

PAIN MONITOR AND RECORDER

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PROJEK SARJANA MUDA II

Tajuk Projek : PAIN MONITOR AND RECORDER

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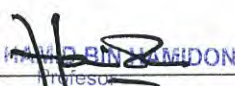
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DECLARATION

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DEDICATION

Alhamdulillah,

I dedicate my dissertation work to my family and many friends. A special feeling of gratitude to my loving parents, Abdul Rashid Fikri Bin Abdul Rahman and Hafshah Binti Ismail whose words of encouragement and push for tenacity ring in my ears.

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ABSTRACT

There are various tools used to measure the pain level experienced by the patient. All the tools allow the user to express their pain in term of scales. The user is required to mark the pain scale depending on their pain experienced while enduring the pain. This tool is used for those patients who are conscious only. This is because, they know better about the pain that they are experiencing. However, existing pain scales are not good enough due to several weaknesses. The pain scales cannot record the data. Therefore, the data that is required to be collected day by day before statistical analyzing is not available automatically. When this happens, it affects the quality of measure and could affect the treatment. The doctor would needs a lot of time to decide on the types of treatment required. Existing tools, cannot explain the absence or presence of other types of pain condition. For example the absence or presence of itch and nausea besides the actual pain due to the injury itself. Pain Monitor and Recorder is a device designed to record levels of pain to be used in patient. This tool is used to track the progress of patients through the pain experienced. The pain monitor system is a monitoring device using PIC microcontroller to measure the pain level experienced by the patient. The system will allow the user to update their pain level time after time for supervision by the doctor. Two pushbutton switches are used to measure the presence or absence of other pain conditions. The data that comes from the patient will be stored in an EEPROM memory inside the pain monitor for detailed analysis.

ABSTRAK

Terdapat beberapa jenis alatan yang digunakan untuk mengukur tahap sakit yang dialami oleh pesakit. Setiap alatan tersebut membolehkan pengguna untuk menunjukkan sakit yang mereka alami di dalam bentuk skala. Pesakit perlu menanda skala tersebut berdasarkan pengalaman sakit yang mereka alami. Selain daripada itu, alatan-alatan ini hanya digunakan untuk pesakit-pesakit yang dalam keadaan sedar sahaja. Hal ini adalah kerana, mereka lebih memahami keadaan sakit yang mereka hadapi. Walaubagaimanapun, skala sakit yang sedia ada ini memiliki beberapa kelemahan. Alatan-alatan tersebut tidak boleh merekod data. Jadi, data-data tersebut perlu diambil setiap hari sebelum data dianalisis(rekod secara manual). Apabila hal ini berlaku, ianya akan memberi kesan terhadap kualiti rawatan. Doktor memerlukan masa yang lama untuk membuat keputusan berkenaan jenis rawatan yang diperlukan. Alatan-alatan sedia ada tidak dapat menunjukkan jenis sakit yang lain selain daripada sakit yang utama. Sebagai contohnya kehadiran gatal-gatal dan pening kepala yang dialami pesakit secara tiba-tiba. Perekod dan pemantau sakit dihasilkan untuk penjagaan pesakit . Alat ini digunakan untuk mengesan kemajuan kesihatan pesakit melalui kesakitan yang dialami. Sistem pemantauan sakit merupakan alat pemantauan menggunakan PIC mikropengawal untuk mengukur tahap kesakitan yang dialami oleh pesakit. Sistem ini akan membolehkan pengguna untuk mengemas kini tahap kesakitan mereka masa demi masa untuk pengawasan oleh doktor. Dua suis punat tekan digunakan untuk mengukur kehadiran atau ketiadaan keadaan atau jenis sakit yang lain. Data yang datang dari pesakit akan disimpan dalam ingatan EEPROM di dalam Perekod dan Pemantau Sakit dari masa ke semasa.

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LIST OF ABBREVIATION

NUM.	ACRONYM	-	DEFINITION
1	LED	-	Light emitting diode
2	PIC	-	Peripheral interface controller
3	USB	-	Universal serial bus
4	RTC	-	Real-Time Clock
5	PCB	-	Printed Circuit Board
6	IC	-	Integrated Circuit
7	EPROM	-	Erasable programmable read-only memory
8	EEPROM	-	Electrically erasable programmable read-only memory
9	I/O	-	Input/output
10	PC	-	Programmable Controller
11	LCD	-	Liquid Crystal Display
12	ISA	-	Instruction set architecture
13	SRAM	-	Static random access memory
14	KB	-	Kilobyte
15	ICSP	-	In circuit serial programming
16	ARES	-	PCB layout designer
17	3D	-	Three dimension

CHAPTER I

INTRODUCTION

1.0 Project Summary

Pain monitor is a device designed to assist in patient care. This tool is used to track the progress of patients through the pain experienced. The pain monitor system is a monitoring device using PIC microcontroller to measure the pain level experienced by the patient. The system will allow the user to update their pain level time after time for supervision by the doctor. A line of 10 pushbutton switches representing the input from the user. These pushbuttons also represent pain threshold values. Input '1' represents no pain while input '10' which is the highest rating represents the worst pain imaginable. The system is able to show the trend of data inserted by the patient and display the status on an LCD screen. The monitoring is displayed in windows on the personal computer.

There are many "pain scales" used such as visual analog score, numeric score intensity, graphic analog score and so on. The most common one is the visual analogue score. This type of tool is a 100mm line where one end represents no pain while the other end represent the worst pain imaginable. The patient is expected to mark along this line depending on their pain severity. Pain is a subjective experience and its perception will vary from patient to patient. The idea to create the device comes from those existing pain scales to monitor the patient condition.

The pain monitor requires an input from the user. The device act as a tool that can manually measure the painful experience of the patient and record it automatically. The pain monitor will always display the latest input that comes from the user on an LCD screen. The data that comes from the patient will be stored in the EEPROM memory inside the pain monitor time by time. Besides that, the pain monitor can also display the full data that stored in the memory in a group of data (continuous data). The data can be displayed on windows by using the Personal Computer. The device is portable in used (use battery). Therefore, even though the patient is at home, the Doctor still can learn about the pattern of the pain experience by the user of this device.

1.1 Problem Statement

Pain scale assessment is a tool that is commonly used in medical treatment. The use of pain scales such as visual analog score, numeric pain intensity and others is needed in order to measure the pattern of pain experience of patient. This is because, it is important to understand the pain that comes from a patient. However, the use of pain scales is not good enough because:-

a) The pain scale assessment cannot record the data.

- The pain scales that is commonly used is in visual analog score. The tool appearance is in terms of a 100 millimetre ruler. These are tools that cannot record the data by itself after receiving the input from the user.

b) The doctor needs to record the data from the patient manually before analyses.

- The problem happens due to the weakness of existing pain scales and pain assessment. They cannot record the data. Therefore, the data need to be collected day by day before statistically analyse of the data (manually record). When this happens, it affects the quality of treatment. The doctor needs a lot of time to decide on the types of treatment.

c) The patient cannot express the absence or presence of other painful condition

- The existing tool cannot explain the absence or presence of other types of pain condition. For example the absence or presence of itch and nausea besides the actual pain due to the injury itself.

1.2 Objectives Of Study

The objective of this project is:-

- a) To create a device that can monitor the pain from a patient continuously in a systematic monitoring system and statistically analyse the data.
- b) To program the pain monitoring system using PIC microcontroller, where the program simulates data from patient.
- c) To display the recorded data from the patient using the LCD and Windows on the personal computer.

1.3 Scope Of The Project

The scope of this project is to measure and record the pain level of the patient. However, the measuring process require the patient themself to insert the input. This process is inserted manually since the patient knows better about what type of pain that they are facing. The recording process will take place after the pain monitor receives the data. The process of measuring, recording and displaying the data gathered from the patient is not the same as the existing pain tools. Therefore the scope of the project to explain the measuring, recording and displaying process. The component are use as follow:-

1.3.1 Measuring Part

1. A line of 10 pushbutton switches representing and measuring the pain threshold values.
2. 2 pushbutton switches to measure the presence or absence of other patient conditions.
3. 13 LED to visually indicate conditions selected.
4. Using a PIC microcontroller to decide the condition and express it in terms of words that human understand.

1.3.2 Recording Part

1. A non-volatile memory Serial EEPROM with 32K bytes storage is used, so that the data inside the pain monitor cannot be changed.
2. The unit can be switched off without memory loss..
3. Provision for monitoring up to 99 patients on the same unit.
4. PIC monitor switch presses, a record of which switch is selected and the time it is pressed.

1.3.3 Display Part

1. The LCD display the latest recorded patient data
2. A Serial PC interface is used to display the full set of data inside the personal computer (any current windows platform) .

1.4 Methodology In General

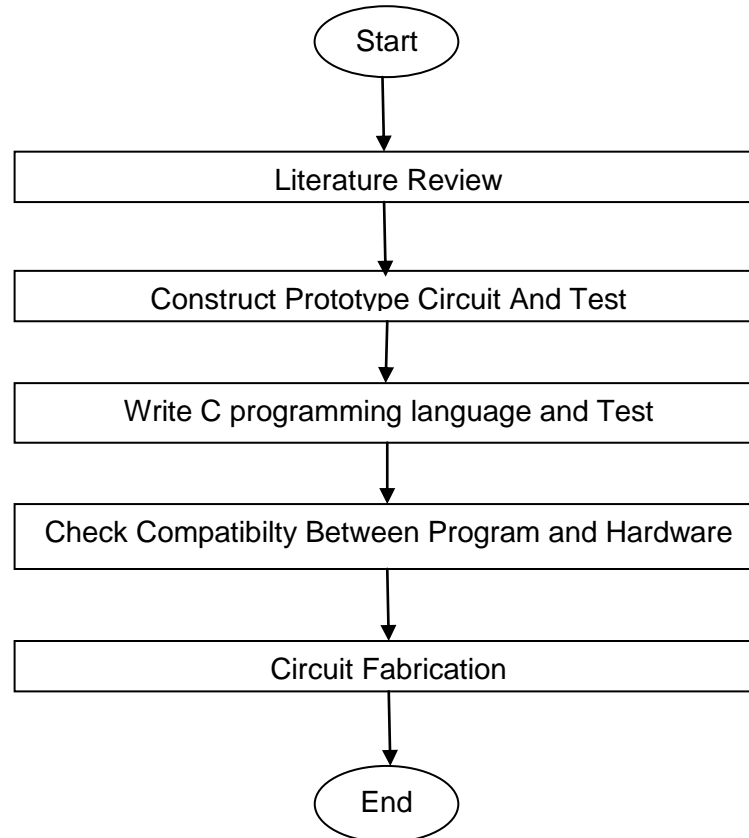


Figure 1.1 : Methodology in general

1.5 Project Importance

This project is very important in order to improve the quality of the treatment for the patient. The pain monitor is an electronic device that combines the ability to measure and record the pain level experienced by the patient. Therefore, it can allow the patients to express their pain level. Apart from that, it also helps the doctor to monitor the pattern of pain experience of the patient within a short period of time.

CHAPTER II

LITERATURE REVIEW

This chapter presents the literature review that is related to the existing pain scales as a tool to track the pain experience of the patient.

2.1 Existing Tools To Measure Pain Level

There are various tools used to measure the pain level experience by the patient. All the tools allow the user to express their pain in term of scales. The user need to mark the scale depending on their experience while enduring the pain. Apart from that, this tool is used for those patients who are conscious only. This is because, they know better about the pain that they experienced.