

A reasoning approach towards Ethics-Based Medicine and care of disabled people

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Abstract. This paper introduces a reasoning approach supporting Ethics-Based Medicine. In contrast with Evidence-Based Medicine, Values-Based Medicine and Evidence-Based Ethics, our proposal is neither to limit the clinical decisions to normative medicine, patient perception or normative ethics but to strengthen the balance between philosophy and science. This is a conceptual approach of reasoning to cope with different points of view (patient, family, caregivers, society). The reasoning provides a decision that has a good chance to maximize the support of the care and ethical objectives while minimizing the risks. The resolution provides a balanced decision by using different proposals and by merging various methods. The decision is associated with qualitative and quantitative information dealing with the care and ethics. A clinical case of a disabled child illustrates the ethical reasoning.

Keywords: Medicine, Ethics, Reasoning, Decision, Computer support.

1 Introduction

Evidence-based medicine (EBM) is still the major approach used in modern medicine in order to take the best decision using the available scientific evidences. Due to the scientific limitations of the knowledge, [1] considers different levels of evidence (from unsatisfactory to excellent). Value-Based medicine [2] aims at adjusting the highest level of EBM with the patient-perceived value conferred by healthcare interventions. From another side, Evidence-based ethics [3] extends empirical ethics with a single definition of ethic i.e. that enforces 1) Respect of autonomy, 2) Beneficence, 3) Non-Maleficence and 4) Justice using internal and external information to examine the different trade-offs. However, that latter ethical/philosophical model mainly takes the patient point of view in consideration. A different perspective such as the clinician, the family or the society point of view could provide medical decisions that conflict with the patient's will. Moreover, the connection between ethical models and existing evidence-based approach still is an open problem. Finally, a conceptual approach is missing for evaluating the possible clinician decisions regarding may be conflicting ethical objectives.

That paper tackles those different limitations. It defines a conceptual approach of Ethics-Based Medicine. That notion proposes a reasoning method to find a decision according to conflicting ethical objectives. In order to exemplify our approach, a use case is proposed regarding the notion of autonomy of a disabled child. The decision is resolved by merging various resolution methods (scenarios, casuistic, arbitrariness, pragmatism, evidential reasoning, artificial intelligence) and by using the set of proposed solutions.

2 A conceptual approach of Ethics-Based Medicine

This section gives the different entities and relationships supporting the proposed approach of Ethics-Based Medicine. Our approach is illustrated using a concrete care case. That case deals with the usage of a powered wheelchair for a child of 7 years old with a motor disability and cognitive deficiencies. Different points of view are considered in order to demonstrate how conflicting ethical objectives can be resolved.

Regular or unattended events: those types of event correspond to regular or unusual care/ethical objectives, models/contexts of care or evaluation/comparison results for a patient. For example, such an event can be a child able to drive a powered wheelchair with conflicting ethical and care objectives or a bad evolution of the health.

Care objectives: those entities define the addressed care and the considered deficiencies. The care objectives can have different sub-objectives corresponding to different perspectives. For example, the care objective of the family is to protect the child from physical injuries. The care objective of the child is to develop social relationships.

Ethical objectives: those entities define the different possible ethical models of the care. For example, the ethical objective for the family is to protect the child against his deficiencies of self-determination. The child objective can be to respect his capability of self-determination.

Models of care: those entities correspond to different models or methods of care. For example, a manual wheelchair and an electrical wheelchair are different kinds of mobility aid. A manual wheelchair requires motor capabilities from the patient while a powered wheelchair needs cognitive abilities.

Contexts of care: those entities describe the practical contexts of care such as a rehabilitation center or the family home. For example, the kid can use the powered wheelchair inside the rehabilitation center.

Evaluation methods: those entities are generally associated with the models of care. For example, the evaluation addresses the ability to drive an electrical wheelchair. The evaluation can be either qualitative (example: ability to move with a powered wheelchair) or quantitative (example: wheelchair tests). For example, the Gross Motor Function Classification System [4] qualifies the motion ability and a Wheelchair Skills Test [5] provides quantitative measures.

Efficiency of the care models regarding the ethical objectives: those entities summarize the efficiency of the care models to support the different ethical objectives. For example, the electrical wheelchair and the measures for the kid enable to satisfy his

request of self-determination in order to get an autonomous mobility that improves his social relationships. However, the cognitive evaluation of the kid conflicts with the ethical objective of both the clinician and the family to protect the kid from physical injuries. Thus, the benefit is high regarding the couple [free wheelchair, self-determination of the kid] but the risk is high regarding the couple [free wheelchair, limited self-determination].

Efficiency of the care contexts regarding the ethical objectives: those entities show the efficiency of the care contexts for supporting the ethical objectives. Considering the care contexts enables to refine the care regarding the environment. For example, a rehabilitation center is a satisfying context for using a powered wheelchair. Thus, the benefit is middle for [free wheelchair inside the center, self-determination of the kid] and the risk is middle for [free wheelchair inside the center, limited self-determination].

Processes of opinion: those entities process the different tables of efficiency and the evaluation results for the patient in order to propose different solutions. Each process can use a particular hierarchy of the different ethical objectives from the least to the most important one. For example, a process for the family opinion considers the limitation of the self-determination before the self-determination of the child.

Set of the solutions: this is the set of the solutions produced by the different processes. Each solution includes the considered order for the different ethical objectives plus qualitative and quantitative attributes. For example, the second solution is [free wheelchair inside the center, limited self-determination]=middle risk, [free wheelchair inside the center, self-determination of the kid]=middle benefit, [protection against the physical injuries]=middle risk, [development of social relationships]=middle benefit, GMFC=4 and WST score=0.05.

Comparison between patients: those entities give the relative score and decision for the different similar patients. If there is no immediate and evident solution for the considered patient, those data will help to improve the decision. For example, among a set of kids the only one, that has a free usage of the powered wheelchair inside the rehabilitation center, has a WST score=0.95.

Resolution methods: That entity can use a wide range of resolution methods including scenarios [7], casuistic [8], pragmatism [9] or other methods of decision such as a evidential reasoning [11] or artificial intelligence. For example, the scenarios method corresponds to choosing one solution among the set of solutions.

Resolution of the decision: that entity uses the resolution methods to maximize the satisfaction of the different ethical objectives while improving health and wellness of the patient. The purpose is not to find a consensus but to find the solution that maximizes the satisfied objectives and minimizes the risk [6]. The resolution can merge various methods e.g. a care team using a pragmatism approach associated with an artificial intelligence to ease the decision in order to adjust the decision according to the proposed set of solutions. The quantitative and qualitative attributes help to find a decision that has a good chance to be the more ethical and efficient. For example, the second solution ([free electrical wheelchair inside the center, limited the self-determination]=middle risk, [free electrical wheelchair inside the center, self-determination of the kid]=middle benefit, [protection against the physical injuries]=middle risk, [development of social relationships]=middle benefit, GMFC=4

and $WST=0.05$) seems to be satisfying. But, a comparison with the other kids invite to search a better solution since the only kid, with a free usage of the wheelchair, has a WST score of 0.95.

New iteration: this entity aims at finding a better decision than the previous one. For this purpose new elements have to be proposed for the ethical/care objectives, models/contexts of care or evaluation methods. For example, a new context of care ‘restricted wheelchair inside the center’ is proposed for restricting the wheelchair under observation of a caregiver in order to limit the risk of physical injuries.

Decision: this is the result produced by the whole reasoning. But, a new unattended event can restart the whole reasoning in order to produce a decision adapted to the new situation. For example, the result is a restricted usage of the wheelchair associated with a monitoring carried out by the caregivers inside the rehabilitation center. But an unattended event such as the child injury during the restricted usage requires a new reasoning.

Figure 1 describes the relationships between the different entities of the Ethics-Based Medicine. The care objectives, ethical objectives, models of care, contexts of care and evaluation enable to produce the two efficiency tables, the results for the patient and a comparison with other patients. The processes for the different opinions use different inputs such as the efficiency tables and the results of the evaluation scales for the patient in order to provide a set of solutions for the resolution entity.

The processes of opinion can propose concurrent solutions. In this case, the resolution of the decision aims at using those solutions to derive a proposal that has a good balance between the benefit and the risk. Indeed, the decision must 1) maximize the benefit i.e. the satisfaction of both the health improvements and the ethical requirements and 2) minimize the risk i.e. the iatrogenic effects of the care regarding both health and ethics. For example, let us consider that the processes can propose three different solutions for the wheelchair of the child. The first process uses the self-determination of the kid as a priority while the second process considers the limitation of the self-determination from the family point of view as a priority: the first process gives [free wheelchair, self-determination of the kid]=high benefit, [free wheelchair, limited self-determination]=high risk, [protection against the physical injuries]=high risk, [development of social relationships]=middle/low benefit and the second process gives: [free wheelchair inside the center, limited self-determination]=middle risk, [free wheelchair inside the center, self-determination]=middle benefit, [protection against the physical injuries]=middle risk, [development of social relationships]=middle benefit.

The resolution entity can decide that none of those solutions is satisfying. In order to find a better issue, a new iteration starts introducing the new context of care: temporary electrical wheelchair inside the center. A third process provides the following solution: [restricted wheelchair inside the center, limited self-determination]=low risk, [restricted wheelchair inside the center, self-determination]=low benefit, [protection against the physical injuries]=low risk, [development of social relationships]=middle benefit.

The resolution decides to use the method of scenarios and chose the third solution that should have the best benefit while limiting the risk. Thus, the resolution entity stops the iterations. Indeed, increasing the self-determination benefit requires a WST score of at least 0.95.

Our approach supports unattended events that will introduce new care/ethical objectives, models/contexts of care or evaluations/comparisons of the patient. For example, the aggravation of the health of the child can require new cares or ethical objectives. Also, the society or the care center can have new ethical objectives such as minimizing the cost of the care or maximizing the number of the cares. The caregivers also can have additional ethical objectives such as balancing the cares among the different patients or preserving a quality of work. Obviously, the more the care or ethical objectives are, the more the combinatorics of the decision is high.

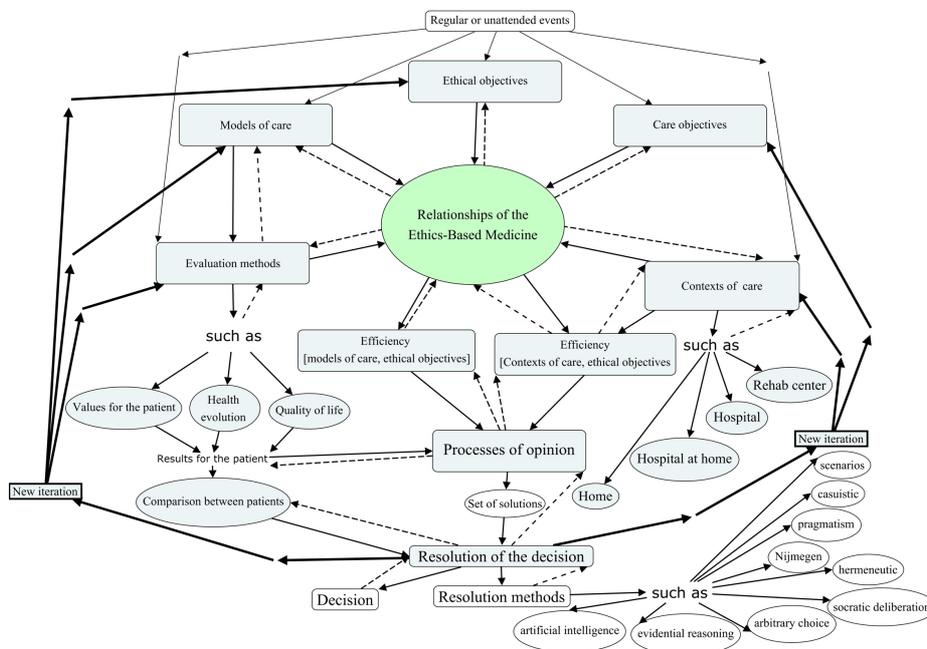


Fig. 1. A reasoning method for Ethics-Based Medicine.

3 Discussion

Our approach follows a relativism approach where no one can say what is good or bad. Indeed, one ethical objective can be considered as good from one point of view and bad from another point of view. The purpose is not to satisfy an ethical system as a set of universal ethical objectives that can be considered as an absolutism approach. The proposed reasoning approach is not a formal ethics [11]. Indeed, the purpose is not to prove through logic that the decision satisfies the objectives. In contrast with [9] where pragmatic is the major way to solve ethical problems, the proposed

reasoning does not require to experience an opinion. Indeed, the different processes can be viewed as different opinions. However to some extent, our approach supports democracy as a type of resolution method but do not force to use such a method. Moreover, the feedback obtained from the unexpected events offers a kind of experience of the decision.

Our method supports the Nijmegen method, Hermeneutic method or Socratic deliberation [12]. However, our proposal extends those three approaches in different directions. First, it provides a common framework for integrating those approaches of reasoning. Second, it gives the precise entities involve in the reasoning. Third, it defines loose relationships between the entities and the connections with the different resolution methods. Finally, that modeling sufficiently is precise to support a computer processing and cooperation between different participants (patient, family, clinicians, caregivers, social care agencies, ...).

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