The Effectiveness of Smart Palliative Bed to Measure a Patient's Weight

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Abstract-Patient safety is the most important thing in health services at the hospital. Hospital services have a high risk of patient safety, especially in providing medical care and treatment. The most common incidence of patient safety in Indonesia is the mistake of administering drugs. It needs innovation that can facilitate health workers in carrying out their duties, especially calculating drug dosages by knowing the patient's weight through the bed scale. The research method used in this study is research and development, namely the research method is used to produce a particular product. Then the finished product will be tested with 16 respondents selected by according to the criteria, the study sample was taken using a purposive sampling system. Respondents were weighed twice, first with digital floor scales and second with bed scales. The results of this study are patient bed products with weight scales for total bed rest patients. Then conducted a test on the respondent and the results were tested using paired t test, the result was a P value = 0.333> 0.05. These result indicate that there is no difference between the digital floor scales and the bed scales. Bed product with weight scales is a new innovation in the health world that function as weight-weighing patients who are unable to get out of bed. So that patients can do direct weighing in bed to find out the latest weight and as a basis for calculating the drug dosage that the nurse will provide.

Keywords: patient beds, scales, weight

I. INTRODUCTION

Patient safety is the most important thing in health services in hospitals. Hospital services have a high risk of patient safety, especially in providing medical care and treatment. The progress of the world of technology will require progress in the field of service to society. Progressing in the world of technology makes services in the health sector easier, faster, more precise and efficient. Advanced equipment in the world of health is very necessary to make it easier for health workers to take care and treat patients (1).

Giving medicine to patients at the hospital is a routine action carried out by paramedics and medical. The drug given must be in accordance with the dosage and therapy recommended by the medical team, each dose of administration must be adjusted to the calculation of body weight or body width. Based on data from the National Patient Safety Map (PERSI Congress, 2007), medication errors were ranked first at 24.8 percent of 10 cases. The Ministry of Health reports that the most frequent incidents of patient safety in Indonesia are errors in drug administration (2). The study conducted at the UK Hospital was out of 36,200 drug instructions, found 54% of the dose errors occurred in administration to patients (3).

Errors in drug administration can be caused by humans or errors in data obtained by nurses. Data needed for drug

administration is to know the body weight or body area of the patient (4). Information on body weight is obtained by taking measurements first using a weight scale. Weighing body weight in patients hospitalized can be performed on patients who are able to mobilize, whereas not all patients can be measured for immobilization.

Joint Commission International (JCI, 2011) said that patient safety consists of (1) correctly identifying the patient, (2) increasing effective communication, (3) preventing drug errors, (4) preventing procedural errors, places and patients in surgical procedures, (5) prevent the risk of infection, (6) prevent the risk of the patient falling. The report from the Institute of Medicine (2006) in Purwanto (2017) explains that there are errors in the drug administration procedure of more than 1.5 million patients each year and each inpatient is at risk to get a mistake in administering a daily dose of medication.

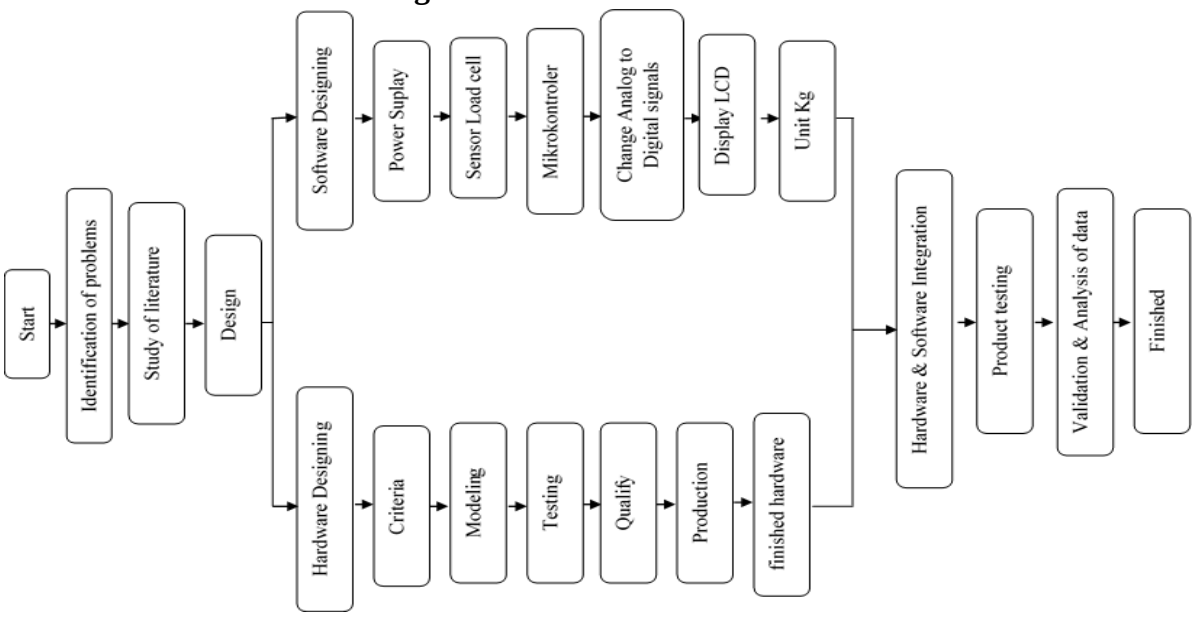
The causes of drug errors are divided into three, namely prescribing errors, dispensing errors, and administration errors (5). All of these causes involve information that must be obtained, namely the patient's weight. In paramedic and medical dose calculations, it requires weight and body size. During this time when giving drugs more often using the patient's weight. New innovations are needed for patients who experience total bedrest so that the body weight is still in accordance with the patient's condition when administering the drug.

Based on the problems described above, researchers want to conduct research related to designing patient beds that are able to accurately weigh and not cost expensive manufacturing. The design of the patient's bed is expected to be a solution for nurses to find out the patient's weight in immobilized patients. The objectives in this study are as follows; 1) Knowing how to arrange the bed according to the needs of the patient, 2) Knowing how the patient's bed works with a weight gauge, 3) Knowing the patient's weight using the patient's bed.

II. METHOD

The research method used in this study is reseach and develompment, the research method used to produce a particular product. Furthermore, it begins with creating a framework, where the work will outline the sequence of activities in this study. Figure 1.1 shows the framework for the method of conducting research.

Figure 1.1 Research Framework



The first stage is identifying problems, after which problem solving is done by making and looking for references in the literature review. The next step will be obtained by the hypothesis that the concept of designing a patient's bed with the patient's weight scale with the stages of designing hardware and software.

After designing hardware and software are complete and testing has been done for each sub system designed, the next step is to integrate the hardware and software that has been designed.

Beds with weight scales that have been completed will be tested using respondents as examiners of the tool. And the results of testing the tool are compared with digital floor scales, after which the results of both tests are conducted Paired T Test to find out if there are differences between the digital scales and the bed scales.

III. RESULTS

Figure 1.2 is a bed with a weight scale ready for use. Beds with this scale are able to weigh a person up to 500kg of weight.

Figure 1.2 Beds with Weight Scales

Testing is done to ensure that between hardware and software works properly and can be used. Tests are carried out using digital scales as a comparison of whether the scales on the patient's bed are working properly. Testing by using respondents as tool testers, sample selection is done using the formula frederer (n-1) (t-1) ≥15, obtained by respondents 16 with the criteria of the sample are male and can be invited to cooperate.

Stage of weighing respondents:

1. Respondents were asked to take off their shoes, sandals and items taken except the clothes worn by the respondent.
2. Respondents were asked to weigh on digital scales
3. The researcher records the results of the scales from the respondents
4. Respondents were asked to go to bed with weight scales
5. Lock Frame Order Plate off
6. The researcher turns on the digital display and waits for the results
7. The results will look accurate when the Stable menu is on
8. The researcher records the results of the respondent's weighing
9. And done again from stages 1 to 7 to other respondents.

Table 1.1 Test Results for Paired T Test Statistic

Jenis	N	*Mean*	*Sig. Correlation*	*Sig. Differences*
Timbangan				
Timbangan Digital	16	61.637 5	0,000	0,333
Timbangan Tempat Tidur	16	61.700 0		

Table 1.1 explains that the average value of the digital scale is 61.6375, while the bed scale has an average of 61.7000. significant test results the relationship between the two types of scales is 0,000, which means <0.05, meaning that there is a relationship between digital scales and bed scales. And the results of the significant difference test are 0.333> 0.05, which means there is no difference between the digital scales and the bed scales.

IV. DISCUSSION

The way of working from a bed with this weight scale is to use a load sensor that is connected to a digital display. There are four load sensors installed in each corner of the patient's bed frame with a weight capacity of each sensor is 500kg. Four load sensors are put together on one cable, then one cable is connected to a digital display that has been prepared. The pressure given to the sensor load will be converted from manual to digital, so the numbers that appear on the screen are digital numbers.

This bed with weight scales can be used as a measure of weight in each drug administration or nutritional need for patients who are unable to get out of bed. So that it will reduce the level of errors in administering drug doses. Because the data needed in calculating drug dosages is body weight (4).

This bed with weight scales can be used as a tool for patient beds in hospitals, especially for patients who cannot mobilize, so that patients can just stay asleep in the patient's bed to find out their weight without having to get out of bed. Suggestions in this study so that it can be further developed by adding output from digital is knowing the patient's body weight with the patient's calorie needs every day.

V. CONCLUSION

Setting the weight scale with the patient's bed requires precision in order to bring accurate values when weighing, because if the digital scales are in a place that is not equal, it will produce a value of min. So that it needs to be placed on a flat surface, in order to get a high accuracy value.

The results obtained from the bed test with this weight scale tested using the application in the form of a paired T test found that there was no difference between the digital scales and the scales on the bed with a significance level of 0.333 greater than P value (0.05).

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