Social sciences methodology vs medical approach to quality in health care

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Abstract. The search of lists of medical specialties, scientific disciplines and requirements of medical and social science journals was performed to find the convergences between social science and medical approach to study quality in health care. 14 databases were also searched with 3 sets of key words. 420 top-listed articles were hand-searched to disclose 34 reports fulfilling inclusion criteria. The results indicated that the number of medical specialties exceeded 50, the number of scientific disciplines is continuously increasing and the medicine and some social sciences are put together into "applied sciences". However, the multidisciplinary research seems to be promising to overcome the difficulties in comparison of quality in health care in different countries. Team work requires more precise definitions used in social and medical sciences to avoid the problems resulting from the different understanding of the same terms in different disciplines and specialties.

Introduction

Methodology is a guideline system for solving a problem, with specific components such as phases, tasks, methods, techniques and tools. According to Merriam-Webster dictionary, methodology is defined as:

- a body of methods, rules, and postulates employed by a discipline
- a particular procedure or set of procedures
- the analysis of the principles or procedures of inquiry in a particular field [http://www.merriam-webster.com/dictionary/methodology]

Referring to "classic" division of science one can disclose methodology of:

- Exact science (e.g. physics)
- Natural science (e.g. biology)
- Social science (e.g. economics)

There are different classifications of scientific methodologies. It can be easily seen that medicine – recognized as the art and science of healing – cannot be attributed neither to social nor natural science. That implicates that medical methodology is something different from methodology

ISBN 978–83–7431–336–0 ISSN 0860-150X

of natural science. However, the Vancouver protocol has been generally accepted by all biomedical journals since 1978 and approved by the National Library of Medicine in 1979. According to that protocol the Uniform Requirements for Manuscripts Submitted to Biomedical Journals is now a must for authors intending to publish an article in any biomedical journal [3, 16]. The structure of a biomedical article should reflect the methodology of the biomedical research. According to current version of Uniform Requirement the format of an article encouraged for original research articles is:

a) Introduction (a brief, logical lead-in to the subject, hypothesis, and objectives),
b) Materials and Methods,
c) Results, and
d) Discussion.

However, this format does not include several other important and integral parts of an article [3].

No similar "uniform requirements" have been implemented in social sciences. The authors representing social sciences, even those investigating health problems, do not need to obey such rigid requirements. The structure of an article ("main text") may be quite different from that of a biomedical journal [17]. The British Sociological Association supports the following structure/elements of a typical scientific project or paper:

a) Conception or design.
b) Data collection and processing.
c) Analysis and interpretation of the data.
d) Writing substantial sections of the paper (e.g. synthesizing findings in the literature review or the findings/results section).

Starting from the conception (hypothesis to be verified) or from the background (towards the proven hypothesis) seems to be the most important difference between "medical" and "social science" approaches. The question arises whether the differences in the structure of an article may be attributed to the different methodology of different scientific disciplines. Moreover, it may be important to establish whether the differences of methodologies would lead to different results and conclusions.

The quality of health care is an excellent example to study. Considering this problem as a medical quality, social understanding of quality and, last but not least, managerial approach to quality may result in different methodology and significantly different opinions. The European Health Consumer Indices is an example of such mixture of different methods [9]. EHCI combining different types of indicators (epidemiology, public opinion

survey and different requirements and expectations) is used to compare the health care systems in European countries:

- Patient rights and information (12 indicators)
- Accessibility – waiting times for treatment (5 indicators)
- Outcomes (8 indicators)
- Prevention/ Range and reach of services provided (10 indicators)
- Pharmaceuticals (7 indicators)

However, it is difficult to prove how, for example the indicator called "layman pharmacopeia[1]" is a factor measuring the quality of health care system. The same problems are with, for example "undiagnosed diabetes". How can one count the undiagnosed entity without diagnosis? EHCI must not be mismatched with ECHI (European Community Health Indicators) [10] containing 88 health indicators which describe and measure:

- demographic and socio-economic situation
- health status, health determinants
- health interventions: health services
- health interventions: health promotion

It seems that differences between EHCI and ECHI (as well as other sets of indicators) result from different methodologies used, so different comparisons on the quality in health care may provide even conflicting opinions. This study was aimed at the methodological aspects of research on the quality in health care to disclose whether significant methodological differences and their consequences exist between social sciences and medical sciences.

Material and methods

The following searches were performed to compile lists of medical specialties, classification of scientific disciplines, and top-rated articles in the scientific databases. The lists of medical specialties were taken from the official documents and legal regulations in the European Union, the USA and Poland. The classification of scientific disciplines was based on monographs, legal regulations in Europe and the USA, and research papers found by scrutinizing 5 databases: three multidisciplinary bases (Science Direct,

[1] Pharmacopeia is highly specific, pharmacists addressed, and it contains the procedures and descriptions of medicinal compound. It is necessary to be educated in pharmacy to understand such information. The information directed to the patient must be simplified and adjusted to an average patient's knowledge. That is an important difference.

OvidSP/MEDLINE/Embase, EBSCO), and two medical bases: HighWire Press and PubMed. Search of Google and Google – Scientific Reports was performed as well. Search of Science Direct was performed in Springer journals and Elsevier journals. The latter were searched in the following categories: economics; business, management, accounting; mathematics; medicine; social science.

The key words used in following combinations:

1. social sciences methodology medical quality health care
2. social sciences methodology quality health care
3. medical methodology quality health care

Ten top listed articles in each of the search were based on the best matches, relevance, percentage of hits. Hand search was also performed to clarify and to verify the information. Ten top listed articles in each out of 42 searches (14 bases, 3 combination of key words) has been reviewed. The following criteria of exclusion were used: methodology not sufficiently described, quality not precisely defined. Only the articles referring directly to the methodology of social science and medical methodology were included.

Results and Discussion

The most comprehensive and covering almost all medical specialties in one document is the Directive 2005/36/EC[2]. It contains 54 medical specialties [Tab. 1]. Some of the Polish specialties (e.g. forensic medicine or hypertensiology) are not mentioned here. Currently in Poland there are 37 "basic" specialties and 30 "detailed" medical specialties. On the other hand, the number of subspecialties may be different in different countries. In the USA the following 12 specialties are recognized inside "neurology": behavioral neurology, clinical neurophysiology, geriatric neurology, headache medicine, neuromuscular medicine, neurodevelopmental disabilities, neuro-oncology, neuroradiology, vascular neurology, hospice and palliative medicine, pain medicine, sleep medicine. Above mentioned abundance of disciplines and specialties make it difficult to compare different specialties in different countries.

[2] Note that there is substantial overlap between some of the specialties and it is likely that, for example "clinical radiology" and "radiology" or "dental, oral and maxillo-facial surgery" and "maxillo-facial surgery" refer to a large degree to the same pattern of practice across Europe. The rest of medical professions e.g. specialties in pharmacy, dentistry, nursery, laboratory diagnostics, orthoptics etc. are not discussed here.

Tab. 1. Medical specialties in EU Directive

Allergology	Anaesthetics	Biological hematology
Cardiology	Child psychiatry	Clinical biology
Clinical chemistry	Clinical neurophysiology	Clinical radiology
Dental, oral and maxillo-facial surgery	Dermatology	Dermato-venerology
Endocrinology	Gastro-enterologic surgery	Gastroenterology
General hematology	General surgery	Geriatrics
Immunology	Infectious diseases	Internal medicine
Laboratory medicine	Maxillo-facial surgery	Microbiology
Nephrology	Neurology	Neuro-psychiatry
Neurosurgery	Nuclear medicine	Obstetrics and gynecology
Occupational medicine	Ophthalmology	Orthopaedics
Otorhinolaryngology	Paediatric surgery	Paediatrics
Pathology	Pharmacology	Physical medicine and rehabilitation
Plastic surgery	Podiatric Medicine	Podiatric Surgery
Psychiatry	Public health and Preventive Medicine	Radiology
Radiotherapy	Respiratory medicine	Rheumatology
Stomatology	Thoracic surgery	Tropical medicine
Urology	Vascular surgery	Venerology

For example, "Anesthetics[3]" is not the same as "Anesthesiology". So, it can be accepted that medicine itself uses different methodologies depending on the subject of studies (specialty), and the term "medicine" should not be used as a general description of all medical activities. The term "quality" in case of forensic medicine must have quite different meaning as compared with internal medicine. Public health researchers often use queries, like in social sciences, nevertheless the Vancouver protocol is obeyed in public health journals. Unfortunately, the social sciences use the term "medicine" or "medical" in the broad meaning, that leads the misunderstandings.

[3] The term "anesthetics" refers usually to medical products used in anesthesiology.

Also the classification of scientific disciplines is generally difficult, and seems to be a never-ending process. Continuous development of different disciplines, emerging new interdisciplinary sciences as well as overlapping of the fields of interests, result in difficulties in delineating the borders between scientific disciplines. Abbott proposed to manage such "chaos" by placing 44 disciplines into 5 branches [1]:

1. Humanities (history, linguistics, literature, performing arts, philosophy, religion, visual arts)
2. Social sciences (anthropology, archaeology, area studies, cultural and ethnic studies, economics, gender and sexuality studies, geography, political science, psychology, sociology)
3. Natural sciences (space science, earth sciences, life sciences, chemistry, physics)
4. Formal sciences (computer sciences, logic, mathematics, statistics, systems science)
5. Professions and applied sciences (agriculture, architecture and design, business, divinity, education, engineering, environmental studies and forestry, family and consumer science, health science[4], human physical performance and recreation, journalism, media studies and communication, law, library and museum studies, military sciences, public administration, social work, transportation) [1].

On the other hand, the number of disciplines in social science may be increased up to 11 (in such a case linguistics is a social science) or even 19 (including e.g. communication studies and public administration). Pieter identified nine types of scientific methods applicable to all scientific disciplines: observation, intuitive method, source criticism, survey, critical analysis, experimental method, monographic method, case study, diagnostic survey [20]. No specific "social science" or "medical" methodology was disclosed. One can discuss whether this list is complete, but the alternative is the 44 methodologies, at least one for each discipline. Moreover, Abbott's list does not cover the next 27 "applied science", one of them is medicine[5], and the number of medical specialties excesses 50. The search for articles gave surprising results [Tab. 2].

[4] Medicine is understood here as one type of health science.

[5] Medicine – "science and art of healing. It encompasses a variety of health care practices evolved to maintain and restore health by the prevention and treatment of illness in human beings" This definition is obviously too narrow, it does not cover e.g. public health, occupational medicine, pathology, forensic medicine etc.

Tab. 2. The search results of articles and web sites obtained by the use 14 databases

Database	Key words: ***social sciences medical sciences*** methodology quality health care	Key words: ***social sciences*** methodology quality health care	Key words: ***medical sciences*** methodology quality health care
OVID SP/MEDLINE/ Embase	5 136	5 467	6 773
Science Direct Springer	2	7	75
Science Direct Elsevier	18 904	26 202	34 750
Business, management, accounting	815	2 141	1 003
Economics	685	1 568	813
Mathematics	177	286	336
Medicine	14 351	16 293	27 077
Social Science	3 764	6 211	4 094
HighWire	21 350	29 570	46 996
PubMed	10 446	257 979	455 933
HighWire + PubMed	21 420	29 786	48 853
EBSCO	151 984	217 001	322 815
Google	11 300 000	3 710 000	11 800 000
Google – Scientific reports	703 000	1 170 000	2 110 000

It can be easily seen that the number of retrieved articles is very high, except in one case (Science Direct – Springer). Even in the category "mathematics" the search yielded 177 to 336 items. It can be noted that similar percentages of "social science" and "medical" articles are found in top-listed articles. However, the numerous, important reports have not been retrieved in such a way. The design of this study was based on the assumption that the search in 14 databases would provide the most relevant papers which match the sets of key words. A prediction was made that the same most relevant articles would be retrieved from different databases and the social sciences methodology will be more often used than "medical" methodology in health care. However, the results were astonishing, as in each database the top-listed articles were different and no single paper articles were found twice in different databases. It seems that, for example HighWire and EBSCO use different methods of retrieving data and it is possible to obtain different re-

sults. When Science Direct-Elsevier was used – the search engine covers journals of one publisher only – the top-listed articles were different in different searches. First of all, no single paper was found in which the social sciences methodology and medical methodology were applied to the same problem, e.g. multidisciplinary approach to quality in health care.

The results of hand search yielded 34 articles out of 420 searched. This is a better proportion than in other medical investigations. For example, Smetana et al. accepted only 49 articles – out of 2459 citations found in MEDLINE [21]. Even in one type of search, data from different sources may differ significantly. Machlin et al. in an economic study compared four sources on ambulatory care in the USA: Medical Expenditure Panel Survey (MEPS), National Health Interview Survey (NHIS), National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS) [18]. The numbers of visits to hospital emergency departments were estimated as 46.3 million (MEPS), 52.4 million (NHIS) or up to 90.3 million (NHAMC).

The content of the top-listed articles (sorted according to their relevance) revealed that the type of methodology was not limited to "social science" or medical journals. Some publications in journals devoted to public health use the same methodology as social science. But there were some important differences. The first problem resulted from the terminology of medical disciplines and specialties, as mentioned above. Next – the problem of precision in defining terms and attributes. It is well illustrated by the results of Delphi studies by Haggerty et al. [12]: only 5 out of 25 attributes (accessibility, first-contact, continuity-relational, family-centered care, intersectoral team, population orientation) were recognized as specific to primary care. Though the article was published in a medical journal, the social science methodology was used. However, it remained to be clarified how to distinguish and quantify the "more intersectoral" from "less intersectoral" team. The term "social capital" a corner-stone in health promotion can be described as a metaphor, rhetoric or science. The latter is an association between social and economic factors and health, but the authors have suggested that "the concept of social capital may add little and may perhaps even act to dilute social health initiatives already in place (under the various names of community health promotion, community development, empowerment and capacity building)" [13].

Totally different approach to the problem of quality in health care is based on the quantitative indicators. Asch et al. constructed aggregate scores from 439 indicators of the quality of care for 30 chronic and acute conditions and for disease prevention [2]. It is noteworthy that the authors

limited their activities to selected conditions and tried to measure as much as it is possible, but not generalized to the general population. Such "medical" approach narrowed the scope of the study, but increased its specificity. Sometimes the economic terms implemented into medical investigation may lead to serious consequences. Efficacy studies of the drug/procedure should not be mismatched with effectiveness studies, as efficacy refers to "optimal circumstances" and effectiveness to "usual circumstances". It means that each type of studies covers different population (eligible subjects vs. any subjects), different intervention (fixed regimen/forced titration vs. flexible regimen) compliance (high vs. low) and outcomes (condition-specific vs. comprehensive) [4]. The results of efficacy study when applied to hospital-acquired infection may indicate quite different way of management as compared to the results of effectiveness study [19]. Deccache et al. also noted the need of combining public health and social sciences methodology to evaluate the quality of health promotion [7]. On the other hand, Camargo et al. stressed that the scientific medicine is not necessarily good medicine, also indicating the need of interdisciplinary approach [5]. Fielding – a sociologist – postulated to overcome the bipolar academic and applied research settings as distinct spheres and to broaden mixed methods research (MMR) applied to research on social aspects of health and illness [11]. From the medical point of view, Wensing advocated implementing social science methods into health sciences research [22]. However, there are some tendencies to generalize and to create models met in social science publications. The comparison

Tab. 3. Managerial and medical cultures: points of divergence according to Davies [2000]

	Managerial culture	Medical culture
Structure:	Bureaucratic	Collegial
Group loyalty:	Low	High
Job security:	Low/medium	High
Disciplinary base:	Social sciences	Natural sciences
Evidence base:	Case studies on organisations	Clinical studies on patients
Focus:	Patients as groups	Patients as individuals
Skills:	Managerial/human relations	Biomedical/technical
Allegiance:	Organisation/corporate goals	Patient/professional
Success measure:	Efficiency	Effectiveness
Quality emphasis:	Consumer rated quality	Technical quality
Performance review:	Public	Confidential
Public trust:	Low	High (but vulnerable)

of managerial with medical cultures by Davies contains some simplifications [Tab. 3], but it may indicate more convergences then divergences in both types of applied sciences [6].

Simplifications cause misunderstandings. For example, managerial and "medical" skills are both based on human relations; technical quality is only an element of quality of health care from the medical point of view; efficiency and effectiveness – depending on their definitions used – are equally important in managerial and medical culture [6]. The above mentioned "efficacy" in medical studies has not necessary the same meaning as the "efficacy" in economic analyses. Nevertheless, tendencies to combine different methodologies indicate the way of future development of social and medical sciences.

Conclusions

1. Methodology of social sciences and medical sciences still differs significantly one from another, but increasing tendencies in combining them can be seen in the last decade.

2. Multidisciplinary research seems to be promising to overcome the difficulties in comparison of quality in health care in different countries.

3. Team work requires more precise definitions used in social and medical sciences to avoid problems resulting from different understanding of the same terms in different disciplines and specialties.

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