PERCEPTIONS OF MEDICAL TEACHERS ABOUT INTEGRATED CURRICULUM

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ABSTRACT

BACKGROUND: There is a significant progress in medical education in recent years but still there is room for reforms and innovations. Development of curriculum is a dynamic process which is ongoing since centuries. With advances in medical sciences, changes in patterns of diseases, changing socio-economic realities, periodic updating of a curriculum is necessary. Medical curriculum has gone through many reforms and for implementation of a new curricular reform detailed understanding of implementer's perceptions is mandatory.

AIM: The study is aimed to determine the perceptions of medical teachers about curricular reforms.

METHODS: Search was done utilizing the PubMed and ERIC databases and grey search utilizing search engine Google and Google scholar, following the Haig and Dozier approach. Optimal search with combine natural language and controlled vocabulary approaches was used.

RESULTS: After initial selection of 237 articles relevant to the research question there abstracts were studied, inclusion and exclusion criteria were applied and it was found that there are many articles which are nonspecific (not having proper study designs, conference proceedings) and 10 were duplicate. Three themes were identified after search: Theme 1: Evolution of integrated curriculum/ Historical Perspective, Theme 2: Implementation of the integrated curriculum and Theme 3: Failed reforms to implement the integrated curriculum

CONCLUSION: It is concluded that integrated curriculum in an organ-system-based model is a curricular reform that is well accepted by teachers around the world. It helped reducing the excessive information and repetition of content

KEY WORDS: Integration, perceptions, curriculum development, organ-system-based, thematic analysis, mix-methods research.

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INTRODUCTION

Significant progress has been achieved in medical education in recent years, but there is still room for reforms and innovations.[1] Medical education is roughly divided into three periods:

1) Period before Flexner (until 1910), which was based on master-apprentice model,

2) Flexner period (1910-1970), during which biomedical approaches prevailed in education,

3) Society-centered medical education. [1]

Development of curriculum is a dynamic process which is ongoing since centuries. With advances in medical sciences, changes in patterns of diseases, changing socio-economic realities, periodic updating of a curriculum is necessary.[2] Institutes plan curriculum for the learners through curricular committees which include all the stake holders but mostly teachers play a major role in it.

Going through the history of curriculum it can be appreciated that in the eighteenth century in the earliest medical schools apprenticeship-based curricular model was followed.[3] In this model there were two semesters each having four months duration during which courses of anatomy, physiology and pathology were taught. Courses taught in the first semester were repeated in the second semester also.

Flexner argued that the master-apprentice model failed to train qualified physicians and that there was a need for greater emphasis on

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science in medical education.[4] Discipline-based curricular model followed in which individual subjects were taught being divided into basic and clinical sciences. The two semesters of four month's periods were extended to two years of basic science teaching and then clinical subjects were taught after initial two years. Basic and clinical subjects were studied separately with no connection between them; medical graduates had to integrate during their clinical practice.

A major criticism by teachers was content overload because of exclusive subject-based teaching.[5] To address this issue teachers planned reduction in unnecessary detail and in 1950s the organ-system-based model was introduced in medical education which has integration of basic and clinical sciences with control of content given to the topic committees rather than individual subject specialists.[3] Teachers presumed that this will provide the learners an integrated knowledge base in clinical context necessary for problem solving.

All curricular reforms and new trends in medical education are for the improvement of learner's education.[6] An innovative curricular reform was planned and implemented in Pakistan but it was unsuccessful because of administrative, institutional and financial issues.[7] We are following integrated curriculum in AJK Medical College, and we feel that for a successful reform process a thorough understanding of the history and reforms in medical curriculum needs to be understood. For this purpose we planned this systematic review. This was done by a systematic literature search to address all the issues beginning from history of integrated curriculum, teacher's perception at that time and narrowing down to situation in Pakistan.

METHODS

Literature search technique

Literature search was done utilizing the PubMed and ERIC databases and grey search utilizing search engine Google and Google scholar, following the Haig and Dozier approach.[8]

An optimal search with combine natural language and controlled vocabulary approaches was used. While searching World Wide Web there is no consistency of words used by authors therefore natural language is used. Controlled vocabulary is structured hierarchy of terms for categorization and is used in databases like pub med. It is documented that natural language terms combined with controlled vocabulary terms retrieve the maximum number of relevant records.[9]

Keywords

Integration, curriculum, perceptions, curriculum development, organ-system-based, medical, teachers, medical college, thematic analysis, mix-methods research.

Descriptors

Boolean operators 'AND' and 'OR'

Inclusion criteria

Human Studies
Meta-Analysis
Randomized Controlled Trial
English literature

Exclusion / search restrictions

Non English literature
Case reports
Editorial
Guideline
Reviews
Conference proceedings

RESULTS

Table 1 shows the search strategy used to search the literature. Figure 1 shows the flowchart of the literature review.

After initial selection of 237 articles relevant to the research question there abstracts were studied, inclusion and exclusion criteria were applied and it was found that there are many articles which are nonspecific (not having proper study designs, conference proceedings) and 10 were duplicate. At last ten most suitable articles were selected for critical appraisal in the study. All the other articles referenced in this research were selected in grey search with Google. Table 2 shows the critical appraisal of selected articles. After thorough search three themes were identified:

Theme 1: Evolution of integrated curriculum/ Historical Perspective

Theme 2: Implementation of the integrated curriculum

Theme 3: Failed reforms to implement the integrated curriculum

DISCUSSION

Theme-1: Evolution of integrated curriculum/ Historical Perspective

The word curriculum came from Latin which means race or course of race which again is derived from the verb "currere" means to run. Curriculum is a defined or prescribed course of studies, which students must complete in order to reach a certain level of education. An individual teacher's curriculum means all the subjects that will be taught during a school year by him. A curriculum is a prescriptive, and is based on syllabus which simply specifies what topics must be understood and to what level to achieve a standard. A Medical college might refer to a curriculum as the courses required in order to get MBBS Degree.

A curriculum can be defined in a variety of ways; it is the content for which students are held accountable or it is a set of instructional strategies teachers plan to use. There is a history how curriculum has developed and different perspectives are a path followed from traditional to modern era. While planning or developing a curriculum attention must be given to the historical dimension of the curricular development and the problems faced by the curriculum developers over the past decades.[11]

In the eighteenth century the earlier medical schools in North America followed apprenticeship based curriculum. Although medicine was taught in Baghdad in as early as seventh century and Islamic Spain in twelfth century in the form of lectures and same apprenticeship based model was followed. In this

TABLE 1: SEARCH STRATEGIES USED TO SEARCH THE DATABASE

S.No	Key words or Search Terms	Google scholar search & No. of results	Database searched PubMed & No. of results	Database searched ERIC & No. of results	Total Number
1.	Perceptions of teachers	1,920,000	2405	27,055	1949460
2.	perceptions of medical teachers	612,000	545	31991	644536
3.	Faculty perceptions	1,740,000	16451	7114	1763565
4.	Integrated modular curriculum	31,400	61	52	31513
5.	Integrated Curriculum history	1,200000	609	1,265	1201874
6.	2 & 4	18,500	4	81	18585
7.	2 & 4 with exact phrase	07	4	7	18
8.	2,4,6&8	0	0	0	0

FIGURE 1: Flow sheet of the Literature Review.[10]

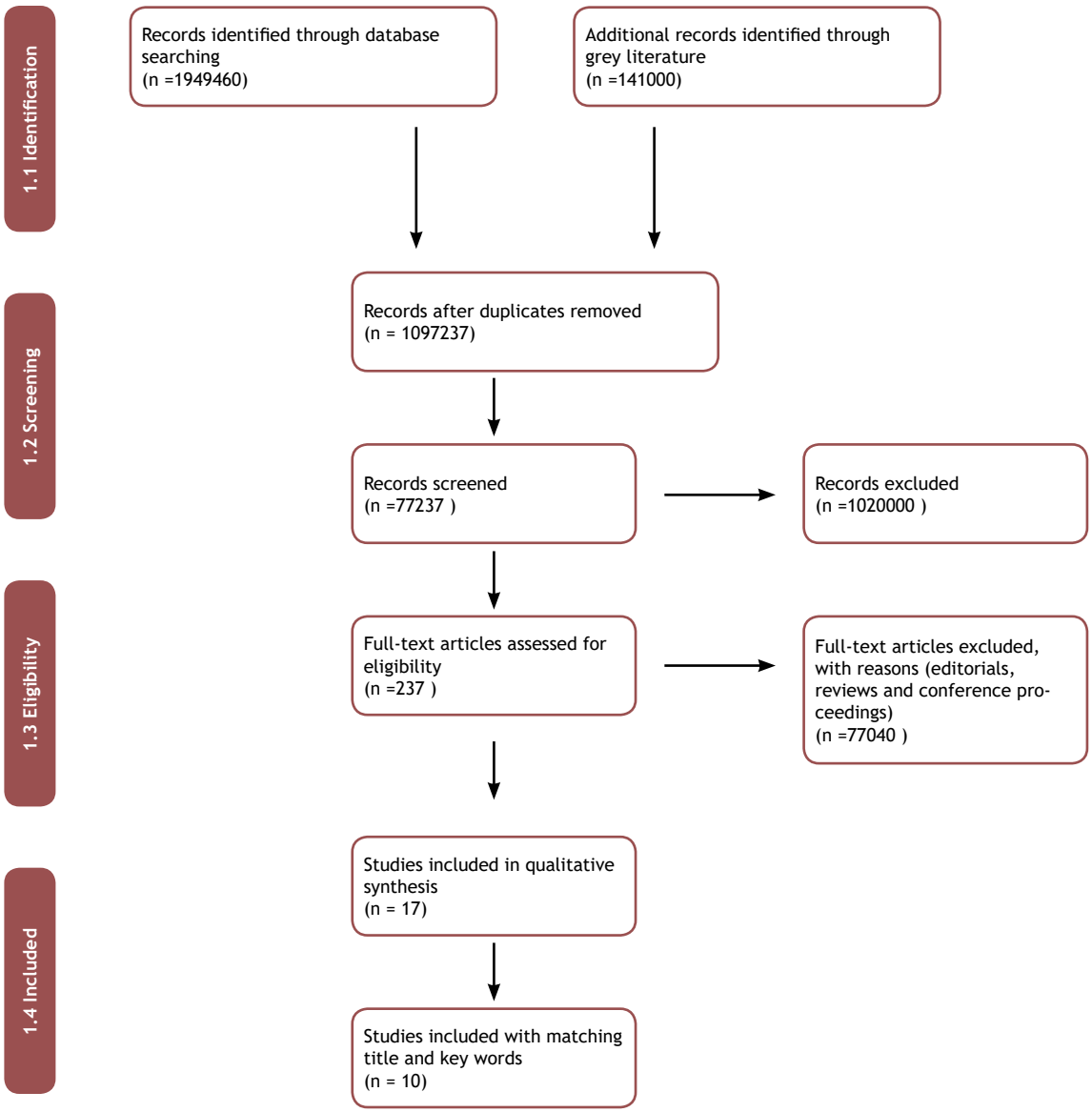

TABLE 2: CRITICAL APPRAISAL OF THE SELECTED ARTICLES

Name of Author	Research Topic	Type of study	Sample	Data collection method	Data Analysis	Key Findings
Papa FJ, Harasym PH 1999	Medical Curriculum Reform in North America, 1765 to the present	Descriptive	Five major curricular reforms	Content analysis	Themes	Medical education improved as each new curriculum model built on the strengths of past innovations and implementation at the same time overcoming the past weaknesses. Increasing interest in, attention to, and understanding of knowledge base structures and cognitive processes that characterize and distinguish medical experts and novices.
Cooke M, Irby DM, Sullivan W 2006	American Medical Education 100 Years after the Flexner Report	Descriptive	40 Articles	Content analysis	Themes	Curricular reforms are never easy or simple but they are inevitable. The challenge is not to define appropriate content but incorporating it into the curriculum in a manner that emphasizes its importance relative to the traditional content and then finding and preparing faculty to teach this revised curriculum
Ali SK, Baig LA. 2012	Problems and issues in implementing innovative curriculum in the developing countries: the Pakistani experience.	Mixed Methods	Key informants 16, faculty 514, administrators 16	In depth interviews, focus groups and mail in surveys	Thematic analysis Survey questionnaire were used for triangulation	Curriculum reform couldn't be implemented without adequate infrastructure. The administrators were willing to provide financial assistance, Political support and better coordination and felt that COME could improve the overall health system of the country whereas the faculty did not agree to it. The key issues identified in the study included frequent transfer of faculty of the designated colleges and perceived lack of: Continuation at the policy making level, Communication between the stakeholders and Effective leadership
Littlewood S, pinazar VY, Margolis SA, Scherpbier A, Spencer J, Dornan t. 2005	Early practical experience and the social responsiveness of clinical education	Systematic review	Bibliographic databases and journals from 1991-2000	Content analysis of articles	Themes	Vertically integrated curriculum; early practical experience helps medical students learn, and develop appropriate attitudes towards their studies and future practice, and also orientates medical curriculums towards societal needs
Cecilia K, Chan Y, Lillian Y. 2013	Faculty Perspectives on the "3+3+4" Curriculum Reform in Hong Kong: A Case Study	Case study	60 faculty members	Questionnaire on 5- point Likert scale	Thick descriptions & SPSS	Teachers feel new university curriculum as an increase in workload, they shown understanding of outcome based learning and common core courses. They also had concern that reformed curriculum may not bring benefit to the students as most teaching is didactic during their school years. It is vital to prepare teachers in any curricular reform process.
Dashputra A, Kulkarani M, Chari S, Manohar T 2012	Perception of Medical Teachers toward Present Day Medical Education	Descriptive Cross sectional study	73 Teachers	Questionnaire using Likert Scale	Descriptive statistics	Teachers agreed that the medical teacher should be aware of the curriculum. They also felt that syllabus should be provided to the students. Most of them agreed that the quality of student is deteriorating in medical college. Maximum teachers were in favor of upgrading medical teaching with the help of Medical Education Technology
Bandiera G, Boucher A, Neville A, Kuper A, Hodges B 2013	Integration and timing of basic and clinical sciences education	Descriptive	30 National key Stakeholders	Interview	Thematic analysis	New curricula tend to emphasize integration, development of more diverse physician competencies, and preparation of physicians to adapt to evolving technology and patients' expectations
Ghayur S, Rafi S, Haroon A, Nadeem R, Iqbal M 2012	Delivering endocrinology and reproduction in an integrated modular curriculum	Descriptive	86 students and 14 faculty	Likert scale questionnaire and free comments	Descriptive statistics and thick descriptions	70% students thought that clinical concepts were given more emphasis. 80% wanted scheduled time to be increased. All faculty members agreed that Interactive learning promotes relevance and helps create connections across various disciplines. There was positive rating of the integrated system of learning by a majority of students and an excellent rating of the system by the faculty.

Harden RM, Swoden S, Dunn WR. 1984	Educational strategies in curriculum development: the spices model	Descriptive	10 Articles	Content analysis	Themes	Six educational strategies in a spices model can provide a framework around which a more meaningful curriculum can be planned. Making decision that a curriculum should be integrated would depend upon weather one wish to encourage interdisciplinary and community based research.
Harden RM. 2000	The integration ladder: a tool for curriculum planning and evaluation	Descriptive	22 Articles	Content analysis	Themes	Curricular integration is an important strategy but also is a complex concept. There are eleven steps between subject based and integrated teaching. As one moves up the ladder the emphasis on the role of disciplines decreases. The higher up one goes on the ladder more important is communication and joint planning between teachers of different disciplines.

model in North American medical schools basic sciences were not given enough importance and most of the clinically relevant knowledge was imparted in two sessions each consisting of four month. There was repetition and memorization of contents of lecture. Note taking compulsory attendance and text book studies which emerged in 1850's were the learning strategies. General medical practitioners were faculty members and role models. The disadvantages of this model were wide variations in curricular quality from school to school and the caliber of instructors which was not standardized. Memorization was one of the primary learning strategy, teachers perceived that education based upon rote memorization has many disadvantages like inability to think critically and solve problems.

The situation of doctors graduating in the apprenticeship based curriculum was varied. Charles Eliot described the situation as the ignorance and incompetence of graduates when they receive the degree which lets him loose to practice on community as horrible.[12] Towards the end of nineteenth century disciplined based curricular model started to be followed, in which there was a strong hold of subject specialists. Teachers then believed that there is a need for a strong knowledge base of basic sciences for the students, and before getting that knowledge base there was no clinical training during the first two years. This division is still present in medical curricula. There was emphasis on university housed departmental structure which was discipline based, this lead to increase in the quantity of knowledge which lead to new clinical applications. The primary instructional goal of this curricular reform was not to provide students with knowledge of facts but to polish their abilities to think critically and to become problem solvers and to keep up with changing times.[13]

Abraham Flexner a famous research scholar at the Carnegie Foundation for the Advancement of Teaching took an assessment of medical education in America,[14] he visited 155 medical schools in the United States and Canada He reported: "Each day student was subjected to interminable lectures and recitations. After a long morning of dissection or a series of quiz sections, they might sit wearily in the afternoon through three or four or even five lectures delivered in methodical fashion by part-time teachers. Evenings were given over to reading and preparation for recitations. If fortunate enough to gain entrance to a hospital, they observed more than participated." His report in 1910, addressed primarily to the public, helped change the face of American medical education.[15,16]

Flexner's report influenced change in curriculum by criticizing the ordinary quality and profit motive of many medical schools and medical teachers, the inadequate curricula and facilities at a number of schools. Admission criteria, length of medical education in a medical school and exclusive basic science knowledge base of two years came into practice.

Strengths of this curricular design were a strong basic sciences knowledge base and the development of hypothetico-deductive reasoning skills which will serve as foundation for intellectual skills like self-directed learning and problem solving.

Major disadvantage of this curricular model (structure of discipline) was that students were not allowed to see real patients for the first two years, another important issue was sequencing of teaching in basic disciplines thus resting all the responsibility of integrating information on the students. Individual departments have control over the information and they wanted to produce mini scientists who by themselves will become scientific practitioners.

These disadvantages as appreciated and perceived by teachers and curricular experts lead to integrated curricula the organ-system-based model during 1950's in which there was reduction in basic sciences details and integration of basic sciences information thereby avoiding unnecessary repetition of information.

In integrated curriculum education is planned in a way that it cuts across subject matter lines, bringing together different aspects of the curriculum into significant association to focus upon broad areas of study. It views learning and teaching in a holistic way and reflects the actual world, which is interactive.

During the same period the departmental barriers were lifted and curriculum was overseen by topic committees who were responsible for planning an educational program. Western Reserve School of Medicine gave the first organ system based model in which basic science teachers from various disciplines integrated their lectures using a single organ system as focal point.[17,18] Clinical integration was achieved later when clinical case encounters were introduced in each organ system. With integrated curriculum student learning was maximized by teaching basic and clinical sciences integrated within an organ system. Students attain skills as self directed learning and problem solving; further integration will be achieved by the students when they start clinical training. Taking the control of curriculum from the departments and giving it to the curriculum committee ensures successful implementation throughout institution and by defining learning objectives performance expectations are also defined.

Theme 2: Implementation of the integrated curriculum

Since 1950 integrated curriculum; the organ system based model is followed worldwide it started from North America, most of the medical schools of Europe adopted the same reforms. Innovative curricula as practiced in different part of the world like Dundee UK, McMaster in Canada, Maastricht in Netherlands and Newcastle in Australia and many others follow Spices model of curricular reform as proposed by Harden.[19] This model is a continuum from traditional to modern designs with newer schools tends to be more on the left of continuum.

Integration as opposed to discipline based curriculum is one of the important components of SPICES model. This started earlier than student centered and problem based approaches which actually are considered as a part of integrated curricula. It is the organization of teaching matter of different academic courses taught by different disciplines. Integration is accepted as one of the important educational strategy and eleven levels of integration[20] have been described from total isolated teaching to complete integration that is trans disciplinary.

In Isolation subject specialists arrange their teachings without considering for other disciplines, while in the awareness stage they are aware of what is covered in the other disciplines. In harmonization stage teachers consult with each other and communicate about their courses, this stage is described as "connection"[21] disciplines remain separate but teachers make explicit connections like connecting topics in one session to earlier sessions. The next step is nesting; an integrated approach in which in a subject based course teacher introduces skills from another subject like a pathology course introducing aspects of clinical medicine. In temporal coordination timing of teaching topics of individual subjects is done with coordination of other disciplines. Example of temporal coordination is functions of the heart taught by physiologists at the same time when anatomists teach structure of the heart.

Sharing is the step six of the ladder in which two disciplines agree to plan and jointly implement a teaching program. In correlation step emphasis remains on disciplines, an integrated teaching session is planned in addition to subject based teaching. Complementary approach is step eight it has both subject based and integrated teaching, now more times is dedicated towards integrated teaching and focus of teaching is a theme or a topic.

Multidisciplinary approach brings together a number of subject areas in a single course with themes. The themes selected may function in a different ways,[22] the themes can delineate an area in which practical decisions are to be practiced or a structured body of knowledge has to be mastered. In the step ten; interdisciplinary integration there is further shift of emphasis on themes as a focus of learning and to commonalities across disciplines.

In trans-disciplinary integration the focus of learning is field of knowledge as in the real world and not the themes or topics. Teacher provides the structure or framework of knowledge and integration takes place in the mind of learners.

There was a mixed response of teachers over the integrated curriculum, more of them perceived it having a positive impact on learning. The interest of control of information by topic committees as opposed to departmental control and organization of content around organ system was appreciated by teachers and experts.[23] There were other perceptions among teachers like lack of context in the organ-system-based model does not enable the learner to understand better.[24,25]

Organ-system-based model with integration of basic and clinical sciences in the curriculum is being practiced in regional countries also. A study from India about perceptions of Medical Teachers[5] has concluded that teachers agree with implementation of curricular reforms.

Basic science and clinical teachers alike identify the need for greater integration in the curriculum. Exposure of students to real patients in first year and curriculum stimulating research are the areas of concern in the study. Teachers feel that quality of medical education is deteriorating and improvements need to be made in curricular planning, assessment and use of technology in medical education

Integrated curriculum is practiced in another regional country that is Nepal[26] and studies about the perceptions of students revealed concerns about certain basic sciences subjects to be removed from later part of semesters.

Theme 3: Failed reforms to implement the integrated curriculum

Structure of discipline model is followed throughout the medical colleges of our country. Community

oriented medical education [COME] an organ-system-based curricular reform was instituted by the government of Pakistan in 1992 taking lead from the Edinburgh Declaration asking the faculty and administrators of medical institutions to develop a revised/new curriculum for use by all the medical institutions of the country. The World Health Organization (WHO) was contacted for assistance in this regard.

The COME project (as it was called) was initiated as a pilot in 1994 in collaboration with the WHO by the Government of Pakistan. Four medical Colleges, one from each province were included in the program. They were Dow Medical College (Sindh), King Edward Medical College (Punjab), Bolan Medical College (Balochistan) and Ayub Medical College (Khyber Pakhtoon Khwah). The faculty of medical colleges and the other stake holders were involved in revising the traditional curriculum with incorporation of COME in undergraduate teaching. The conceptual framework for the curriculum was taken from the spiral curriculum at the medical school of Dundee in United Kingdom.

The curriculum was developed during regular meetings of the faculty from these four colleges and launched in 2001. Three out of these four colleges piloted one to two first year blocks. However despite intensive efforts by the consultants, coordinators, and the faculty, the COME curriculum could not be implemented.

A study was initiated by WHO and Ministry of Health (MOH) in 2004 to look into the factors, which hampered the implementation of the COME curriculum in the selected colleges. The objectives of the study were to identify the reasons for non-implementation of the COME Project and to assess the understanding of the stakeholders about COME. Perceptions of faculty (medical teachers), administrators and students were analyzed.[7]

A mixed method approach was used with both quantitative and qualitative study designs. Data collection was done by detailed interviews, mail-in survey questionnaire and discussions with groups of stakeholders.[7]

Three themes were identified after coding; institutional issues, programmatic issues and curricular issues. Majority (92% of the faculty) felt that COME curriculum could not be implemented without adequate infrastructure. The administrators were willing to provide financial assistance, political support and better coordination and felt that COME could improve the overall health system of the country whereas the faculty did not agree to it. The key issues identified in the study included frequent transfer of faculty of the designated colleges and perceived lack of:

- Continuation at the policy making level
- Communication between the stakeholders
- Effective leadership

This was the story of a failed curricular reform in Pakistan; nevertheless organ-system-based model is being followed with varied level of integration in many public and private sector medical colleges. There is no uniform policy at the state level to regulate educational reforms, one attempt made by the government failed and there is no follow up program even after twelve years.[7]

The Pakistan Medical and Dental Council (PMDC) which is the regulatory body who has to take lead seems to be in a state of confusion as well, in the latest draft curriculum.[27] The organ-system-based curriculum with horizontal and vertical integration is preferred & subject based is allowed. But just after that claim following whole document is subject based with no evidence or suggestion of integration. Information overload is being pointed out as a major challenge and it is written that the answer is identification of core curriculum with plenty of opportunities for electives, Unfortunately this is not being done in this curricular document rather converse has been done with everything compulsory and nothing mentioned about electives.[28]

This has left this PMDC curriculum as data gathering and subject based only; therefore no way forward as far as overall responsibility of regulatory body is concerned.[27]

The literature review on teacher's perceptions about integrated curriculum revealed that it is practiced worldwide with advantages over the earlier curricular reforms. Students have better insight of the subject matter and have their say in planning of curriculum. At the same time this curriculum could not be implemented without adequate infrastructure. The faculty, administrators and policy maker's willingness is also a prerequisite along with removal of financial constraints.

CONCLUSION

It is concluded that integrated curriculum in an organ-system-based model is a curricular reform that is well accepted by teachers around the world. It helped reducing the excessive information and repetition of content. In Pakistan an innovative curriculum was formulated but unfortunately there was failure in implementation due to various reasons. Role of regulatory body the Pakistan Medical and Dental Counsel is insensitive towards the change. We have to remember that organ-system-based model came into practice in 1950's and now it's 2014, hence we are far behind in medical education.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.

ETHICS APPROVAL

The approval/permission was obtained from Khyber Medical University Research and Ethics Board.

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