Chula Med J Vol. 45 No. 11 November 2001

The correlation between GPAX and Comprehensive MCQ score of the medical students academic year 1995 -1999, Faculty of Medicine Chulalongkorn University

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Laisnitsarekul B, Tantayaporn K, Kiattinart S. The correlation between GPAX and Comprehensive MCQ score of the medical students academic year 1995 -1999, Faculty of Medicine, Chulalongkorn University. Chula Med J 2001 Nov;45(11): 971 - 80

Objective : *To determine the correlation between GPAX and Comprehensive MCQ score of the sixth year medical students, Faculty of Medicine, Chulalongkorn University in the academic year 1995-1999.*

Design : *Retrospective descriptive study.*

Methods : *The GPAX and Comprehensive MCQ scores of sixth year medical students at Faculty of Medicine, Chulalongkorn University during academic year 1995 - 1999 were collected from the registration unit and the Comprehensive Examination Committee. The data were calculated by the Pearson's Product Moment Correlation Coefficient and the Spearman's Rank Correlation Coefficient by EPISTAT program.*

Results : *The reliability of Comprehensive MCQ tests in academic year 1995 -1999 were 0.84, 0.87, 0.87, 0.87 and 0.86 respectively. The Pearson's correlation coefficient between GPAX and Comprehensive MCQ scores in academic year 1995 -1999 were 0.62, 0.72, 0.71, 0.77 and 0.74 respectively ($p < .01$). When divided GPAX in to three groups such as grade A (3.51-4.00), grade B (3.00-3.50), grade C (2.00 -2.99) and calculated the Pearson's correlation coefficients with Comprehensive MCQ score, the correlation coefficients were high too.*

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Conclusion : *The sixth year medical students at Faculty of Medicine, Chulalongkorn University in academic year 1995-1999 who have high GPAX would be receive high score of Comprehensive MCQ score. The Faculty medical advisor should inform this research's result to every year medical student for motivating them intended their education. The Comprehensive Examination Committee should maintain the quality of MCQ test.*

Key words : *Cumulative Grade Point Average (GPAX), Multiple Choice Question (MCQ), Comprehensive Examination.*

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Received for publication. April 6, 2001

บุญนาท ลายสนิทเสรีกุล, กิจประมุข ตันตยาภรณ์, เสาวรส เกียรตินาถ. สหสัมพันธ์ระหว่างอันดับคะแนนเฉลี่ยสะสมกับคะแนนข้อสอบปรนัยของการสอบเวชปฏิบัติทั่วไป ของนิสิตแพทย์ชั้นปีที่ 6 คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย ประจำปีการศึกษา 2538 ถึง 2542. จุฬาลงกรณ์เวชสาร 2544 พ.ย; 45(11): 971 – 80

วัตถุประสงค์ : *เพื่อหาค่าสหสัมพันธ์ระหว่างอันดับคะแนนเฉลี่ยสะสมกับคะแนนข้อสอบปรนัยของการสอบเวชปฏิบัติทั่วไป ของนิสิตแพทย์ชั้นปีที่ 6 คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย ปีการศึกษา 2538 ถึง 2542*

รูปแบบการศึกษา : *การศึกษาเชิงพรรณาแบบย้อนหลัง*

วิธีการศึกษา : *รวบรวมอันดับคะแนนเฉลี่ยสะสมของนิสิตแพทย์ชั้นปีที่ 6 ปีการศึกษา 2538 ถึง 2542 จากหน่วยทะเบียน คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย และคะแนนข้อสอบปรนัยการสอบเวชปฏิบัติทั่วไป ของนิสิตแพทย์ชั้นปีที่ 6 ปีการศึกษา 2538 ถึง 2542 จากคณะกรรมการจัดการสอบเวชปฏิบัติทั่วไป นำอันดับคะแนนเฉลี่ยสะสมและคะแนนข้อสอบปรนัย มาคำนวณหาค่าสหสัมพันธ์ด้วยวิธีของเพียร์สันและเสปียร์แมน โดยใช้โปรแกรม EPISTAT*

ผลการศึกษา : *ข้อสอบปรนัยของการสอบเวชปฏิบัติทั่วไป ปีการศึกษา 2538 ถึง 2542 มีค่าความเที่ยงเท่ากับ 0.84, 0.87, 0.87, 0.87 และ 0.86 ตามลำดับ ค่าสหสัมพันธ์แบบเพียร์สันระหว่างอันดับคะแนนเฉลี่ยสะสมกับคะแนนข้อสอบปรนัยของการสอบเวชปฏิบัติทั่วไป ปีการศึกษา 2538 ถึง 2542 มีค่าเท่ากับ 0.62, 0.72, 0.71, 0.77 และ 0.74 ตามลำดับ โดยมีนัยสำคัญทางสถิติที่ระดับ .01 เมื่อแบ่งอันดับคะแนนเฉลี่ยสะสมออกเป็น 3 กลุ่ม คือ กลุ่มเกรด A (3.51-4.00) กลุ่มเกรด B (3.00-3.50) และกลุ่มเกรด C (2.00 - 2.99) คำนวณหาค่าสหสัมพันธ์แบบเพียร์สันกับคะแนนข้อสอบปรนัยของการสอบเวชปฏิบัติทั่วไปพบว่า ค่าสหสัมพันธ์อยู่ในระดับสูงเช่นกัน*

สรุป : *นิสิตแพทย์ชั้นปีที่ 6 คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย ในปีการศึกษา 2538 ถึง 2542 ผู้ที่มีอันดับคะแนนเฉลี่ยสะสมสูง จะได้คะแนนข้อสอบปรนัยของการสอบเวชปฏิบัติทั่วไปในระดับสูง อาจารย์ที่ปรึกษาของคณะ ฯ ควรนำผลการวิจัยนี้แจ้งให้นิสิตแพทย์ทุกชั้นปีได้รับทราบ เพื่อเป็นการกระตุ้นให้นิสิตสนใจการเรียนยิ่งขึ้น สำหรับคณะกรรมการจัดการสอบเวชปฏิบัติทั่วไปควรดำรงคุณภาพของข้อสอบปรนัยให้อยู่ในเกณฑ์ที่ดีต่อ ๆ ไป*

คำสำคัญ : *อันดับคะแนนเฉลี่ยสะสม, ข้อสอบปรนัย, การสอบเวชปฏิบัติทั่วไป*

The Comprehensive Examination Committee, Faculty of Medicine, Chulalongkorn University has constructed a Multiple Choice Questions (MCQ) test and Objective-Structured Clinical Examination (OSCE) based on criteria established by the medical council since 1993.[1] The Comprehensive MCQ test, consists of 300 single-best responses. The Comprehensive Examination Committee divided the contents of the questions as follows :- Medicine 65 items, Pediatrics 49 items, Radiology 8 items, Preventive Medicine 20 items, ENT 5 items, Rehabilitation Medicine 3 items, Surgery 64 items, OB-GYN 49 items, Orthopedic 9 items, Psychiatry 10 items, Forensic Medicine 5 items, EYE 5 items and Anesthesia 8 items. The contents cover both emergency and OPD situations and are designed for General Practitioners (GP). About 15 % of the questions measure recall ability, 25 % measure interpretation ability, more than 60 % measure the problem-solving ability.[2] The sixth year medical students who have a Grade Point Average (GPA) higher than or equal to 2.00 must pass the comprehensive examination.[3] Then they receive the M.D. degree from the university and a professional license from the medical council.

A grade is an alphabetical or numerical symbol. or mark, that indicates the degree to which intended outcomes have been achieved. The major purpose of grades is to communicate how well a student is doing in the various subject areas. Grades are recorded in cumulative files (cumulative Grade Point Average : GPAX) and communicate the level of achievement at various points in time to interested persons.[4]

Since 1979, when the Faculty of Medicine, Chulalongkorn University developed the M.D. curriculum, there has been no study of the correlation between the GPAX of sixth year medical students and the Comprehensive MCQ score. The authors decided to determine the correlation between these factors the academic years 1995-1999.

Objectives

This retrospective descriptive research aimed is towards determining the correlation between GPAX and Comprehensive MCQ Score of sixth year medical students, Faculty of Medicine, Chulalongkorn University in the academic year 1995 to 1999.

Definitions

1. **Grade**[4] A grade is an alphabetical or numerical symbol, or mark, that indicates the degree to which intended outcomes have been achieved. The major purpose of grades is to communicate how well a student is doing in the various subject areas.

2. **Grade Point Average (GPA)**[5] The GPA represents the summation of the value of the letter grade which the student receive multiplied by the weight of credits, divided by the total credits.

3. **Cumulative Grade Point Average (GPAX)**[4] The GPAX will communicate past achievement at various points in time to interested persons at a later date. The GPAX represents the cumulative of GPA which the student has achieved from the beginning to present.[6]

Methods

The GPAX and Comprehensive MCQ score of the sixth year medical students at Faculty of Medicine, Chulalongkorn University during academic year 1995 -1999 were collected from the registration

unit and the Comprehensive Examination Committee. The data were calculated by the Pearson's Product Moment Correlation Coefficient and the Spearman's Rank Correlation Coefficient by EPISTAT program.

Results

1. The reliability of the Comprehensive Examination MCQ tests in academic year 1995-1999 were 0.84, 0.87, 0.87, 0.87, and 0.86 respectively.

2. The maximum of GPAX of the 136 sixth year medical students in academic year 1995 was 3.88. The minimum of GPAX was 2.02 and the mean was 3.06.

3. The maximum of GAPX of the 160 sixth year medical students in academic year 1996 was 3.83. The minimum of GPAX was 2.06 and the mean was 3.01.

4. The maximum of GPAX of the 171 sixth year medical students in academic year 1997 was 3.86. The minimum of GPAX was 2.0 and the mean was 3.07.

5. The maximum of GPAX of the 174 sixth year medical students in academic year 1998 was 3.91. The minimum of GPAX was 2.17 and the mean was 3.13.

6. The maximum of GPAX of the 194 sixth year medical students in academic year 1999 was 3.91. The minimum of GPAX was 2.25 and the mean was 3.17.

7. The Pearson's correlation coefficient and the Spearman's rank correlation coefficient between GPAX and Comprehensive MCQ score of the 136 sixth year medical students in academic year 1995 were 0.62 and 0.64 respectively ($p<.01$). When the GPAX was divided into three groups such as grade A (3.51-4.00), grade B (3.00-3.50), grade C (2.00-2.99) and was calculated the Pearson's correlation with the Comprehensive Examination MCQ score, the correlations were 0.24, 0.34 and 0.43 respectively.

8. The Pearson's correlation coefficient and the Spearman's rank correlation coefficient between GPAX and Comprehensive MCQ score of the 160 sixth year medical students in academic year 1996 were 0.72 and 0.75 respectively ($p<.01$). When the GPAX was divided into three groups such as grade A (3.51-4.00), grade B (3.00-3.50), grade C (2.00-2.99) and calculated the Pearson's correlation with the

Table 1. Reliability of the Comprehensive Examination MCQ test, Number of the sixth year medical students and GPAX in academic year 1995 -1999.

Academic Year	Reliability of MCQ	Number of students	Maximum of GPAX	Minimum of GPAX	Mean of GPAX
1995	0.84	136	3.88	2.02	3.06
1996	0.87	160	3.83	2.0	3.01
1997	0.87	171	3.86	2.0	3.07
1998	0.87	174	3.91	2.17	3.13
1999	0.86	194	3.91	2.25	3.17

Comprehensive MCQ score, was calculated the correlations were 0.23, 0.45 and 0.25 respectively.

9. The Pearson's correlation coefficient and the Spearman's rank correlation coefficient between GPAX and Comprehensive MCQ score of the 171 sixth year medical students in academic year 1997 were 0.71 and 0.71 respectively ($p<.01$). When the GPAX was divided in to three groups such as grade A (3.50-4.00), grade B (3.00-3.50), grade C(2.00-2.99) and the Pearson's correlation with Comprehensive MCQ score, was calculated the correlations were 0.46, 0.38 and 0.23 respectively.

10. The Pearson's correlation coefficient and the Spearman's rank correlation coefficient between GPAX and Comprehensive MCQ score of the 174 sixth year medical students in academic year 1998 were 0.77 and 0.77 respectively ($p<.01$). When divided GPAX in to three groups such as grade A (3.51-4.00), grade B (3.00-3.50), grade C (2.00-2.99) and the Pearson's correlation with Comprehensive MCQ score, was calculated the correlations were 0.50, 0.45 and 0.36 respectively.

11. The Pearson's correlation coefficient and the Spearman's rank correlation coefficient between GPAX and Comprehensive MCQ Score of the 194 sixth year medical students in academic year 1999 were 0.74 and 0.73 respectively ($p<.01$). When divided GPAX in to three groups such as grade A (3.51 - 4.00), grade B (3.00-3.50), grade C (2.00 - 2.99) and the Pearson's correlation with Comprehensive MCQ score, was calculated the correlations were 0.39, 0.31 and 0.21 respectively.

Table 3. The Pearson's correlation coefficient of the 1996 Comprehensive MCQ score and GPAX.

Grade	No. of Student	r_{xy}	Significant
Grade A (3.51-4.00)	19	0.34	NS
Grade B (3.00-3.50)	67	0.45	P < .01
Grade C (2.00-2.99)	74	0.25	P < .05
Total	160	0.72	P < .01

Table 2. The Pearson's correlation coefficient of the 1995 Comprehensive MCQ score and GPAX.

Grade	No. of Student	r_{xy}	Significant
Grade A (3.51-4.00)	10	0.24	NS (Not Significant)
Grade B (3.00-3.50)	74	0.34	P < .01
Grade C (2.00-2.99)	52	0.43	P < .01
Total	136	0.62	P < .01

Table 4. The Pearson's correlation coefficient of the 1997 Comprehensive MCQ score and GPAX.

Grade	No. of Student	r_{xy}	Significant
Grade A (3.51-4.00)	25	0.46	P < .05
Grade B (3.00-3.50)	74	0.38	P < .01
Grade C (2.00-2.99)	72	0.23	P < .05
Total	171	0.71	P < .01

Table 5. The Pearson's correlation coefficient of the 1998 Comprehensive MCQ score and GPAX.

Grade	No. of Student	r_{xy}	Significant
Grade A (3.51-4.00)	28	0.50	P < .01
Grade B (3.00-3.50)	74	0.45	P < .01
Grade C (2.00-2.99)	72	0.36	P < .01
Total	174	0.77	P < .01

Table 6. The Pearson's correlation coefficient of the 1999 comprehensive Examination MCQ test and GPAX

Grade	No. of Student	r_{xy}	Significant
Grade A (3.51-4.00)	33	0.39	P < .05
Grade B (3.00-3.50)	100	0.31	P < .01
Grade C (2.00-2.99)	61	0.21	NS
Total	194	0.74	P < .01

Discussion

The Comprehensive Examination MCQ tests in academic year 1995-1999 were determined to be good test as Hubbard and Clemans,[7] Schumacher,[8] Cox and Ewan[9] have suggested that a good test should have reliability 0.70 or over. Thus the MCQ score should be highly acceptable. Gough, Hall and Harris[10] found that the GPAX was a single index-cumulative GPA over all four years of training - that reliably represented scholastic achievement. The Pearson's correlation coefficient between MCQ score and GPAX of the sixth year medical students in academic year 1995-1999 were highly correlated (p<.01). When the students were placed into three groups such as grade A, grade B and grade C and the correlation between MCQ score and GPAX, calculated the results were also highly correlated. Phulklongtan,Jaroongdaechakul and Limpapayom[11] said that the students who have high scores in the pre-clinic and clinic years should have high scores in the Comprehensive Examination. Many research articles have reported that the undergraduate grade-point average (GPA) was influenced by the admission decision, and were reliable in helping predict medical school performance and licensing examination. Some of such these articles are. Blue et al.,[12] Veloski et al.,[13] Shaw et al.,[14] Cooke et al.,[15] Aaron and Skakun,[16] Koenig et al.,[17] Roth et al.,[18] Vancouver et al.,[19] Sarnacki.,[20] Johnson et al.,[21] Meleca,[22] Compos-Outcalt et al., [23] Hesser and Lewis,[24] Colliver et al.,[25] Warrick and Crumrine,[26] Pholwam and Tantayaporn.[27] The findings showed that the sixth year medical students who have a high GPAX should receive a high score of Comprehensive MCQ score. This means they can pass Comprehensive Examination, will receive the M.D. degree from the university and also a professional license from the medical council. However the evaluation of performance during medical training not only evaluates knowledge but also evaluate the skill and attitude of the student. According to Gough et al.,[10] criteria for a study of performance during medical training should include the following elements as a minimum:1) GPA by year and cumulative overall GPA, 2) Faculty ratings, and 3) Peers ratings. Abboud[28] found that the academic GPA and the MCQ test similar aspects of clinical competency related to knowledge, and the Clinical

Placement scores and the OSCE test similar aspects of clinical competency that are related to clinical reasoning and skill performance. Ginsburg et al.,[29] suggested that the focus of medical education in the past century was on knowledge and skills. For the future of medicine, attention to the teaching and evaluation of professionalism is vital. Kassebaum and Eaglen[30] found that the number of schools using standardized patients in comprehensive fourth-year examinations increased from 19.1% to 48%. The accreditors are paying closer attention to how well schools provide measured assurances that students learn what the faculties set out to teach. Singer et al.,[31] examined the objective structured clinical examination (OSCE) as a performance-based assessment method for clinical ethics and found that the OSCE is not a feasible, stand-alone method for summative evaluation of clinical ethics. This performance-based evaluation method should be combined with other, more reliable evaluation methods.The OSCE does have promise for formative evaluation. The academic advisor can use this research result to motivate the medical students in their studies. The study of medicine is a continuous education process. Every medical student should work hard from the first year until the sixth year course. The MCQ test is an instrument of the Comprehensive Examination and measures only knowledge. OSCE measures medical skill and attitude in the Comprehensive Examination. The advisor should be remember that GPAX is highly correlated with MCQ score. However there has not been any research in Faculty of Medicine, Chulalongkorn University that studied has the correlation between GPAX and OSCE score. More research in this area should be desirable.

Conclusions

The sixth year medical students, Faculty of Medicine, Chulalongkorn Umiversity in academic year 1995-1999 had high GPAX averages. When calculated correlation coefficient between GPAX and the Comprehensive Examination MCQ scores with high reliability, was they calculated showed high correlation ($p<.01$) between GPAX and MCQ score in all years. Also when the students were divided in to three grade groups (A, B, C), there were high correlation between GPAX and MCQ score as well. Many research papers reported that GPA is reliable in helping to predict medical school performance and licensing examination. The faculty medical advisor should give these results to all medical students to performance motivate to perform better. The Comprehensive Examination Committee must maintain the quality of MCQ test. Future research should be conducted to determine the correlation between GPAX and comprehensive examination OSCE scores.

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