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Application of a stock control sheet in a food and nutrition unit

Aplicação de uma planilha de controle de estoque em uma unidade de alimentação e nutrição

Abstract

Introduction: the professional nutritionist has the tasks of planning menus and, consequently, stock control. Among countless activities inherent to the collective food sector, the importance of supply management can go unnoticed and cause problems in the execution of the menus, generating monotony in them. So, control tools are needed, since food monotony can cause health problems for users. *Objective:* this study aimed to present the preparation and implementation of a stock control spreadsheet in a food and nutrition unit (FNU) of a public higher education institution. *Methods:* the study was developed and carried out at the Restaurante Universitário da Escola Agrícola de Jundiaí (University Restaurant of the Agricultural School of Jundiaí), of the Universidade Federal do Rio Grande do Norte (Federal University of Rio Grande do Norte), located in the District of Jundiaí, Macaíba, Rio Grande do Norte, Brazil, with a survey of control cards. *Results:* the product of this study was a spreadsheet in Excel® format to control dry foodstuffs from the stock. It was observed that in addition to controlling the entry and exit of the genders, the spreadsheet also helped in the decision to purchase and replenish supplies. *Conclusion:* in view of the desired objectives, the spreadsheet was developed and applied successfully, reaching the purpose expected by the service.

Keywords: Collective Feeding. Safety stock. Supply Management.

Resumo

Introdução: O profissional nutricionista tem, entre suas atribuições, o planejamento de cardápios e o controle de estoque. Dentre as inúmeras atividades inerentes ao setor de alimentação coletiva, a importância da gestão de suprimentos pode passar despercebida e acarretar problemas na execução dos cardápios, gerando monotonia nos mesmos. Assim, ferramentas de controle são necessárias, visto que a monotonia alimentar pode acarretar problemas à saúde dos usuários. *Objetivo:* Este trabalho teve como objetivo apresentar a elaboração e implantação de uma planilha de controle de estoque em uma unidade de alimentação e nutrição (UAN) de uma instituição de ensino superior pública. *Métodos:* O trabalho foi desenvolvido e executado no Restaurante Universitário da Escola Agrícola de Jundiaí, da Universidade Federal do Rio Grande do Norte, localizada no distrito de Jundiaí, Macaíba, Rio Grande do Norte, Brasil, com levantamento das fichas de controle. *Resultados:* O produto deste trabalho foi uma planilha no formato Excel® para controle dos gêneros alimentícios secos do estoque. Observou-se que, além de controlar a entrada e a saída dos gêneros, a planilha auxiliou na tomada de decisão de compra e reabastecimento de suprimentos.

Conclusão: Diante dos objetivos almejados, a planilha foi desenvolvida e aplicada com êxito, alcançando a finalidade esperada pelo serviço.

Palavras-chave: Alimentação coletiva. Estoque de segurança. Gestão de suprimentos.

INTRODUCTION

According to Resolution CFN no.600, of February 25, 2018, one of the duties of a nutritionist in the management of food and nutrition units (FNU) is to design menus based on the nutritional needs of the clientele, respecting eating habits, regional, cultural and ethical apects of the public being served.[1] However, for the menu to be executed optimally, it is necessary that FNU have stock available for the menu's complete and adequate implementation. In this context, for better results, institutions must pay attention to inventory management and control.[2]

Within stock management, one of the responsibilities of the nutritionist in charge is to determine the maximum and minimum stock, with definition of the number of items that must be kept in the dry and cold pantries to guarantee the maintenance of service for a certain time, without risking stock rupture. One of the difficulties that can be cited by FNU managers is to reduce inventory without compromising production,[3] keeping inventory to a minimum as security against possible unforseen events (delay in supply, failure of demands or production), eliminating the risks of shortages.[4,5]

Therefore, it is essential to know how to apply purchasing policies, considering: what, how much, when, who, where, why and how to buy. It is necessary to evaluate the cost of acquisition, storage and distribution, aiming at reducing stock costs and improving meal quality.[2] An effective supply management occurs through the following steps: planning and forecasting of materials, receipt, storage, inventory and consumption control.[6]

Thus, controlling stock movement is crucial to learn the available quantity of items and to define how much and when to buy what is needed.[5] Lack of control can be easily perceived when materials are not available at the exact and correct times to meet instant demand.[7] Hence, meal quality can be impaired by changes resulting from the lack of products and generate menu monotony, affecting the nutritional and sensory characteristics of food, as well as changing meal costs.[8] The Food Guide for the Brazilian Population of 2006 emphasizes the importance of food variety in the diet, in order to guarantee good availability and bioavailability of nutrients,[9] a factor that demonstrates how harmful food monotony can be.

A tool that assists in stock control, providing the nutritionist subsidies for elaboration and maintenance of menus with variety and quality is essential, since there are many tasks to be performed within the daily routine of the FNU, which sometimes overloads the professional.

Many methods and systems are used to increase and improve stock control: two-drawer system; replacement time and reorder point; *Kanban; Inventory Day of Supply* (IDS); ABC classification; Economic Purchasing Lot (EPL) and safety stock.[10] It is important to remember that "the main objective of the information system is to guarantee the quality of the information flow and to streamline decision making".[7] However, there will always be the need for the collaborator and the nutritionist to discuss the management of materials.

This study dealt with the elaboration of a database in *Excel*® for stock control of an institutional FNU. The motivation for its elaboration came from the observation in loco of the lack of products, to the detriment of others that were obsolete in the stock, causing repetition of items and generating a certain monotony in the served menu, besides the inexistence of a technological tool that could be offered at a low cost for the institution. In addition, the tool brought visibility to items that were in stock, but were little used.

That said, the objective of this study was to develop and implement a stock control spreadsheet in a food and nutrition unit (FNU) of a public higher education institution in the town of Macaiba, Rio Grande do Norte, Brazil, to minimize waste and shortages during the on-site production process.

METHOD

Research Location

The study was developed and executed at Restaurante Universitário da Escola Agrícola de Jundiaí (University Restaurant of the Agricultural School of Jundiaí), Located in the District of Jundiaí, Macaíba, Rio Grande do Norte, Brazil, of Universidade Federal do Rio Grande do Norte (Federal University of Rio Grande do Norte). It was a technological purpose study.

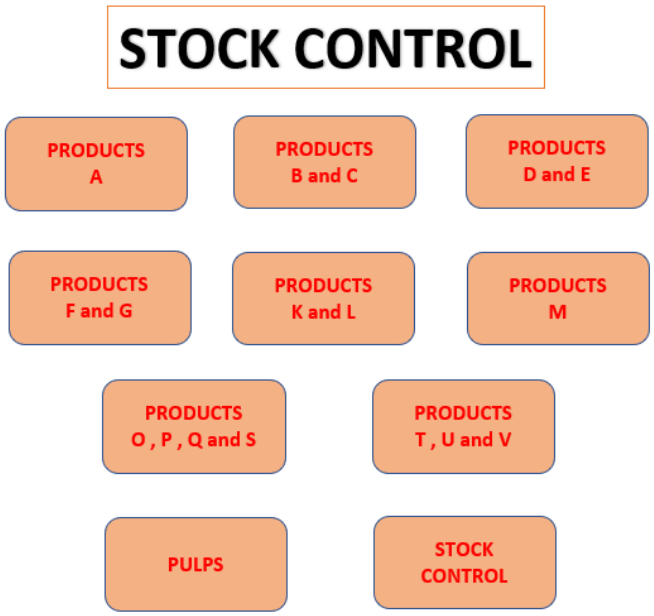
Data Collection Technique

It was necessary to carry out a survey of the items in the dry stock, listed through printed control sheets, and the collection of two pieces of information necessary for the calculation of the minimum stock: the average daily consumption of each item (per capita multiplied by number of users), seen through the five cyclic planned menus, which accounts for around a month and a week until the beginning of a new menu cycle; and the replacement period, that is, the time the restaurant wants to have the products in stock according to the output, which could be verified with the chief nutritionist responsible for contacting suppliers and requesting inputs.

Creating Spreadsheets in Microsoft Excel®

The spreadsheet was built with a total of 11 tabs (figure 1), whose names are: Menu; A; B and C; D and E; F and G; K and L; M; O, P, Q, and S; T, U, and V; Pulps; and Control, in addition to one last tab for the inclusion of the restaurant's ABC curve.

Figure 1. Microsoft Excel® spreadsheet menu



a) The "Menu" tab had shortcuts that, when clicked on, referred to the other tabs of the spreadsheet.

b) The tabs that were named by letters indicated that, in that specific tab, there were all foods beginning with the letter that gave the name to the tab. There were spaces to enter entries and exits of genres, according to the delivery and use of the items. On a cell next to the item's name, there was the total quantity of that item in stock (figure 2). These spreadsheets subsidize the "Control" spreadsheet.

Figure 2. Example of an input and output spreasheet prepared in Microsoft Excel®

CN	CO	CP	CQ	CR	CS	CT
		A				
				BALANCE OR STOCK		
PRODUCTO :	OATS	UNIT	Box	51		PRODUCTO :
Date	Event	Entry	Exit	Balance		Date
07/01/2019	Balance	35		35		
07/12/2019	Restaurant		1	34		
07/16/2019	Receipt	30		64		
07/23/2019	Restaurant		2	62		
07/23/2019	Return	2		64		
07/25/2019	Restaurant		6	58		
07/31/2019	Restaurant		1	57		
07/01/2019	Restaurant		6	51		
				51		
				51		
				51		
				51		
				51		
				51		

c) The "Control" spreadsheet (figure 3) is a summary of the total quantity in stock of all items, with the fields: "Names", so that the names of the items are placed; "Measurement Unit", so that the unit of measurement of the item (kilos, bales, boxes, cans, etc.) is inserted; "'Place", where the material is located, since there are the warehouse, cold rooms and freezers for storing materials; "Average daily consumption", so that the average daily consumption of each item is inserted; "Days in stock", which corresponds to the number of days that the nutritionist wants to have an item in stock, taking into account the output on the menu; "Minimum", to register the minimum quantity necessary of a particular product in stock, as a result of multiplying the "Average daily consumption" cell with the "Days in stock" cell; "Balance", which corresponds to the internal inventory linked to the inflows and outflows of each item; "Status", to learn what level the product is at, below or above the minimum stock, and "Situation", a cell to alert for the reorder point.

Figure 3. Inventory Control Spreadsheet

STOCK CONTROL - EAJ

BACK TO MENU

NAME	CONTRACT	MEASUREMENT UNIT	PLACE	AVERAGE DAILY CONSUMPTION (Kg/G/Unit)	DAYS IN STOCK	MINIMUM	BALANCE	STATUS	SITUATION
SUGAR		Kg	WAREHOUSE	15	10	150	294	Gren	BALANCE ABOVE MINIMUM STOCK
PARBOILED RICE		Kg	WAREHOUSE	26,8	10	268	448	Gren	
WHITE RICE		Kg	WAREHOUSE	22,5	10	225	36	Red	WARNING! PRODUCT NEEDS REORDERING
RED RICE		500 g	WAREHOUSE	24	1	24	22	Red	WARNING! PRODUCT NEEDS REORDERING
BROWN RICE		Kg	WAREHOUSE	24	1	24	21	Red	WARNING! PRODUCT NEEDS REORDERING
PEANUTS		500 g	WAREHOUSE	1100	20	44	20	Gren	

The following cells are filled in manually: Names; Measurement Unit; Place; Average daily consumption; Days in stock; and the spreadsheets for registering the entries and exits of genres. The total quantity of an item, or "Balance", the minimum stock ("Minimum" cell), "Status" and "Situation" are automatically filled in by the spreadsheet. "Status" and "Situation" take into account the "Balance" available and the minimum stock for their updates. As the internal stock or balance approaches the minimum stock value, an alert message will automatically appear and notify the nutritionist of the reorder point for a particular product.

Establishing Fomulas to Feed the Spreadsheet

The calculations had formulas as representations:

E_{min}= Replacement period x average daily consumption

In which:

Average daily consumption = average consumption x number of daily users + safety margin

Safety margin = 10%

Ex.: Parboiled rice

Daily consumption – 50 g/person

Number of guests/day – 200

Average daily consumption of parboiled rice = 50 x 200 = 4000 g + 10% (safety margin) = 4400 g =>4.4 kg

Replacement period: every 4 days

E_{min}= 4 x 4.4 kg =>17.6 kg or 18 kg

RESULTS AND DISCUSSION

The product of this study was a spreadsheet in Excel® format to control the items in the dry stock. In addition to controlling the entry and exit of genres, it also helped in the decision to purchase/replenish supplies, thus minimizing the repetition of menu preparations.

The warehouses in the sector were assigned the task to filling out the spreadsheet with all entries and exits of the genres, so that the final balance was automatically updated and sent to the "Control" tab, thus supply need notices were issued. Training was carried out with all employees responsible for this task. They realized and reported that exchanging the previously used manual control for the spreadsheet made work faster and more practical, and the preference for the spreadsheet control was unanimous.

With the spreadsheet use, the managers also noticed a reduction of failures in the dry stock balance. Failures frequently occurred in the manual filling system. This benefit was attributed to the fact that the spreadsheet performs accurate calculations after entries of inputs/outputs, while manual completion was subject to calculation errors. The spreadsheet also increased the manager's visibility of items in stock, thereby reducing problems with lack of products. In addition, it brought speed and convenience to consulting the dry stock, both for the nutritionist responsible for supply, as for the production, speeding up preparation and implementation of menus.

The spreadsheet was inserted in the cloud/drive of the FNU e-mail, and can be accessed on any computer that has the access link and permission to edit it. A shortcut was installed in the sector's computer, on the internet browser, that directed to the spreadsheet, which in turn, was updated in real time. In practice, when the warehouses launched movements of inputs in the stock, all other computers also received the update automatically.

However, some difficulties were encountered. It was noticed that sometimes the employees, when filling out, deleted some formulas from the spreadsheet. To solve this problem, the function "protect spreadsheet", and "block cells" was used in all cells that presented formulas, that is, those in which the filling was done automatically, after updating the manually filled cells.

One of the disadvantages of using the spreadsheet was the fact that the service needed employees who knew Excel® spreadsheets well, that is, who had skills beyond filling out cells and inserting simple formulas. This is because, for several situations, there was the need to adjust the spreadsheet due to flaws in the technology itself, or even to include new items. Nevertheless, simple training has managed to enable employees to perform this task. In addition, currently, most public and private institutions have technology and information technology professionals.

The correct calculation of the minimum stock is essential for the success of the spreadsheet, as it is based on this datum that the supply need notices are launched. Thus, it is necessary to have a nutritionist to use this stock control tool.

Change in the menus ends up generating repetition of preparation (food monotony), requiring proper menu planning and the fulfillment, by the suppliers, of their duties for the menu to be followed.[11] However, a range of factors can hinder the delivery of inputs and the menu planning and, for those reasons, it is essential to work with a safety stock. Thus, the nutritional and sensory quality of the diet does not undergo frequent changes and is safe for consumption.

In literature, the importance of using the minimum stock for control is not new. Authors looked at the stock area of a company in the supermarket sector, as well as its supply dynamics, and from there they suggested improvements for the company. One of the suggestions was the inclusion of the minimum stock in the purchasing system, with the objective of reducing the excess of goods in the place. The objective was to help the organization not to request the purchase of items unnecesarily, that is, without the system actually having alerted about the real need for supply. To this end, they reduced the rotating inventory from 39 days to 28 days, which represented a reduction of approximately 27% in the network's inventory value. In real values, the savings were approximately R$ 3,000,000.00.[12] One of the expected objetives with the

implementation of this spreadsheet was precisely to assist in decision making to prevent the unnecessary purchase of products that would end up exceeding their expiration date while in stock.

The safety stock can also be used for the implementation of other systems, since it is the basis of inventory control, being of fundamental importance for a company. A 2016 study proposed inventory management models for the production process, among which the *Lead time indicator*, "time elapsed between the release of a purchase or production order until the material is available for use". The author deduced the importance of standardizing important times in service units due to the participation of this indicator in the calculation of the safety stock, which is essencial for stock efficiency.[13]

Finally, the positive results obtained with the implementation of the stock control spreadsheet at the reported institution showed that simple technologies linked to the scientific knowledge inherent to the collective eating area can make the difference in the management of FNU, being an important work tool for the nutritionist.

CONCLUDING REMARKS

In view of the proposed objectives, the spreadsheet was developed and executed reaching the purpose expected by the service. Its results further reinforce the need for collective food and nutrition units to adopt control systems that assist the nutritionist as a manager. The spreadsheet was perceived as easy to handle and of important application, which can be used by different establishments in the food industry, as well as in companies that need material stock.

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Contributors

Silva FP participated in the idealization of the study design; creating the tool, analyzing and interpreting the data; writing the paper; Galdinho ABS participated in the idealization of the study design; writing the paper; final review and approval of the manuscript for submision; Goes PA participated in the idealization of the study design; final review and approval of the manuscript for submision.

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