A Review on the Use of Multi-Attribute Decision Making (Madm) in Healthcare Sector

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Abstract

Decision Making is about indentifying and choosing alternatives based on the values and preferences of the decision maker.The significance of decision making in HealthCare cannot be stressed enough as many decisions are complex and involve uncertainities.In situations where we have several parameters affecting the final decision we can use Multi Attribute Decision Making.The main aspects of any method under this model are : alternatives to be appraised,criteria(or attributes) against which the alternatives are appraised,scores that reflect the value of an alternative's expected performance on the criteria,criteria weights that measure the relative importance of each criterion as compared with others.The model can play a significant role in HealthCare sector amid the peratainig health needs and accelerating technological development putting an ever increasing demand on limited health budgets. The objective of this article was to discuss Multi Attribute Decision Making (MADM) and its applicability in HealthCare sector.

KEYWORDS:Decison Making,HealthCare,Multi Attribute,Health Budgets,Multi Attribute Decision Making

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I. Introduction

Decision Making is about indentifying and choosing alternatives based on the values and preferences of the decision maker.Multi Attribute Decision Modelling (MADM) is used to help objectify decision making where multiple choices exist.MADM is nowadays used in various business sectors to objectify decision making.It takes into consideration multiple attributes associated with certain choices or actions.The model utilizes comparative mathematical analysis to give scores and weights to the attributes for various alternative actions.Decisons are difficult when they involve high degree of complexity,large uncertainity,tradeoffs between multiple objectives,opinions of different stakeholders.Majority of decisions in HealthCare sector are complicated and have significant consequences on the quality of life of individuals and on the allocation of limited resources.The main aspects of the model are : alternatives to be appraised,criteria(or attributes) against which the alternatives are appraised,scores that reflect the value of an alternative's expected performance on the criteria,criteria weights that measure the relative importance of each criterion as compared with others. MCDA frameworks have been successfully applied to solve decision problems in many areas, including sustainable energy management, energy planning, transportation, geographical information systems, budgeting and resource allocation. The term multi attribute decision modelling (or model) is often used interchangeably with multi criteria decision analysis (MCDA).

II. MADM in HealthCare Sector

The significance of decision making in HealthCare cannot be stressed enough as most of the decisions are complex and involve uncertainities.Over the past several years MADM has been used as a guide to help physicians choose treatments.MADM brings a strong objective element to compare various drug treatments and medical interventions.The best possible composite score or profile across a range of attributes is looked at and then it is measured how close each drug or intervention is to the hypothetical ideal profile.The model can be of great help in various decision making situations such as : Brand Differentiaiton,Portfolio planning and optimization,asset assessment,resource deployment,etc. The model is increasingly becoming a popular framework for aiding and supporting healthcare decision making. The model can play a significant role in HealthCare sector amid the peratainig health needs and accelerating technological development putting an ever increasing demand on limited health budgets.

MADM METHODOLOGY: The core of the model to implement MADM is a comparison grid. The comparison grid lists choices of action against a series of common comparable attributes.For accurate and appropriate analysis, objective, comparable data or scores for each attribute must be available. The following figure shows a comparative grid which then feeds the MADM:

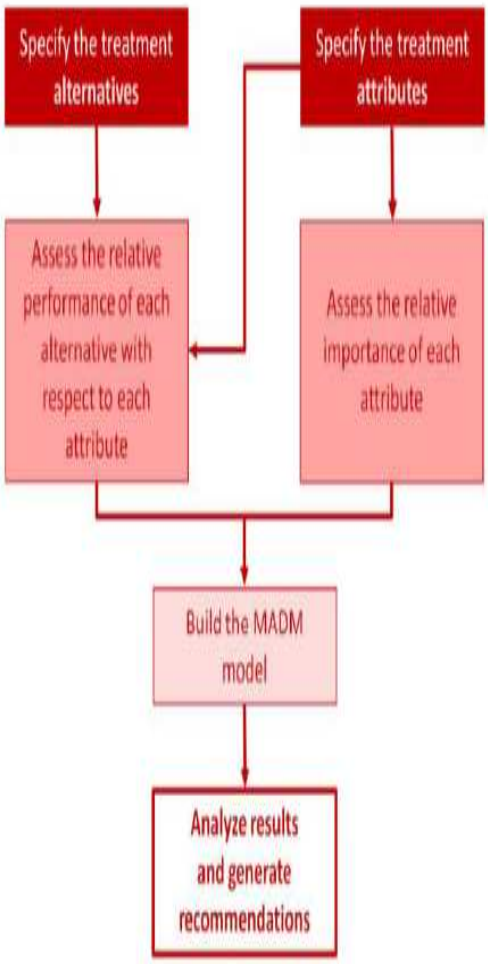

Figure 1: MADM Grid

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Azar (2000) uses three different methods Simple Additive Weighting Method (SAW), Weighted Product Mehtod (WPM) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) to evaluate the performance of different imaging techniques used to detect cancers in the female breast. The need for such a decision support system arises from the fact that each of the several techniques which helps diagnose breast cancer, has its own specific characteristics, advantages and drawbacks. The four imaging techniques compared are Magnetic Resonance Imaging (MRI), Mammography, Ultrasonography, and Nuclear Medicine. Lee et al (2003) showcases the applicability of MADM in case of women undergoing hormonal therapies. The results were found to be quite satisfactory when compared to the advice of the physicians. Lezzi (2006) used multi criteria decision making in OPDs located in hospitals.Decision model was developed based on Simple Additive Weighting(SAW).The model addressed the issues of waiting time and variablility in demand.Shanbezadeh et al (2013) classified the factors influencing the assessment of asthama level using clinical guidelines.Then a MADM model was implemented and the data of 50 patients was used.Comparisons of the results of the model with the advice of the physician were found to be 80% accurate.

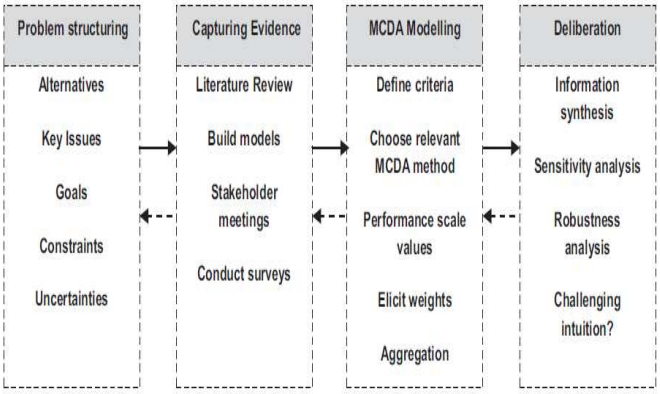

Figure 2: Block Diagram of MADM

The above figure shows the block diagram of MADM model.It explains how the technique can be used in HealthSector to objectify decision making.

IV Scope of MADM in Health Care Sector

MADM can contribute in the HealthSector in the following domains:

1 Brand Differentiation: Testing and clarification of prelaunch positioning scnerarios, competitior launch threat characterization and defence, drug choice support tool.

2 Portfolio Planning and Assessment: Market potential and gap analysis, optimize drug combination assessments, diminishes single brand dominance

3 Resource Deployment: Flexible budget planning, objective
Marketing mix analysis.

Another area in which the model can contribute significantly is the patient satisfaction.Majority of patient's list waiting time as their measure of quality of service. Well designed and executed patient scheduling has the potential to increase patient satisfaction in terms of reducing the waiting time.

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