

When designing this device we must keep in mind our clients. The first client is a 52-year-old male who is blind and just recently had a small stroke. He is proud of his physical condition, but dislikes high technology. He lives with his vision-impaired wife who loves the Internet. The second client is a 31-year-old female who recently received a head injury that has left her partially paralyzed on her right side, which is her dominant side. She administers pain medication to herself through an infusion pump. She is concerned about the appearance of the equipment in her home and does not want to look sick to the family and friends that come to visit her. The third client is an 86-year-old female who is deaf, has severe arthritis, and a heart problem. She lives with her son, his wife, and grandson and receives infusions for her heart problem. Her 11-year-old grandson loves electronics and assists her in collecting her vital signs.

Questions

How will we incorporate generic bought transducers into the device?
How will we make the casing?
How will we design the device so it won’t stand out in the home environment?
How many buttons will we use and how will we make them accessible?
How will we include audio output/prompting?
How will we save data and transmit it via the Internet?
Should we include a scheduling option?
How long will we record vitals signs for?
Should we add a battery backup?
How will we make the weight option accessible for all patients?