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The impact of gender and English language on the academic performance of students: An experience from new Saudi medical school

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ABSTRACT

Gender-based differences and English language were found to be factors that may affect students' academic achievements. In Saudi Arabia, the number of female students is rapidly increasing in universities. In addition, medical students suffer learning difficulties due to the adoption of English language as a medium of education in all school, although schooling is mostly in Arabic. To investigate whether gender and English language proficiency has an impact on the academic performance of medical students in pre-clinical phase. A cross-sectional, comparative study included final grades in English (premedical) and Basic Medical Sciences courses of two students' cohorts in the second and third year medical school. We analysed data using Student's t-test, Pearson correlation, and regression analyses considering gender and English as effect variables. Female students significantly outscored their male counterpart in most of the Basic Medical Sciences as well as in English courses for all students in the two cohorts ($p < 0.05$). English has a significant correlation with grades in all courses for the students in two cohorts, and contributed significantly to the regression on these courses ($p < 0.05$). Gender has a significant regression main effect only on two courses for 2nd year cohort, however, it contributed significantly to the regression on English grades for both cohorts ($p < 0.05$). Saudi female students demonstrated superior academic performance to male students in pre-clinical courses at medical school. However, English language proficiency was the significant predictor of academic performance rather than gender. Therefore, we suggest that there is a need to introduce an English proficiency test such as the International English Language Testing System (IELTS), in addition to the implementation of a radical revision and improvement of the English language curriculum associated with the inclusion of modern methods of teaching foreign language learning strategies.

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INTRODUCTION

Academic success is considered to be a significant predictor of postgraduate achievement [1], on the other hand, poor performance in preclinical years have been found to be associated with serious professional misconduct in later practice [2,3]. There have been several studies on predictors of success in medical school regarding the influence of gender and age. With respect to gender, research indicates that women performed better than men in certain settings, while men performed better than women in other settings [4-6]. Female medical students demonstrated a better performance than male medical students in clinically

based performance examination [6-9]. Results of different studies indicated that men were better than women on several standardized written examinations as well as in certain intelligence test assessment [10-12].

The proportions of female students in medical schools is increasing with time however, concerns remain about differing performance in examinations [6,13,14]. In Saudi Arabia, the number of female students in tertiary education in the kingdom rose six-fold between 1970 and 2007 compared with a quadrupling of male enrolments during the same period [15]. With such

higher rates of growth for women education, they will soon take the lead in post graduate education, as well as, in labour market. At our medical school, all students arrive with equivalent prior educational attainment. However, we observed that there is a wide discrepancy between the academic performance of the male students and female student in different courses in the pre-clinical years.

Medical students may face different challenges that could exert an effect on their academic performance [16]. Ananya et al. (2012) has demonstrated that male gender and the inability to understand foreign language as the medium of instructions are among the factors that affect the academic performance of undergraduate medical students [17]. English language as a medium of education in medical schools for the non-English speaker students is considered one of these important challenges in our region. Despite having met general English requirements at high school, students from non-English speaking countries entering medical schools with a curriculum delivered in English often appear to encounter considerable difficulty with academic performance [18]. English as a medium of instruction also affects the academic performance of non-English speaker students elsewhere in the globe [19-21]. Generally, in our region the mother language is Arabic and it is used as a medium of education throughout schooling years until the end of high school. At the Faculty of Medicine in King Fahad Medical City (FOM-KFMC), King Saud bin Abdulaziz University for Health Sciences we adopt a Problem Based Learning curriculum which include three phases extended over 6 years. Phase one (premedical) is covered in year 1, phase two (preclinical) is covered in year 2, 3, and first semester of year 4, and phase three (clerkship) is covered up to the 6th year. Our students take two courses of English language, seven credit hours each, in the first year (premedical year) to solidify their skills. In these courses, as part of assessment, the students are exposed to oral as well as written exams in order to evaluate students' skills in listening, speaking, reading and writing English. However, we still observe students having difficulty in using the language for the purpose of studying, reading and expression in the exams.

The current research was conducted in order to investigate whether gender and English language proficiency has any impact on the academic performance of medical students in pre-clinical phase.

METHODS:

Ethical Approval

We obtained the ethical approval for this study from Institutional Review Board-IRB at KFMC (IRB Number: 10-107).

Setting

The study was conducted at the FOM-KFM, King Saud bin Abdulaziz University for Health Sciences, Riyadh/Saudi Arabia.

Subjects

The study methodology was a cross-sectional, comparative research. The study involved all second and third year (preclinical) medical students at our faculty during the academic year 2010-2011.

Data collection

We collected the demographic data as well as students' grades from the department of Registration Affairs for the 2nd year and 3rd year students. Also, we collected the final grades of the two English language courses covered in the first premedical year and the arithmetic mean was calculated. In addition, we collected final grades of different medical sciences courses covered in the preclinical years. Courses for 2nd year students include: Growth and development (GROW), Molecular base of disease (MBOD), Therapeutic-1 (THER-1), Principles of disease 1 and 11 (DISP-1, and DISP-11), Diagnostic (DIAG), Musculoskeletal and Integument (MSKI), and Haematopoietic (HEMP). Courses for 3rd year students include: Cardiovascular system (CVSS), Respiratory System (RESP), Gastrointestinal system (GITS), Endocrine system (ENDO), Nervous system (NSSS), and Urogenital system (UROG).

Data Analysis

We analyzed the data using the SPSS software. For data analysis, we extracted simple descriptive statistics, t-test, Pearson correlation analysis, and multiple linear regressions. The degree of statistical significance is denoted by the *p*-value of 0.05.

RESULTS

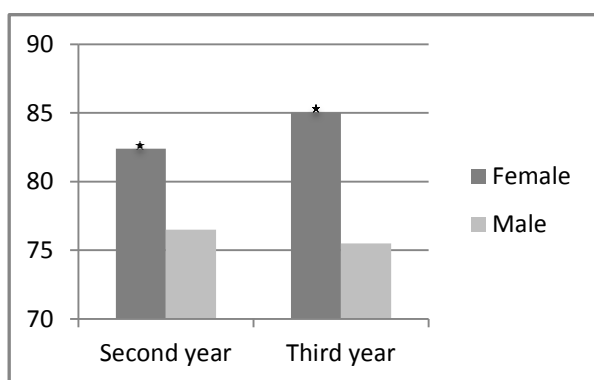
The characteristics of the study population including two cohorts of students are demonstrated in Table 1. Overall, the percentage of male students (63.3%) was higher than female students (36.7%). However, the mean (SD) age of female students (20.8±0.9) was lower than mean (SD) age of male students (22.2±1.3). All students were Saudis (no international students) and the language spoken at home is Arabic.

We compared English grades between female and male students for the 2nd and 3rd year cohorts (Figure 1). English grades of female students (82.4±6, 85±0.7) were higher than male students (76.5±6.7, 75.6±8.8) for the 2nd and 3rd year cohort respectively. This difference was statistically highly significant (*p*<0.001).

Table 1. Descriptive statistics of the study population

Student characteristics	Female students N (%)	Male Students N (%)
Second year	38 (40.0%)	57 (60.0%)
Third year	34 (33.7%)	67 (66.3%)
All students in the two cohorts	72 (36.7%)	124 (63.3%)
Age (years)*	20.8± (0.9)	22.2±(1.3)

* Mean±SD

Figure 1. Grades of English courses covered during the first year in medical school for the two cohorts*Statistically significant difference from male counterpart ($p < 0.05$)

After the collection of all final grades of medical subjects for students in the 2nd and 3rd year cohorts we compared the mean values between the grades of female and male (Tables 2 and 3). For the 2nd year cohort, Table 2 shows that there was a significant difference between the final grades of female and male students being higher for female in all courses ($p < 0.05$) For the 3rd year cohort, Table 3 indicates that final grades of females students were significantly higher than their male counterpart in all courses ($p < 0.05$). However, for the CVSS, although female students scored higher grades than male students but the difference did not reach a statistical significance ($p = 0.132$).

Multiple regression analyses were conducted to examine whether there is any predictive value of the two effect variables gender and knowledge of English language on the academic performance of medical students in medical subjects at our faculty. Grades of students in different courses were the dependent variable with gender and the English grades being the

Table 2. Grades of the medical subjects for the 2nd year cohort

Course	Female Students (N=38) Mean(±SD)	Male Students (N=57) Mean (±SD)	t-test p-value
GROW	74.6 (8.4)	68.4 (11.2)	0.004
MBOD	78.3 (9.3)	67.0 (12.5)	0.0001
THER-1	72.4 (10.7)	66.1 (12.1)	0.011
DISP-1	65.1 (11.3)	59.3 (13.4)	0.031
DIAG	73.2 (8.8)	65.5 (10.2)	0.0001
DISP-11	78.9 (8.5)	72.1 (10.3)	0.001
MSKI	72.1 (10.7)	66.1 (12.7)	0.019
HEMP	79.4 (8.6)	66.8 (11.5)	0.0001

Table 3. Grades of the medical subjects for the 3rd year cohort

Course	Female Students (N=34) Mean(±SD)	Male Students (N=67) Mean (±SD)	t-test p-value
CVSS	72.2 (13.3)	68.1 (12.8)	0.132
RESP	76.6 (8.5)	65.2 (13.8)	0.0001
GITS	74.7 (11.0)	66.2 (12.4)	0.001
ENDO	78.0 (10.3)	72.1 (12.4)	0.019
NSSS	75.5 (11.3)	67.0 (17.5)	0.012
UROG	77.2 (12.6)	68.3 (16.2)	0.006

independent variables. Table 4 demonstrates that, for the 2nd year cohort, English grades variable contribute significantly to the regression on the dependable variable of all courses ($P < 0.05$). Although by Pearson correlation analysis we could demonstrate a positive significant relationship of gender with most of the courses ($p < 0.05$) (data not shown), by multiple regression analysis we found that a significant main predictive effects of gender only with MOBD and HEMP for the 2nd year cohort ($P < 0.05$).

Table 5 demonstrates the results of regression analysis for the 3rd year cohort. Results indicates that English grades had statistically significant main predictive effects on all courses ($P < 0.05$). For gender variable, there was no statistically significant main predictive effect on any scores of the third year courses ($P > 0.05$). However, gender variable showed a statistically significant predictive effect on the English grades of the two cohorts ($P < 0.05$) (data not shown).

Table 4. Multiple regression coefficients of English and gender for Basic Medical Science subjects of 2nd year cohort

Course	Effect variable	Beta coefficient	Std. Error	Sig.	95%CI Lower	95%CI Upper
GROW	ENGL	0.996	0.130	<0.001	0.739	1.253
	Gender	0.521	1.854	0.779	-3.161	4.204
MOBD	ENGL	0.858	0.161	<0.001	0.539	1.180
	Gender	6.233	2.298	0.008	1.669	10.798
THER-1	ENGL	1.047	0.153	<0.001	0.743	1.350
	Gender	0.161	2.176	0.941	-4.162	4.483
DISP-1	ENGL	1.204	0.162	<0.001	0.883	1.525
	Gender	-1.266	2.304	0.584	-5.842	3.310
DIAG	ENGL	0.667	0.140	<0.001	0.389	0.945
	Gender	3.847	1.994	0.057	-0.113	7.808
DISP-11	ENGL	0.766	0.134	<0.001	0.500	1.003
	Gender	2.404	1.912	0.212	-1.393	6.202
MSKI	ENGL	0.902	0.170	<0.001	0.564	1.240
	Gender	0.679	2.426	0.775	-4.122	5.515
HEMP	ENGL	0.725	0.151	<0.001	0.425	1.026
	Gender	8.354	2.156	<0.001	4.073	12.636

Table 5. Multiple regression coefficients of English and gender for Basic Medical Science subjects of 3rd year cohort

Course	Effect variable	Beta coefficient	Std. Error	Sig.	95%CI Lower	95%CI Upper
CVSS	ENGL	0.734	0.141	<0.001	0.453	1.015
	Gender	-2.731	2.770	0.327	-8.227	2.766
RESP	ENGL	0.730	0.132	<0.001	0.468	0.992
	Gender	4.616	2.582	0.077	-0.508	9.740
GIT	ENGL	0.609	0.134	<0.001	0.344	0.874
	Gender	2.750	2.616	0.296	-2.441	7.942
ENDO	ENGL	0.745	0.124	<0.001	0.499	0.991
	Gender	-1.081	2.424	0.657	-5.892	3.730
NSSS	ENGL	0.854	0.173	<0.001	0.511	1.197
	Gender	0.472	3.382	0.889	-6.238	7.183
UROG	ENGL	0.860	0.164	<0.001	0.535	1.185
	Gender	0.855	3.209	0.783	-5.483	7.253

DISCUSSION

Research on gender differences in academic achievement may offer information and guidance for educators as well as for the future labour market. The potential role gender plays when studying students' academic performance is becoming increasingly important. Results of this study highlight the difference in academic performance between male and female medical students in the preclinical phase at the FOM-KFMC. Overall, female students had gained significantly higher scores than male students in most medical science subjects. This is consistent with other studies which showed that the academic performance of female medical students was better than male students [7-9]. However, these studies did not compare the performance for basic medical science subjects in

the preclinical phase but rather for clinical subject such as medicine and surgery. Generally, in higher education women were often found to outperform men in different schools irrespective of the measure of success used [22-24]. In Saudi Arabia, a ten year retrospective study conducted at King Saud University revealed that male medical students performed significantly better than female in preclinical years [25]. This contradiction with our results may be explained in different ways. First, the proportion of female students had increased lately in higher education in the kingdom and there are more females enrolled in medical schools according to Ministry of Higher Education (2010). Saudi women live in a conservative climate and it seems that this keeps them under continual pressure to prove

themselves, have social recognition, prestige and maintain high income. Academic success is reported to be a significant predictor of postgraduate achievement and this ensures more participation in labour market [23]. Recent legislations have been implemented in Saudi Arabia support the utilization of women potentials especially that they form 50% of Saudi work force that need to be utilized. Of these legislations the most important is the governmental support for women to achieve a postgraduate degree in recent years; this in fact could be another major motive for competition and attaining higher grades [26].

Various studies from different parts of the world, had reported learning difficulties with the use of foreign language as a medium of education. Saudi Arabia is no exception. All Saudi Medical Schools use English as the language of communication and learning. Language barrier has been observed to be the most crucial one in higher education in this country since the majority of the students have Arabic as their first language with schooling entirely in Arabic [27]. At FOM-KFMC, students take two courses of English language are designed to be in the first year of medical school (premedical year). The main objective of these courses is to bridge the gap between the general English studies in high school and language requirement for students studying medicine. Courses also enable students for special writing skills such as technical report writing, as well as, reading skills such as scanning and interpreting charts, tables, etc. This is carried out through focusing on English for special purpose (ESP) test, as well as an introduction to medical terminology component in order to enhance the learning of English within a medical context.

The result of this study revealed that females' scores in English were significantly higher than males' scores ($p < 0.05$). We observed a strongly significant positive relationship of gender on English scores ($p < 0.05$). This may be explained by suggestions of authors from different studies who observed that the motivation and the positive attitude to learn English are significantly higher in females than in males. This observation has been reported with Arabs learning English [28-30], as well as, with English learners elsewhere in the world [31-33]. Interestingly, psychologists and educationalists have shown that there is a difference in the strategy adapted in learning English language between male and females [34,35]. In Saudi Arabia, a study investigated Saudi undergraduate preferred motivational orientations to study English as a foreign language. They reported a significant difference towards extrinsic motivational orientations between female and male medical students in favour of females [36]. Undergraduate Saudi female students found to use language learning strategies more frequently than their

male counterpart during English learning courses [37,38].

In order to investigate whether gender or the English language knowledge had any impact and predictive values on students' academic performance, we performed multiple linear regression analyses considering these two effect variables. The results indicated that English language knowledge has a significant correlation with academic performance of all courses for the 2nd and 3rd year students (A narrow range for the 95% CI can be observed). Gender had a positive significant relationship with most of the courses which was demonstrated by Pearson correlation analysis. However, by multiple regression analysis, gender had a significant correlation only with MOBD and HEMP for the 2nd year students, as well as, with English courses for the students in two cohorts ($p < 0.05$). Accordingly, we may conclude that, English language competence and knowledge is a strong significant predictor of the academic performance, and this may have created the difference observed in academic performance between female and male medical students rather than the apparent effect of gender. Therefore, it appears that the more competence in English language the better is the academic performance. This conclusion is supported by other studies which demonstrated that English language proficiency is an indicator of academic performance at tertiary intuitions [20]. One of the limitations of this study was that inability to have data about the type of schooling and at which level each student started learning English. In addition, it is worth mentioning that apart from the effect of gender and English language knowledge, there could be other confounding factors including academic and non-academic factors that may affect medical students' academic performance.

Finally, this study confirms that Saudi female medical students demonstrated superior academic performance to male students in pre-clinical courses. These finding may encourage more females to be enrolled in medical schools. Later, female physicians will compete strongly for getting postgraduate degree, and this will be more reflected on the competition for the health care labour market. Since English as a medium of instruction creates difficulties to most of the target learners in the school especially male students, therefore, it is essential to deal with such variable in order to get the maximum educational output. Although English curriculum at our faculty includes two courses in addition to English for Special Purposes, there is a need for more areas to be included. We suggest that there is an urgent need to introduce an appropriate English proficiency test such as the International English Language Testing System (IELTS), in addition to the implementation of a radical

revision and improvement of the English language curriculum associated with the inclusion of modern methods of teaching foreign language learning strategies.

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Declaration of interest:

The authors report no conflicts of interest.

REFERENCES

- Huxham GJ, Lipton A, Hamilton D, Chant D. What makes a good doctor? *Med Educ* 1989;23(1):3-13.
- Yates J, James D. Risk factors at medical school for subsequent professional misconduct: Multicentre retrospective case-control study. *BMJ* 2010;340:C2040.
- Dyrbye LN, Massie FS Jr, Eacker A, Harper W, Power D, Durning SJ, Thomas MR, Moutier C, Satele D, Sloan j, Shanafelt TD. Relationship between burnout and professional conduct and attitudes among US medical students. *JAMA* 2010;304(11):1173-80.
- Roter DL, Hall JA, Aoki Y. Physician gender effects in medical communication: a meta-analytic review. *JAMA* 2002;288:765-74.
- Bloor K, Freemantle N, Maynard A. Gender and variation in activity rates of hospital consultants. *J R Soc Med* 2008;101:27-33.
- Sawair FA, Baqain ZH, Al-Omari IKh, Wahab FK, Rajab LD. Effect of gender on performance of undergraduate dental students at the University of Jordan, Amman. *J Dent Educ* 2009;73(11):1313-19.
- Haist SA, Wilson JF, Elam CL, Blue AV, Fosson SE. The Effect of Gender and Age on Medical School Performance: An Important Interaction. *Adv Health Sci Educ Theory Pract* 2000;5(3):197-205.
- Greenfield S, Parle J, Holder R. The Anxieties of Male and Female Medical Students on Commencing Clinical Studies: The Role of Gender. *Educ Health* 2001;14(1):61-73.
- Omigbodun OO, Omigbodun AO. Influence of gender on undergraduate performance in psychiatry at Ibadan, Nigeria. *Med Educ* 2003;37(12):1091-93.
- Case SM, Becker DF, Swanson DB. Performance of men and women on NBME Part I and Part II: the more things change.... *Acad Med* 1993;68(10 Suppl):S25-7.
- Dawson B, Iwamoto CK, Ross LP, Nungester RJ, Swanson DB, Volle RL. Performance on the National Board of Medical Examiners Part I examination by men and women of different race and ethnicity. *JAMA* 1994;272:674-79.
- Ali MS, Suliman MI, Kareem A, Iqbal M. Comparison of gender performance on an intelligence test among medical students. *J Ayub Med Coll Abbottabad* 2009;21(3):163-65.
- Hinkley RE. Changes in profiles of students admitted to Florida allopathic medical schools 1990-1996. *J Fla Med Assoc* 1998;84:578-82.
- Hall FR, Mikesell C, Cranston P, Julian E, Elam C. Longitudinal trends in the applicant pool for U.S. medical schools, 1974-1999. *Acad Med* 2001;76:829-34.
- Ministry of Higher Education, Saudi Arabia 2010. Women in higher education: Saudi initiatives & achievements. General Department for Planning & Statistics. Retrieved April 15, 2012.
- Women in higher education? Available via http://www.mohe.gov.sa/ar/Ministry/Deputy-Ministry-for-Planning-and-Information-affairs/The-General-Administration-of-Planning/Documents/women_in_higher_edu.pdf (Accessed 15/3/2012)
- Alfayez SF, Strand DA, Carline JD. Academic, social and cultural factors influencing medical school grade performance. *Med Educ* 1990;24(3):230-38.
- Mandal A, Ghosh A, Sengupta G, Bera T, Das N, Mukherjee S. Factors Affecting the Performance of Undergraduate Medical Students: a perspective. *Indian J Community Med* 2012;37(2):126-29.
- Ahmed B, Ahmed LB, al-Jouhari MM. Factors determining the performance of medical students of the Faculty of Medicine, University of Kuwait. *Med Educ* 1988;22(6):506-08.
- Hayes SC, Farnill D. Medical training and English language proficiency. *Med Educ* 1993;27(1):6-14.
- Stephen DF, Welman JC, Jordaan WJ. English Language Proficiency as an Indicator of Academic Performance at a Tertiary Institution. *SA Journal of Human Resource Management* 2004;2(3):42-53.
- Haq I, Higham J, Morris R, Dacre J. Effect of ethnicity and gender on performance in undergraduate medical examinations. *Med Educ* 2005; 39(11): 1126-1128
- Dayioglu M, Türüt-Asik S. Gender Differences in Academic Performance in a Large Public University in Turkey. ERC Working Papers in Economics 04/17 December 2004. Available via <http://www.erc.metu.edu/menu/series04/0417.pdf> (Accessed 9/12/2012).
- Castagnetti C, Rosti L. Effort Allocation in Tournaments: The Effect of Gender on Academic

- Performance in Italian Universities. *Economics of Education Review* 2009;28 (3):357-69.
25. Hyde JS, Kling KC. Women, Motivation and Achievement. *Psychology of Women Quarterly* 2001;25:364-78.
 26. El-Hazmi MA, Tekian AS, el-Mahdy S, Lambourne A. Performance of men and women medical students at King Saud University, Riyadh: a 10-year retrospective study. *Med Educ* 1987;21(4):358-61.
 27. Al-Tamimi DM. Saudi women in academic medicine. Are they succeeding? *Saudi Med J* 2004;25 11):1564-67.
 28. Khan IA. An Analysis of Learning Barriers: The Saudi Arabian Context. *International Education Studies* 2011;4(1):242-47.
 29. Schmidt R, Boraie D, Kassabgy O. Foreign language motivation: Structure and external connections, In RL Oxford (ed) *Language Learning Motivation: Pathways to the New Century*, University of Hawaii Press, Honolulu, pp 9-70, 1996.
 30. Shaaban KA, Ghaith G. Student motivation to learn English as a foreign language. *Foreign Language Annals* 2000;33(6):632-41.
 31. Semmar Y. An exploratory study of motivational variables in a foreign language learning context. *Journal of Language and Learning* 2006;5(1):118-32.
 32. Zammit SA. Motivation, test results, gender differences, and foreign languages: How do they connect? Paper presented at the Annual Meeting of the Language Testing Research Colloquium, Cambridge 1993; (ED 362007).
 33. Karsenti T, Thibert G. The Influence of Gender Differences on Within-Term Changes in Junior-College Student Motivation. Paper presented at American Educational Research Association, New Orleans, 1994 April; 8 pp (ED 373537).
 34. Sung H, Padilla AM. Student Motivation, Parental Attitudes, and Involvement in Learning of Asian Languages in Elementary and Secondary Schools. *The Modern Language Journal* 1998;82:205-16.
 35. Green J, Oxford R. A closer look at learning strategies, L2 proficiency, and gender. *TESOL Quarterly* 1995;29:261-97.
 36. Kaylani C. The influence of gender and motivation on EFL learning strategy use in Jordan. In R Oxford (ed), *Language learning strategies around the world: Cross-cultural perspectives*, University of Hawaii Press, Honolulu, pp 75-88, 1996.
 37. Javid CZ, Al-Asmari AR, Farooq U. Saudi Undergraduates' Motivational Orientations towards English Language Learning along Gender and University Major Lines: A Comparative Study. *European Journal of Social Sciences* 2012;27(2):283-300.
 38. McMullen MG. Using language learning strategies to improve the writing skills of Saudi EFL students: Will it really work? *System* 2009;37:418-33

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