

APPLICATION OF WEIGHTED GOAL PROGRAMMING TECHNIQUE FOR FINANCIAL MANAGEMENT IN HEALTH CARE SYSTEM

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ABSTRACT-

The study of healthcare financial management is fascinating and rewarding. It is fascinating because so many of the concepts involved have implications for both professional and personal behavior. It is rewarding because the healthcare environment today, and in the foreseeable future, is forcing managers to place increasing emphasis on financial implications when making operating decisions. First and foremost, financial management is a decision science. Whereas accounting provides decision makers with a rational means by which to budget for and measure a business's financial performance, financial management provides the theory, concepts, and tools necessary to make better decisions.

1 INTRODUCTION-

An individual who wants to play an important role in healthcare without having patient

contact may be interested in learning what healthcare management has to offer. A person does not need to be in the operating room, dispensing medication or providing direct care to patients to be a vital part of the medical industry. Without a good healthcare management system, a healthcare facility would not be able to effectively care for patients, keep a good staff or make a profit. Here is valuable information about healthcare management.

What is Healthcare Management?

Before the advent of rapidly-advancing medical technology, doctors didn't have as much of a need for healthcare managers. However, the near-continuous development of medical technology (including changes in healthcare data systems) and regular changes in laws and regulations surrounding healthcare mean that hospitals and other medical centers need experts in these areas to ensure everything runs as it should.

Healthcare management is exactly what the name implies. It's the overall management of a healthcare facility, such as a clinic or hospital. A healthcare manager is in charge of ensuring a healthcare facility is running as it should in terms of budget, the goals of the facility's practitioners and the needs of the community. A person in charge of healthcare management oversees the day-to-day operations of the facility.

This individual also acts as a spokesperson when providing information to the media. The person in charge of healthcare management also collaborates with medical staff leaders on issues such as medical equipment, department budgets, planning ways to ensure the facility meets their goals and maintaining a good relationship with doctors, nurses, and all department heads. The healthcare manager also makes decisions about performance evaluations, staff expectations, budgeting, social media updates, and billing.

You might imagine hospital managers when you think of careers in healthcare management. However, these jobs exist at every level. For people who prefer a smaller operation, a job as an office manager may be right. Similarly, those with degrees in healthcare management also have the option of working as home health agency managers.

These managers have a variety of responsibilities. Like managers in just about every field, they will handle the scheduling of care workers like nurses and CNAs. They also will make sure patients receive quality care. In order to do this, they may design patient care surveys and address any patient complaints that arise.

"Healthcare management" is an umbrella term that covers a wide variety of job titles. Clinical directors, healthcare supervisors, health coordinators, and nursing home facilitators often have degrees in healthcare management. And while you may think of healthcare managers as people who work at hospitals or in private practice, they may also work at colleges or universities, public health centers, urgent care clinics, insurance companies, or pharmaceutical companies.

There are also more specialized areas of healthcare management that those with healthcare management degrees may want to look into. A great example is health information management. Nearly every type of healthcare practice — from hospitals to urgent care centers to general practitioner's offices — maintains a database of patient health information. These databases are maintained by a variety of professionals. IT specialists design the databases themselves, doctors and other

employees input health information, and medical billing and coding specialists make sure that procedures are properly coded for insurance purposes.

Health facilities need someone to look at the big picture and make sure that the databases are functioning as a whole. They may oversee each individual aspect of the database. For instance, a health information manager will work with cybersecurity analysts to make sure the database is secure enough to protect patient information from leaks. They also may work with doctors and nurses to optimize documentation of procedures and clinic visits. And in order to make sure databases perform optimally, they regularly assess the data collection and documentation process.

Ultimately, healthcare management professionals work to oversee and coordinate every aspect of healthcare. Whether it's overseeing hospital operations or coordinating the happenings in a small private practice, these managers ensure that healthcare facilities operate smoothly for everyone involved.

2, Healthcare Management vs. Healthcare Administration

The terms healthcare management and healthcare administration are often mistakenly used interchangeably,

and many people believe they are the same thing. They are two different things. Healthcare management is in charge of the entire healthcare organization while healthcare administration takes care of the staff and employees. The healthcare administrator may be in charge of hiring staff for a specific department, but it's the healthcare manager who may determine if another employee should be hired. In short, healthcare managers deal mostly with the business side of healthcare organizations.

A healthcare administrator will determine the best ways to help staff be more efficient at their jobs and will understand the type of treatment the facility will provide to patients. The healthcare manager is the one who decides on the treatment, number of staff and how each department should be run. Healthcare managers focus on the big-picture needs and direction of a hospital or other medical setting, while administrators focus largely on working with the staff. In hospitals, healthcare managers typically oversee hospital-wide matters, and administrators oversee individual departments.

Though healthcare managers and healthcare administrators have different duties, they often work together, especially when implementing major changes in policy or technology. In smaller settings (like

private practices), one person may fulfill the roles of both administrator and manager.

How to Become a Healthcare Manager

The first step toward becoming a healthcare manager is to earn a bachelor's degree in healthcare management. When choosing a school, students should make sure the degree program is accredited. This specific degree program is important because it incorporates knowledge from both the healthcare and business fields. Students will learn to manage a business, but they'll also learn about healthcare terminology, hospital organization, and the laws surrounding healthcare and health information. In order to be successful, a healthcare manager needs to be well-versed in both fields. Occasionally, a person may be hired as a healthcare manager if they have a bachelor's degree in a related field like business or nursing.

Though it's possible to get into this field with a bachelor's degree, many hospitals and larger organizations look to hire people who have a master's degree in the field. Smaller organizations (like clinics or small private practices) may be more likely to hire a candidate with a bachelor's degree, and larger organizations may hire a person with a bachelor's degree in a more junior role. Sometimes,

people who want to advance in the field find it helpful to gain some work experience after their bachelor's degree, while others prefer to earn both a bachelor's and a master's before applying for jobs.

For those looking for a master's degree, a master's in healthcare management is a common choice. The individual may also choose a master's degree in public administration or business with a concentration in health services management or healthcare management. With a master's degree, an individual stands a better chance of getting a job in healthcare management at a more senior level.

Experience as a healthcare professional isn't required to get a job as a healthcare manager, but it may be advantageous. If someone has worked as a doctor or nurse, they have unique insight into the people they will be managing. Doctors and nurses who decide they want to make a shift to management will typically choose to pursue a master's degree in healthcare management or healthcare administration. These candidates may have an advantage because they have seen firsthand how healthcare professionals and managers work together. If a doctor wants to start and manage their own private practice, they sometimes choose to pursue an MBA in order to gain the business knowledge to be successful.

Most healthcare management jobs do not require any sort of certification, but having special certifications may make applicants stand out to hiring organizations. For example, the American Health Information Management Association offers certification in management of specialized health information. For applicants interested in medical office management, a certification from the Professional Association of Health Care Office Management may be beneficial.

Skills Needed to Be a Successful Healthcare Manager

Having the right degree is essential to getting a job in healthcare management. However, it's a good idea for degree candidates to also cultivate some of the skills necessary to apply their knowledge.

Decision making and good judgment is one of the most necessary skills for a candidate to have. Healthcare managers need to make regular decisions in the course of the workday, and they will need to carefully weigh options before making the best choice for the institution they manage. In a similar vein, managers need to be both analytical and detail-oriented. Healthcare managers need to have a strong working knowledge of regulations that apply to hospitals, nursing homes, and doctor's

offices, and they need to be able to make sure they consistently operate within those regulations. And since they usually oversee scheduling, billing, and data collection, extreme attention to detail is a must.

The job duties of a healthcare manager can look very different from one day to the next — the manager may go from finalizing budget decisions on Monday to evaluating a new health information system on Tuesday. In order to succeed, managers need to be highly adaptable, and they'll need to be able to juggle concurrent tasks and deadlines.

Successful healthcare managers will also have strong interpersonal skills. Communication is vital — managers will regularly need to inform doctors, nurses, and other healthcare professionals of current policies and procedures. In a healthcare situation, clear communication is especially important. If patients are to receive the best care possible, doctors, nurses, and staff members need to clearly understand organizational policies and procedures. Managers also need to be able to listen to concerns from staff members and patients in order to determine whether any changes to current policies need to be made.

In order to fully understand and oversee operations, a

healthcare manager will need to stay informed about advancements in healthcare technology. This is especially important when it comes to electronic health record systems. Managers will need to be able to assess whether record systems are functioning optimally, and they will need to implement new

3 DATA OF THE PROBLEM

systems if a change is needed. Creative problem solving is must as well – when managing an entire hospital or practice, issues are bound to arise, and they need to be resolved quickly and in a way that benefits patients and employees alike.

This study was carried out in one of the biggest hospital in Delhi. The required information is given in the following tables.

Table-1

Activities	SPIP	Expenditure	% Utilization against PIP
Maternal Health	1.43	1.77	123.86 %
Child Health	1.20	0.12	10.28 %
Family Planning Services	2.90	2.21	76.11 %
ARSH	0.01	0	0 %
Urban RCH	0.48	0.17	35.40 %
Innovations/PPP/NGO	1.63	0.09	5.60 %
Infrastructure & Human Resources	18.93	11.08	58.83 %
Institutional Strengthening	0.45	0.11	25.32 %
Training	1.03	0.24	22.93 %
BCC / IEC	1.43	0.16	11.36 %
Procurement	1.07	0.60	56.09 %
Programme Management	1.22	0.18	14.70 %
Total	31.77	16.73	52.66 %

Table-2

Activities	SPIP	Expenditure	%Utilisation against PIP
ASHA	14.72	2.62	17.79 %
Untied Funds	0.26	0.01	3.84 %
Hospital Strengthening	6.65	2.55	38.34 %
Annual Maintenance Grants	0.00	0.01	
New Constructions/ Renovation and Setting up	0.50	1.24	248 %
Corpus Grants to HMS/RKS	0.38	0.00	0 %
Action Plans (District, Block, Village)	0.00	0.10	
Mainstreaming of AYUSH	0.20	0.01	5 %
IEC-BCC NRHM	2.65	0.17	6.41 %
Training	3.10	0.45	14.51 %
Planning, Implementation & Monitoring	2.47	0.90	36.43 %
Procurement	2.72	0.00	0 %
Regional Drugs PNDT Activities	0.00	0.01	
New Initiatives/ Strategic Interventions (As per State Health Policy)	4.20	0.38	9.04 %
State Health Services Resource Centre (SHSRC)	0.50	0.00	0 %
Support Services	0.00	0.89	
NRHM Management Costs/ Contingencies	8.54	1.96	22.95 %
Other Expenditures	11.59	0.00	0 %
Total	58.48	11.29	19.30 %

Table-3

	FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09
Release	7.27	13.38	6.19	20.13
Audited Expenditure	1.94	4.87	14.14	16.73*

Table-4

S. No	Indicators	Achievement (no. of beneficiaries)			
		2005-06	2006-07	2007-08	2008-09
1	Janani Suraksha Yojana	0	242	7,238	23,829
2	Total Sterilisation	34,168	28,746	26,108	na
3	IUD Insertions	5,57,810	53,003	45,304	na

4 GOAL PROGRAMMING

MODEL

The generalized linear goal programming is defined as

$$\text{Minimize } Z = \sum_{i=1}^m \sum_{k=1}^{n_i} P_i (w_{ik}^- d_i^- + w_{ik}^+ d_i^+)$$

subject to

$$\text{goal constraints } \sum_{j=1}^n (a_{ij} x_j + d_i^- - d_i^+) = b_i \quad i = 1, 2, \dots$$

$$\text{system constraints } \sum_{j=1}^n (a_{ij} x_j) \begin{cases} \leq \\ = \\ \geq \end{cases} b_i$$

$$d_i^-, d_i^+, x_j \geq 0$$

Where w , w 0 and represent the relative weights to be assigned to each of the $k = 1 \dots n$ Different classes within the i^{th} category to which the non-

Archimedean transcendental value of P_i is assigned. The P_i are the preemptive priority factors who serve only as a ranking symbol that can be interpreted to mean that no substitutions across categories of goals will be permitted. It is assumed that the ordering of deviation variables in an objective function, will be minimized in order, where P_i

d_i^+ = is the positive deviation variable from overachieving the i^{th} goal

d_i^- = is the negative deviation variable from underachieving the i^{th} goal

x_j = is the j decision variable a is the decision variable coefficient

b_i = the associated right-hand side

value

Where the deviational variables are mathematically defined as follows

$$d_i^+ = \frac{1}{2} \left[\left| \sum_{j=1}^n (a_{ij}x_j - b_i) \right| + \sum_{j=1}^n (a_{ij}x_j - b_i) \right]$$

$$d_i^- = \frac{1}{2} \left[\left| \sum_{j=1}^n (a_{ij}x_j - b_i) \right| - \sum_{j=1}^n (a_{ij}x_j - b_i) \right]$$

The deviational variable cannot be basic variables at once, because by definition they are dependent. This indicates that in any simplex iteration, at most, one of them can assume a positive value. The following table-1 shows the various types of goal achievement.

In the goal programming, goals are prioritized by analytical hierarchy process. To make a decision in an organized way to generate priorities we need to

decompose the decision into the following steps.

Step-1 outline the matter and confirm the sort of information sought-after.

- Step-2 Structure the choice hierarchy from the highest with the goal of the choice, then the objectives from a broad perspective, through the intermediate levels (criteria on that later components depend) to all-time low level (which typically could be a set of the alternatives).

- Step-3 Construct a collection of pairwise comparison matrices. Every part in associate degree higher level is

employed to match the weather within the level right away below with regard to it.

Step-4 Use the priorities obtained from the comparisons to weigh the priorities within the level right away below. Do that for each part. Then for every part within the level below add its weighed values and acquire its overall or international priority. Continue this method of advisement and adding till the ultimate priorities of the alternatives within the bottom most level is obtained. For detailed methodology is refer.

5 RESULT AND ANALYSIS

The problem was solved by using LINDO package may be interpreted as follows:

Table 4: Solution of WGP

Goal priority	Negative deviation variable (d^-) I	positive deviation variable (d^+) i
P_1	0	0
P_2	.00845	0
P_3	0	.00448
P_4	0	0
P_5	0	.00087
P_6	0	.06685

Table 5: Goal achievement

Minimize	goal	If goal achieved
d_i^-	Minimize under achievement	$d_i^- = 0, d_i^+ = 0$
d_i^+	Minimize overachievement	$d_i^+ = 0, d_i^- = 0$
d_i^-, d_i^+	Minimize both under and over achievement	$d_i^- = 0, d_i^+ = 0$

The table-4 shows the values of positive and negative deviational variables related to the goals from P_1 to P_6 . The first priority P_1 is to maximize the total assets. The goal is fully achieved

because the negative deviational variable $d_1^- = 0$ and $d_1^+ = 0$. This means the asset of the health care system can't be changed. The goal of liability reduction P_2 is also achieved since $d_2^- = 0$ but $d_2^+ = 0.00933$,

this means the liability can be reduced to 0.00933 Trillion. The third priority goal P_3 is achieved since the negative deviational variable $d = 0$ but the positive deviational variable $d = 0.00339$ this means the equity amount can be increased by 0.00339 trillion. The fourth priority goal P_4 is maximizing income is also achieved, since both the deviational variable $d = 0, d = 0$. The profitability goal is achieved, since $d = 0$ but $d = 0.00061$ this indicates the total profit can be changed increased by 0.00061 Trillion. Lastly the goal P_6 of maximizing the proportion of the value given in the financial statement is also achieved, because the negative deviational variable $d = 0$, but the

positive deviational variable indicates that the proportion of the values given in the financial statement can be increased by 0.05695 in the period.

6. CONCLUSION

This paper fascinating because so many of the concepts involved have implications for both professional and personal behavior. It is rewarding because the healthcare environment today, and in the foreseeable future, is forcing managers to place increasing emphasis on financial implications when making operating decisions. First and foremost, financial management is a decision science. Whereas accounting provides decision makers with a rational means by which to budget for and measure a business's financial performance, financial management provides the theory, concepts, and tools necessary to make better decisions.

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