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RESEARCH ARTICLE

DESIGN BACKPACK ERGONOMICS INFUSION OF DATA USING SPACE INPATIENT ANTHROPOMETRY (CASE STUDY HOSPITAL BUDI KEMULIAAN)

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ABSTRACT

In health or hospital facilities is of great concern. The facilities and amenities such as a bed patient infusion device either in the inpatient or outpatient in space. In this study, infusion devices is the focus of this research is the design of Infusion pole. The design of a portable infusion bag must follow the concept of ergonomics design tool. In using such a product, the user will always be looking for a more practical both in use and in storage, because these things will greatly ease the burden on the user to use it. Along with the development of a product will always have innovation in accordance with the needs of its users. Due to the success of the industry in the face of competition is determined by the success in designing and developing products that conform to the desires of consumers and the speed of the industry to adapt / respond to changes in consumer desires. Infusion pole is one of the medical devices that are used to enter into the patient's body fluids. This research aims to design and develop Column Infusion ergonomic backpack shape according to the patient's needs. Design using the model of the human body such anthropometry shoulder height, shoulder width, abdominal circle and circle data. Anthropometry patient data retrieval to design a portable pole conducted at Hospital Budi Kemuliaan by taking 50 patient data on anthropometric data in accordance with the design of the pole. Based on the data processing takes into account the patient's body anthropometry it creates a portable infusion bag with size according to the patient data obtained , the considerable standard deviation , mean and percentile . Obtained high bag size of 47.04 cm, a width of 33.96 cm bag, circle bag fastener width of 84.3 cm and a bag in a chest binder of 27.84 cm. Portable infusion backpack designed to match the needs of people who are following the design model of the human body measurements (anthropometry). Backpacks infusion can be taken by patients without assistance from other parties and reduce the occurrence of infusion pole fallen or falling, when the patient walks.

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INTRODUCTION

In the field of healthcare or hospital facilities is of paramount concern. The facilities include a bed and infusion equipment facilities in room patients either inpatient or outpatient space. In this study, the infusion apparatus is the focus of this research is the design of infusion pole. Design of drip stand must follow the concept design tool ergonomics. In general, infusion pole has the benefit or usefulness as a facility that should be used by the patient when inserting intravenous fluids. infusion fluids were hung on the infusion pole that fluid infusion into the body of the patient.

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Advances in technology facilitate more employment and human activities have sprung up equipment new creature that has the power to more than on the basis of previous abilities. The use of infusion pole for patients is an integral part of the patient's bed. Its use with infusion fluid impinging on the mast top. Adjustments can be performed up to depths up to 135 cm. Users of this infusion pole tend to be difficult to removable, if the patient wants to move it should be assisted by the patient's family or by a nurse to move it. This means that if a patient wants to walk need to ask for help. Less balanced movement could lead to collapse because of infusion pole infusion buffer width ranging from 50 cm to 60 cm. means being balanced if the pole is lifted up to the maximum position. From the above problems is known that the tool used is still not good if the patient wants to travel around the hospital as to the toilet, to the taking of drugs and to the laboratory.

Every patient who wants to travel need to enlist the help of family or caregivers. The purpose of this study was to design a model of backpack ergonomics infusion using anthropometric data.

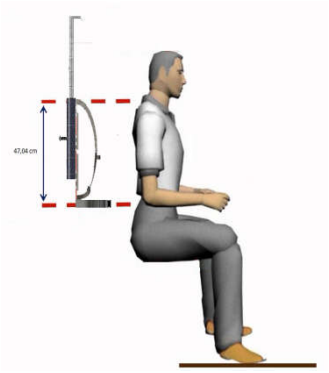

Figure 1. Backpacks Display Infusion Side View

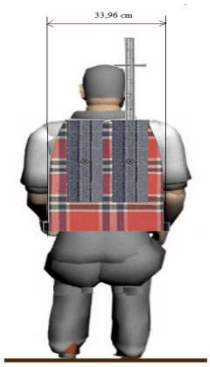

Figure 2. Rear Display Infusion Backpacks

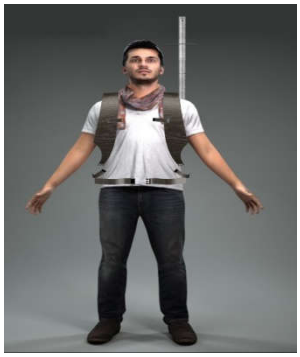

Figure 3. Infusion Backpacks Display Front

LITERATURE REVIEW

Ergonomics is a discipline of the engineering industry as a scientific discipline in relation to the job (Sritomo Wignjosoebroto, 2008: 54). The purpose and goal of ergonomics is to get a complete knowledge about the problems of human interaction with technology and products, so it is possible the existence of a draft system of humans (technology) is optimal Wignjosoebroto, 2008: 55). The interaction between the human dimensional space can have an impact anthropometric, that suitability dimensions of space to the dimensions of the human body. The dimensional suitability can be one of the benchmarks for human comfort as users.

Anthropometric will basically involve the physical size or function of the human body, including here the linear size, volume weight, space, and others. Anthropometric data will be very helpful in the planning of the work equipment or work facilities (including space planning work here). Ergonomic requirements require that equipment and facilities that work according to those who use them, especially concerning body size dimensions. In determining the maximum or minimum size usually used anthropometric data between the 5-th and 95-th percentile. For the planning of the work stations of anthropometric data will be helpful both in selecting facilities suitable working dimensions with body size operators, as well as in the planned dimensions of the workspace itself. Dimensions workspace will be affected by the subject matter, namely the physical situation and the employment situation there. In determining the dimensions of the study need to be considered, among others, within the range that can be done by the operator, restrictions were tasty and enough space to provide more flexibility operator motion and minimum area requirements that must be met for certain activities.

Research Method

Research conducted at the Hospital Budi Kemuliaan Batam Riau Islands. The type of data that is obtained is through quantitative data. The quantitative data obtained through direct observation and recording of the patient's body size dimensions and size of the facility specialized inpatient infusion pole. Source of data used in the design of the backpack infusion by using primary and secondary data. The primary data obtained from interviews with patients or caregivers while secondary data obtained from books related to the science of ergonomics. Data processing method:

Adequacy of test data.

$$N' = \left[\frac{k\sqrt{n\sum x^2 - (\sum x)^2}}{\sum x}\right]^2 \quad (1)$$

Normality test data

Contains the adequacy calculation result data for each dimension and a description of whether the results indicate sufficient data or not, the normality of the data processing and percentile. Uniformity data. Upper control limit (BKA), lower control limits (BKB) using a 95% confidence level.

The control limits above / lower control limits (BKA / BKB):

$$BKA = \bar{X} + k\,\sigma \quad (2)$$

$$BKB = \bar{X} - k\,\sigma \quad (3)$$

Percentile.

This study used percentile for body anthropometric dimensions are:

$$P5 = \bar{X} - 1{,}645\,\sigma \quad (4)$$

$$P_{50} = \bar{X} \quad (5)$$

$$P_{95} = \bar{X} - 1{,}645\,\sigma \quad (6)$$

RESULTS AND DISCUSSION

The design approach anthropometry model of the human body including shoulder height, shoulder width, circle abdomen and chest circle. Antropomentri data retrieval patient to design a portable IV pole carried out in the Hospital Budi Kemuliaan Batam by taking 50 patient data on anthropometric data in accordance with the design of the infusion pole.

Table 1. The test results percentile anthropometry

No.	Dimension	Value of Ergonomic body, anthropometry (cm)		
		P_5	P_{50}	P_{95}
1	Shoulder height of Waist	45.27	47.04	48.815
2	Shoulder width	31,62	33,96	36,3
3	Circle Waist	81,41	84,3	87,20
4	Chest width	26,33	27,84	29,35

Based on anthropometric data processing by considering the patient's body it creates a portable infusion bags with sizes according to patient data obtained, taking into account the standard deviation, mean and percentile. High-bags obtained a size of 47.04 cm by 33.96 cm wide bags, bag binder circle of 84.3 cm and width of the bag in the chest binder of 27.84 cm. Backpack portable infusion is designed according to the needs of patients who followed the model of the design of the human body measurements (anthropometry). Backpacks infusion can be taken by patients without the help of others and reduce the occurrence of infusion fallen pole or fall, when the patient walks.

Conclusion

Research on Designing Backpacks Portable Infusion Case Study of Hospital Budi Kemuliaan Batam, it can be concluded as follows: 1. High Waist Shoulder of designing backpacks for infusion in getting the results of calculation with a value of 47.04 cm, 2. Shoulder Width of body dimensions backpacks infusion humans to design calculation results obtained by value of 33.96 cm, 3. Circle Waist (Stomach) for the measurement of body dimensions of adults to design a bag reminders calculation results obtained with a value of 84.3 cm, 4. Chest width on designing backpacks infusion for dimensional measurements in the adult body can value 27.84 cm, 5. the materials used for the design of portable infusion backpack is the material of cotton fabric and frame made of mild steel. Based on the results of the draft, the infusion excess of Poles Backpacks models are: 1. Backpacks portable infusion is designed according to the needs of patients who followed the model of the design of the human body measurements (anthropometry), 2. Backpacks infusion can be taken by patients without the help of others, 3 . Reducing the IV pole that falls or fall, when the patient walks.

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