ACADEMIC HOSPITALS AND STOCK ADMINISTRATION: DETERMINANT FACTORS FOR IMPROVING HOSPITAL ADMINISTRATION.

Altair de Almeida Campos – Author - Universidade Federal da Paraíba/UFAL – Brazil, altair.campos@uol.com.br; Rawlla Eriam Oliveira Costa – Author – Universidade Federal da Paraíba/UFPB – Brazil, rawlla@yahoo.com.br; Luiz Bueno da Silva - Coordinator – Universidade Federal da Paraíba – Brazil, bueno@ct.ufpb.br

Abstract

This paper presents the difficulties involved in the administration of academic hospitals, the context in which they are inserted and the factors that determine a good administration as well as the proposal of improvement of the administration were considered. The logistics of supplying academic hospitals is discussed and we aim to produce a reflection on the theme in the ambit of Production Engineering. A survey conducted by the authors with 46 workers at an academic hospital in Maceió, during October 2006, shows that 31.5% of known problems that affect the supply department were related to bureaucracy. A lack of work flow and routines represents 7.6% and material specification 6.6% of the problems met. To verify which factors were determinant for the improvement of hospital administration longer studies of exploratory techniques of data variability summarising were used. It was concluded that the academic hospitals inserted in a government context, will only improve their administration starting from better staff selection, revision of internal processes, and application of an appropriate planning strategy. Supply management and production planning can offer a great contribution in academic hospitals bringing improvements for their patients’ lives.

Keywords: Supply administration, academic hospitals, hospital administration

1 INTRODUCTION

To administer an organization nowadays, be it private or public, has become a great challenge. To identify it's objectives, to select and prioritize problems has always been part of the administrator's job since the beginning of administration. To establish and concretize planning, marketing, benchmarking and human resource policies has become a big nuisance to managers worried with a process every day more dynamic and that requires quick and correct decisions.

Management activities in health services, mainly in academic hospitals, comes across many urgent problems which disturb the decisory agenda and cause an internal discomfort in the operational structure and a large waste of time and resources acting in the resolution of urgent problems, leaving planning for the second plan.

In this context, the authors developed a practical study with the application of interviews and questionnaires on 46 respondents in areas directly involved with the problem in Universidade Federal de Alagoas (UFAL)'s academic hospital aiming to reach a quantitative and descriptive evaluation of the causes for the lack of materials. Due to its importance, likeness and scope, the results could be extended to other hospitals.

1.1 Planning in the social health area

According to the Neoclassical Theory of Administration, planning is an administrative function. With planning it is intended to build the future, by means of an action that starts in the present, been bigger when the organization comes across problems or opportunities and when the responsibility with organizational results is high.

Within the problem categories which show themselves in the health area and that should be confronted with the different types of planning there are: well-structured or badly structured, final or intermediate, actual or potential [1].

In the context of academic hospitals, other dimensions to be considered are the actors involved that, in a wide sense, are the various spheres of government that act on the management models and on its finance, the manager in the health area, hospital directors and professionals strong in their beliefs and values.

In the middle of all this are found medical teaching and patient assistance. The system managers could adopt policy implementation strategies and differentiated allocation of resources as for his extension in the process, and his motivations as well as to the system’s control, regulation and autonomy.
1.2 Administration, supply and stock control

Stock administration in a public hospital operation differs from that in industry. In industry, the production line is turned off when a material in lacking. In a hospital when the correct material is lacking, the material that is lacking is substituted by another without the same specifications and therefore without good quality.

Supply can be conceptualized as an activity that has as aims to keep the productive system of an organization with all its materials – quantitatively and qualitatively – available in the correct places (services). Therefore, it is the supply system that feeds the productive activity with all the necessary materials to administer a hospital [1]. However, the following author [2] defines: “supply is the action or act of supplying; provisioning, beat”. Stock management is responsible for controlling the total availability of materials in an organization, that is, the available stock in the storehouse and order balance.

The wastage of time in the conclusion of purchase contracts is huge. The personnel try only to blindly follow the legislation without considering the final activity of the academic hospital. Delays caused by wrong interpretation of the legislations and the lack of administrative preparation by gerentially short-sighted personnel in key roles end up jamming adequate planning and functioning structure of the unit. Moreover, elevated levels of stock of materials are kept in order to compensate the losses due to delays and operational inefficiencies. As an answer, hospitals must prioritize the acquired gains in other areas with the introduction of modern technologies, new equipments and mainly in the dry structuring of its processes. Basically, it is necessary that good attendance planning for hospital demand is done applying the definition and the concepts of Production Programming and Control, which, although is considered for industrial applications fits perfectly for use in the service sector and in those highly diverse applications such as academic hospitals.

Production control in the administration role which plans, drives and controls material’s supply and an industries’ processing activities, in a way that the specified products are produced by pre-established methods to get an approved acting program; these activities are done in such a way that human resources, industrial facilities and available capital are used with maximum advantage [3].

The supply system well managed must find whenever possible an autonomy of action. The health professionals detain the informations about procedures and materials needed for the patients’ care. From the informations collected from the basic list of materials, it is important to create mechanisms that drive away the necessity of always involving professionals of the productive system in the hospitals’ purchase and supply processes.

Stock control must work with the computation of the monthly consumption of materials and from that use prevision and consumption analyse tools, with appropriate techniques of demand evaluation.

2 METHODOLOGY

In the present study a quantitative approach was utilized in data collection and treatment, through exploratory techniques of data variability structure summarization, where it was tried to discover and classify the relation between the causality between variables and investigate the relation of the causality between phenomena [4].

The research has descriptive, explanatory and case-study characteristics [4]. Its descriptive character is expressed by the observation of facts, as well as the register, analysis, classification and interpretation of the same without the researchers’ interference.

A descriptive study has the characteristics of being a standardized technique of data collection which is realised as an interview. It is an explanatory study due to the interpretation of the studied phenomena [5].

It was performed in the UFAL’s academic hospital between the 23rd and the 25th of October, 2006, in the areas directly related with the supply problems. The purchasing, stockhouse, finance, licitation, human resources, invoicing, and data processing sectors, as well as the medical, obstetric, surgical and paediatric clinics were studied.

A questionnaire was used as a research instrument. The first part constituted a series of ordered questions numbered from 1 to 15, with multiple-choice questions about the major problems in relation to purchasing and supplying in the academic hospital. The second part of the questionnaire used 15 variables according to the Likert scale [5], which had as an objective to establish a numerical scale for measuring the data of 5 categories. To the most favourable answer, the highest value of the scale is attributed, lowering to lesser values lower down the scale. Categories 1 and 2 were considered the most unfavourable; categories 4 and 5 were considered the most favourable and category 3 was considered as been the equilibrium point. The data was factorially analysed using the statistical package of StatSoft Statistica Data Analysis Software System, version 6.0 in order to extract a significant assemblage of variables for data analysis and synthesis. Therefore, a group of 6 variables was selected. 3 main components were extracted as autovalores > 1 and that explain 74.34%of the total variance attributed to the factors.

3 RESULTS AND DISCUSSION

The first question put through by the researchers was why the lack of materials in the academic hospital occur and the low aggregated value; which impossibilities the good customer service to the final user of the service, leaving patient care professionals and internal managers frustrated?
The incorrect specification of materials tends to cause delays in the conclusion of the acquisition of materials as well as ordering materials different to what was required [6]. In fact, incorrect specifications induce errors in material purchase and delays the process of the purchase order (6.6%). Incorrect specification is associated with the lack of technical knowledge of the materials by the solicitors, the rotation of personnel in the purchasing and stockhouse sectors.

Deficiencies in technical reports on materials go since severe reports on certain medicines or materials, to the difficulty to find suppliers adjusted for attendance of a specific norm or legislation. Together with the specification, the item inadequate standardization of routines appears in 7.6% of the answers indicating that the lack of standardization of the routines distances the academic hospital of the quality goals leading to loss of resources. The system of reposition known as the two drawer method, adopted by the hospital allows that the materials are consumed without operational efficiency and adequate control.

Therefore, as a consequence of what was exposed previously, the inadequate purchase plans was marked by 8% of the people studied. Operational planning [7] tries to implant the administration by the routine, to assure that all execute the tasks and operations according with the procedures intended by the business, aiming that the same reaches its objectives.

The processing time is fundamental in any activity. A long time spent in processing means wastefulness of important resources and losses. Therefore, delays in the approval of purchase processes by the administration (8.3%) and the transactions of the processes in the academic hospital and in the University Foundation for the Development and Research - FUNDEPES (11.4%) representing 19.5% of the total answers, making the most representatively marked item.

The ordering and the approval of a purchase process is a long process in the academic hospital. The average time between the beginning and the end of a purchase process in 2005 was of 51 days and 69 days until October of 2006. The material's quotations, purchase order analysis and processing are performed by FUNDEPES. The slowness in the formulation, transaction and approval of these processes aggravate the state of the patients' health, which need beyond these basic materials, of medicines, devices in good working order and health-care.

The maintenance of a cash flow is of vital importance for any institution, be it public or private. Although the academic hospital has an internal sector which administers and manages the planning of payments to suppliers and a structure directed toward the maintenance of the financial flow of the hospital, the delay in the release of money by FUNDEPES has been increasing year by year.

Characterization of improvement factors in material administration - analysis of the factors

In the second part of the study, the factorial analysis was used with the objective of summarizing the main information, detecting in the structure the relationship between the determinant variables and factors for the improvement of the hospital administration in the academic hospital.

For the administration improvement model of the academic hospital 6 variables were used: material specification, processing time of purchase orders, purchase order processing, organization and planning supply, speed in the approval of the order by FUNDEPES, time of transaction of the process.

It is demonstrated in table 1 the results found with the variable “material specification” with the highest mean population (Likert Scale from 1 to 5, \( \mu = 4.76 \pm 4.7 \)) and in second place the “delays in purchase process transactions” with \( \mu = 4.47 \).

<table>
<thead>
<tr>
<th>V1</th>
<th>Variables</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>V2</td>
<td>Material specification</td>
<td>4.76</td>
<td>0.431266</td>
<td>46</td>
</tr>
<tr>
<td>V3</td>
<td>Order processing time</td>
<td>4.15</td>
<td>0.918148</td>
<td>46</td>
</tr>
<tr>
<td>V4</td>
<td>Supply organization and planning</td>
<td>4.32</td>
<td>0.731949</td>
<td>46</td>
</tr>
<tr>
<td>V5</td>
<td>Agility in the approval by FUNDEPES</td>
<td>2.00</td>
<td>0.843274</td>
<td>46</td>
</tr>
<tr>
<td>V6</td>
<td>Easiness in the localization of a purchase process</td>
<td>2.93</td>
<td>1.103573</td>
<td>46</td>
</tr>
<tr>
<td>V1</td>
<td>Delays in purchase process transactions</td>
<td>4.47</td>
<td>0.657914</td>
<td>46</td>
</tr>
</tbody>
</table>

In the factorial analysis for the determination of improvement factors in the academic hospitals, the results of the correlation matrix in table 2 were found where can be observed correlations between the variables.
The most correlated variables refer to the Supply organization and planning in the hospital (V3) with the delays in purchase process transactions (V6) and the lack of agility in approval of purchase orders by FUNDEPES to approve the order (V4). The lack of organization in the supply planning area produces hold-ups and delays in purchase process transactions by FUNDEPES and are correlated factors that produce evidence for the slowness of material replacement in the ACADEMIC HOSPITAL.

The commonalities are presented in table 3 and represent the variance proportion of each variable explained by common factors. The variables "Supply organization and planning" (V3) and "Delays in purchase process transactions" (V6), present the bigger $R^2$, indicating that the two variables are well-connected by the respective factor model.

Table 3: Commonalities of Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor1</th>
<th>Factor2</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1 Material specification</td>
<td>0.0689</td>
<td>0.5675</td>
<td>0.161</td>
</tr>
<tr>
<td>V2 Order processing time</td>
<td>0.3959</td>
<td>0.4422</td>
<td>0.272</td>
</tr>
<tr>
<td>V3 Supply organization and planning</td>
<td>0.5646</td>
<td>0.5697</td>
<td>0.352</td>
</tr>
<tr>
<td>V4 Agility in approval of purchase order by FUNDEPES</td>
<td>0.2934</td>
<td>0.3656</td>
<td>0.169</td>
</tr>
<tr>
<td>V5 Easiness in the localization of a purchase process</td>
<td>0.2562</td>
<td>0.7693</td>
<td>0.265</td>
</tr>
<tr>
<td>V6 Delays in purchase process transactions</td>
<td>0.6433</td>
<td>0.7192</td>
<td>0.428</td>
</tr>
</tbody>
</table>

After using the factor extraction method it could be observed that 3 factors possess auto-values above 1 (see table 4), which explains 74.34% of the total variance of the answers obtained in this study.

Table 4: Total explained variance of the factors’ components

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
<th>Accumulated Eigenvalue</th>
<th>Variance %</th>
<th>Accum. Variance %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.222</td>
<td>2.222</td>
<td>37.043</td>
<td>37.043</td>
</tr>
<tr>
<td>2</td>
<td>1.211</td>
<td>3.433</td>
<td>20.189</td>
<td>57.232</td>
</tr>
<tr>
<td>3</td>
<td>1.026</td>
<td>4.460</td>
<td>17.115</td>
<td>74.347</td>
</tr>
</tbody>
</table>

Extraction method: Main component analysis

In figure 1 the scree plot graph can be observed associated to this analysis, where it is verified the existence of three factors that present values above 1. For better visualization, the declining graph which represents the auto-values versus the number of factors by extraction order is presented [8].

The rotated matrix of factors 1, 2 and 3 can be seen in table 5. Factor 1 obtained the highest explained variance with 1.757 and correlates with the variables “Supply organization and planning” (V3), “Delays in purchase process transactions” (V6), Lack of “agility in approval of purchase order by FUNDEPES” (V4), this being the most representative inside factor 1. The factor evidences that the processes are delayed and very bureaucratic and was identified as the bureaucratic factor.

Factor 2 if correlates more strongly with the variable strong “Order processing time” (V2) and “Easiness in the localization of a purchase process” (V5) being this last one negative [8] “a negative coefficient for a positive variable leads to a positive interpretation” identifying that there are difficulties in control and in locating a purchase process inside the working structure of the academic hospital and FUNDEPES. At the same time there are delays in purchase process transactions. This factor was classified as inefficiency.

In factor 3 it was observed that the most significant value with a coefficient of 0.937 was for the material specification, identifying that the correct specification of materials to be bought is very important among the analyzed variables (table 5) and thus was classified as standardization.
The academic hospitals come across many problems in the supply of materials which disturbs its development and makes its operation difficult with the waste of time and resources acting in the resolution of immediate problems due to the lack of planning of its internal operations that aim for the maximization of its resources. The study identified various causes of systemic origin for the lack of materials in the researched unit and which pointed to key factors with respect to the improvement of hospital administration.

Good hospital management will only be reached with the continuity of administrative processes and staff, capacitated people with technical knowledge to exert their functions.

In this research it was identified that 31.5% of the problems that affect the purchase area that supplies the hospital relates to deficiencies in the documentation verification process, transactions and process control. The lack of materials occurs with basic items and non-basic stock material components and in function of the lack of standardization of procedures and materials, a lack of internal control and mainly by the delay in the transaction, release and approval of the purchases.

Other factors intervene in the process in a parallel manner such as inadequate storage and distribution system and purchase planning.

With the use of the factorial analysis and main components extraction, it was arrived the conclusion in this study that three factors explain 74.34% of the variance of problems of the ACADEMIC HOSPITAL and its lack of materials.

Factor 1 was denominated bureaucracy, factor 2 denominated efficiency and factor 3 denominated standardization. Finally, the bureaucracy factor represents the delay in the transaction and approval of purchase processes by FUNDEPES. It also involves the way in which it organizes itself and the plans for the supply of items in the hospital, basic ones and not so basic materials and the dimensioning of re-supply quantities and frequency, making this the most representative factor with variance of 37.04%. The bureaucratic factor delays processes which need agility and performance, and this will be reflected in the medical performance and the worsening of the patient.

The efficiency factor was as the second most representative factor with 20.18% of the explained variance followed by standardization with 17.17% (table 4). The lack of control of purchase order, the difficulty of locating a process and its rhythm were considered in this study as being inefficiency. To this factor is associated the non-usage of adequate tools of managerial control that support the purchase and supply area in an efficient way.

The third factor, standardization, refers to the lack of standardization and specification of materials used in the hospital. Standardization produces a structuralized operational process since the beginning improving the planning, reducing the processing time and facilitating control.

Exploratory data analysis could show that the improvement in hospital administration is linked with more refined purchase planning factors, less bureaucracy in its processes and greater standardization.

4– CONCLUSIONS

The academic hospitals come across many problems in the supply of materials which disturbs its development and makes its operation difficult with the waste of time and resources acting in the resolution of immediate problems due to the lack of planning of its internal operations that aim for the maximization of its resources. The study identified various causes of systemic origin for the lack of materials in the researched unit and which pointed to key factors with respect to the improvement of hospital administration.

Table 5: Rotated matrix of factors 1, 2 and 3.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1 Material specification</td>
<td>0.071</td>
<td>-0.024</td>
<td>0.937</td>
</tr>
<tr>
<td>V2 Order processing time</td>
<td>0.107</td>
<td>0.783</td>
<td>0.364</td>
</tr>
<tr>
<td>V3 Supply organization and planning</td>
<td>0.709</td>
<td>0.361</td>
<td>-0.042</td>
</tr>
<tr>
<td>V4 Agility in approval of purchase order by FUNDEPES</td>
<td>-0.797</td>
<td>0.117</td>
<td>0.030</td>
</tr>
<tr>
<td>V5 Easiness in the localization of a purchase process</td>
<td>-0.105</td>
<td>-0.838</td>
<td>0.285</td>
</tr>
<tr>
<td>V6 Delays in purchase process transactions</td>
<td>0.768</td>
<td>0.230</td>
<td>0.303</td>
</tr>
</tbody>
</table>

Expl.Var 1.757  1.514  1.188
Prp.Total 0.292  0.252  0.198

Extraction method: Main component analysis
Extraction method: Varimax with Kaiser normalization
of processes with better operational efficiency in terms of purchase processing time, verification of documentation.

Therefore, hospital administration of the academic hospitals knowing the representative factors for a good administration, will be able to use appropriate supply administration tools, lessen the purchase processing time, to standardize procedures and to increase the operational efficiency.

The study shows a possibility of improvement of the services given to the patient at the same time in which it propitiates the integration of data analysis, management, and productive integration techniques with more agile and efficient decisions, bringing improvements in the life of the professionals who work in the academic hospitals and for the population in general.

4 REFERÊNCIAS BIBLIOGRÁFICAS