

*Full Length Research Paper*

# **Content validity of first M.B.B.S physiology examinations and it's comparison with teaching hours devoted for different sub-divisions of physiology**

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**Scientific studies confirm that it is the evaluation system rather than educational objectives, curriculum or instructional techniques that have the most profound impact on students learning. The present study was done to find out the coverage of different sub-divisions of physiology in written examination and its comparison with the teaching hours devoted to the teaching of each topic. For the analyses of the written question papers, all the questions of the first M.B.B.S examination of Rajasthan University of Health Sciences from 2001 to 2006 were examined and analyzed for content validity. The results of this analysis were then compared with percentage frequency of teaching hours devoted to each topic. Highest percentage frequency of coverage was with cardiovascular system (15.40%) while lowest was for exercise physiology (1.26%). 45% coverage of all the segments was asked from CVS, blood and CNS including special senses. The percentage frequency of classes for these topics was analysed out of a total of 200 h of teaching. It was found to be highest for nervous system (18%) while lowest for environmental physiology and exercise physiology (2.5% each). In the present study, it was observed that there is some difficulty in setting of questions due to the absence of weight for different sub-divisions. Some sub-division of physiology remains uncovered in some question papers. Content validity is the first priority of any assessment. It is a measure of the degree to which the assessment contains a representative sample of material taught in the course and should cover important skills abilities. Increasing the sample of objectives and contents areas included in any given test will improve the validity of test and for further improvement in assessment system of physiology; content validity is needed to be established.**

**Key words:** Content validity, physiology examinations.

## **INTRODUCTION**

The assessment procedure used has a powerful influence over learning. Scientific studies confirm that it is the evaluation system rather than educational objectives, curriculum or instructional techniques that have the most profound impact on what the students ultimately learn (Miller, 1973). So, the examination or assessment is a very important component of medical education and therefore, the assessment is an integral part of the

curriculum of a course. There are three broad types of assessment instruments that are used in assessing undergraduate's medical students in physiology: written examination, oral and practical examination. In written examination, there are two divisions of papers: papers I and II. In paper I, contents include biophysics, physiology of muscle, nervous system, special senses, endocrine, reproduction and heredity and in paper II, the contents are physiology of blood, respiration, circulation, digestion and absorption, excretion and temperature regulation. Every year, two examinations are conducted - one main examination and another for remanded students (supplementary exam). The present study was done to see the

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**Table 1.** Frequency of coverage of different aspects of physiology in (12) question papers of first M.B.B.S exams of Rajasthan University of Health Sciences.

System	Mean % of segments covered per session	% Frequency of coverage in over all % of segments (out of 474 segments)	% frequency of classes for these topics out of 200 h classes
Cell physiology and biophysics	3.45	4.00	3
Blood	11.78	10.97	12
Nerve and muscle	3.56	3.79	4
GIT	9.43	9.07	7
CVS	15.14	15.40	12*
Respiration	9.97	10.12	7
Excretion	7.97	7.17	7
Endocrine	7.52	7.80	12*
Reproduction	7.61	7.80	6
Nervous system	11.92	12.23	18*
Special senses	5.73	6.32	7
Environmental physiology	4.54	4.00	2.5
Exercise physiology	1.28	1.26	2.5

P>0.05 on comparing % frequency of coverage in overall segments with % frequency of classes for these topics by Kolmogorov- Smirnov two sample test.

coverage of different sub-divisions of physiology in written examination and its comparison with the teaching hours devoted to teaching each topic.

## MATERIALS AND METHODS

For the analyses of the written question papers, all the question of the first M.B.B.S examination of Rajasthan University of Health Sciences (RUHS) from 2001 to 2006 were examined. Thus, the question papers of 6 years were examined.

Two examinations are conducted every year; hence the question papers of 12 exams were analyzed. There were two question papers (papers I and II) per exam. So, a total of twenty four (24) question papers were finally analyzed.

There were four sub-divisions (a, b, c, d) per question paper. So, 96 sub-divisions was analyzed. Each sub-division has one or more part. Thus, a total of 200 parts was analyzed. Each part again comprised of one or more segments. Thus, a total of 474 segments were analyzed (Table 1).

474 segments in each section of the paper were analyzed for the variables frequencies of different aspects covered (expressed as percentage of total number of segments of questions). For the statistical significance, K-S test (Kolmogorov-Smirnov two sample test) was applied.

Content validity, being an important consideration in examinations in education - where we want to correctly judge the knowledge and skill of the learner and desire to have a good coverage contents in the test (Khansam, 1998) - was considered in the current study.

## RESULTS

24 question papers of 12 first M.B.B.S physiology examinations containing 474 segments of questions were analyzed. Table 1 shows the frequencies of the coverage

of different aspects of physiology in 24 question papers of the first M.B.B.S examinations. Highest percentage frequency of coverage was with cardiovascular system (15.40%) while lowest was for exercise physiology (1.26%). 45% coverage of all the segments was asked from CVS, blood and CNS including special senses.

If we observe the percentage frequency of classes for these topics out of 200 h teaching, it was highest for nervous system (18%) and lowest for environmental physiology and exercise physiology (2.5% each).

In CVS, 12% time was given for teaching while 15.40% was the frequency coverage in exam. While for CNS, 18% time was given for teaching while 12.23% was the frequency coverage in exam, in endocrinology, 12% time was given for teaching while 7.80% was the frequency of coverage in exam.

As per statistical calculations, no significant difference was observed between the percentage frequency of classes out of 200 h teaching (classes) and percentage frequency of coverage in overall percentage of segments (out of 474 segments), P>0.05. This means our curriculum of teaching and assessment pattern, matches with each other. In other words, it means topics teaching frequency and their coverage in exam is almost same. Table 2 shows the frequency of coverage of different aspects of physiology in question papers. It shows that in year 2001, questions were not included in exams from topics of reproduction, nervous system, special senses and nerve and muscle while exercise physiology was not included in years 2002, 2003 and 2006 papers. This shows that proper coverage of topics in examinations was not followed regularly. Every year, it fluctuates according to papers setter. So, some sub-divisions of

**Table 2.** The frequency of coverage of different aspects of physiology in question papers of individual examinations.

Aspect	Question papers year-wise						Total {No.(%)}
	2001	2002	2003	2004	2005	2006	
Cell physiology and biophysics	0	2	6	6	4	1	19 (4)
Blood	11	5	9	8	13	6	52 (10.97)
Nerve and muscle	0	6	2	4	5	1	8 (3.79)
GIT	8	4	6	12	8	5	43 (9.07)
CVS	10	12	20	19	8	4	73 (15.40)
Respiration	7	3	11	11	12	4	48 (10.12)
Excretion	9	3	8	5	5	4	34 (7.17)
Endocrine	1	8	6	9	9	4	37 (7.80)
Reproduction	0	9	4	8	11	5	37 (7.80)
Nervous system	0	8	14	14	12	10	58 (12.23)
Special senses	0	7	5	10	6	2	30 (6.32)
Environmental physiology	4	4	3	4	1	3	19 (4.00)
Exercise physiology	2	0	0	2	2	0	6 (1.26)

Two exams were held each year. Total number of segments examined was 474.

physiology remain uncovered in some question papers.

## DISCUSSION

It is evident from the question papers analysis that different sub-divisions of physiology are sometimes not given proper weightage in the examinations. Some sub-divisions of physiology like, environmental physiology and exercise physiology are usually covered less than required. In RUHS, there are no official guidelines regarding the weightage to be given to different sub-divisions of physiology. So, teachers select questions from different sub-divisions of physiology according to their own judgment.

Davis (2001) stated that the examination should be designed to assess the individual candidates' ability to meet the course objectives or curriculum outcomes and should cover the main contents of the course. Begum stated that adequate coverage of course content is necessary for the validity of assessment (Begum, 2001).

In the present study, it was observed that there is some difficulty in setting of questions due to the absence of weightage for different sub-divisions. Some sub-division of physiology remains uncovered in some question papers (Table 2).

Adkoli (1995) stated that weightage to the content areas is a delicate issue on which even the experts often differ in opinion. He also notice, at that time, the weightage of various topics depended mainly on examiners own judgment. This was mostly seen in the Indian scenario.

Crowl (1997) also stated that "in determining of content of an instructional unit, ask yourself not only what topics you have covered but also what proportion of the total

content each topic represents. What proportion of the class time and text book was devoted to each topic?...when constructing your unit achievement test, make the proportion of the total number of test items dealing with each topic correspond to the proportion of the total content dealing with that topic. The resulting test will have content validity because the test items represent an accurate sample of material covered.

Content validity is one of the major types of validity. McAleer (2001) stated that "the content validity refers to the extent to which a test or examination actually measures the intended area. For an examination to have content validity, it must have item validity and sampling validity. These terms are best explained in the following example. If a test is designed to measure knowledge of the human physiology then good item validity is present; if all the questions deal with facts pertaining to the human body systems. However, poor sampling validity will be apparent if all the questions focus on the limited body systems. Content validity is based on expert judgment and the assessor should compare what is taught with what is measured by the examination. If you are testing for achievement, you must ensure content validity.

Content validity is the first priority of any assessment. It is a measure of the degree to which the assessment contains a representative sample of material taught in the course (Newble, 1995) and should cover important skills abilities.

From afore discussion, it is obvious that increasing the sample of objectives and contents areas included in any given test will improve the validity of test and for further improvement in the assessment system of physiology, content validity is needed to be established. So, our teaching can create a desire to learn, and assessment can create a constructive awareness of ignorance; the

two can together, lead to a really meaningful learning.

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