

FOLIA MEDICA CRACOVIENSIA

Vol. LVI, 4, 2016: 31–41

PL ISSN 0015-5616

# The influence of medical education level on the Jagiellonian University Medical College medical students' knowledge concerning oral hormonal contraceptive pills

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**Abstract:** In December 2014 the authors carried out a research among Jagiellonian University Medical College medical students in a form of a questionnaire which consisted of two parts: personal information and multiple choice test concerning student's knowledge on OCPs. It showed that the level of medical education, defined as the year of study, increases student's knowledge about oral hormonal contraceptive pills. New program of study introduced from academic year 2012/2013 gives students wider knowledge on OCPs at earlier stage of education. Factors as female sex, usage of OCPs by student or his partner, positive attitude towards recommending OCPs to future patients show positive correlation with student's knowledge.

**Key words:** medical students, oral hormonal contraceptive pills, OCPs, Jagiellonian University Medical College.

## Background

Issues concerning oral hormonal contraceptive pills [OCPs] are presented to the medical students of the Jagiellonian University Medical College [JUMC] in their education during Pharmacology [1] and Gynaecology and Obstetrics courses [2]. From the academic year 2012/2013 a new program of studies places Pharmacology during IIInd and IIIrd year of studies instead of IIIth and IVth year and Gynaecology and Obstetrics from IIIrd to VIth year of studies, instead of Vth and VIth [3]. The authors wanted to verify if and how the level of medical education defined as the year of study influences students's knowledge on OCPs.

## Materials and methods

589 medical students of the Jagiellonian University Medical College in Cracow, Poland, from each year of the six-years course (91 Ist year students, 98 IIIrd year students, 100 students of each IIInd, IVth, Vth and VIth year), 198 male and 390 female, were asked to complete a survey concerning OCPs consisted of two parts. Yet the participation was voluntary none of the students refused; questionnaire had form of multiple choice test with one correct answer. Research was carried out in December 2014.

First part concerned issues as: sex, use of OCPs by student or his partner, declared level of knowledge about OCPs, recommending OCPs to the future patients, opinion on the number of facts about OCPs presented during university classes and necessity of increasing the number of hours dedicated to the topic in the plan of study.

Second part included 12 questions (5 possible answers) concerning students' knowledge about OCPs. Various aspects of method were raised: 1. Prevention of pregnancy and STD [sexually transmitted diseases]: HIV, HPV. 2. Average monthly cost. 3. OCPs side effects. 4. Mechanisms of action and effects. 5. Main components of the COCP [combined oral contraceptive pills]. 6. Content of the POP [progestogen-only pills]. 7. OCPs effects other than pregnancy prevention. 8. Factors modifying effectiveness of the OCPs. 9. General facts on OCPs. 10. Process of proper drug selection. 11. Activities contraindicated during COCPs therapy. 12. Standard of behavior after improper drug usage. For each correct answer student got 1 point with the maximum score of 12 points.

In the statistical analysis chi<sup>2</sup> test and method of ordinary least squares in a linear regression model were used. The level of statistical significance was established as p<0.05.

## Results

The average result achieved by students for each year is presented in the Chart 1. The average score of maximum 12 points for Ist year students was 7.4 points [61.63%], IIInd year 8.23 [68.58%], IIInd year 10.89 [90.73%], IVth year 9.54 [79.50%], Vth year 10.31 [85.92%], VIth year 11.38 [94.83%] ( $p < 0.05$ ). Plot 1. presents the correlation between years of study and obtained result.

Men's general score was 9.04 [75.33] points, women 9.96 [83] points ( $p < 0.001$ ). The average results are presented in the Chart 2.

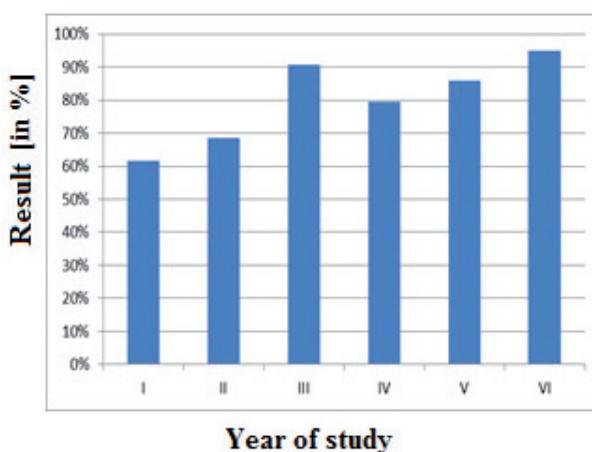
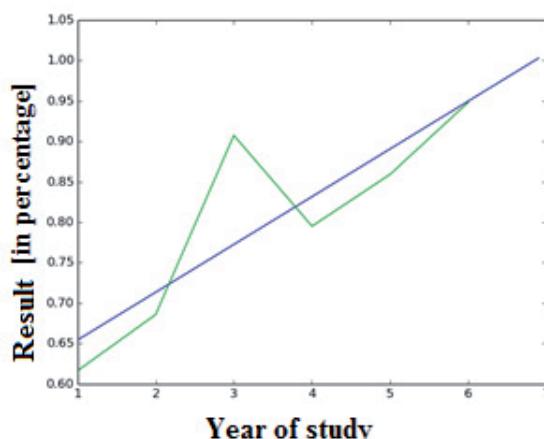


Chart 1. Average percentage result achieved by students for each year of study.



Plot 1. The correlation between mean students' result in each year [in percent] and the year of study with fitted regression line [ $f(x) = 0.59520591 + 0.05908148 \cdot x$ ].

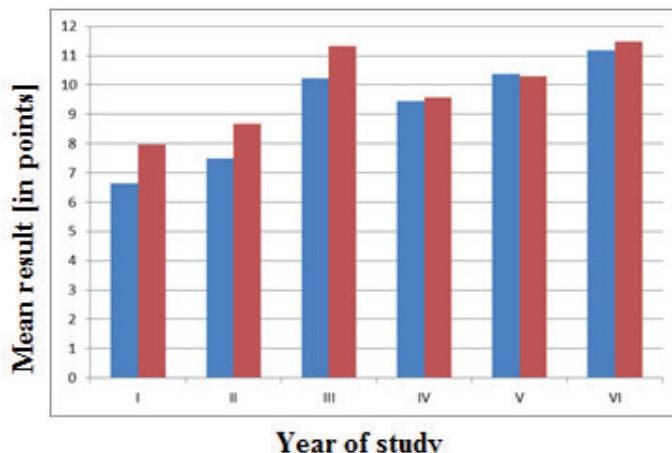


Chart 2. Average score of men [blue] and women [burgundy] in points for each year ( $p < 0.001$ ).

The number of students who declared that they or their partner had been using OCPs was: 12 for Ist year [13.19%], 24 for IIInd and IVth year [24%], 29 for IIIrd year [29.59%], 56 for Vth year [56%] and 53 for VIth year [53%]. Average result in points obtained in the survey in this group: Ist year — 7.58; IIInd — 8.88; IIIrd — 11.03; IVth year — 10.13; Vth year — 10.64; VIth year — 11.60; mean result: 10.49 ( $p < 0.001$ ). Students who declared never using or having a partner using OCPs achieved mean scores (in points) of: Ist year — 7.41; IIInd — 7.98; IIIrd — 10.98; IVth year — 9.36; Vth year — 9.84; VIth year — 11.16; mean score 9.29 ( $p < 0.001$ ). The differences between two groups are presented in the Chart 3.

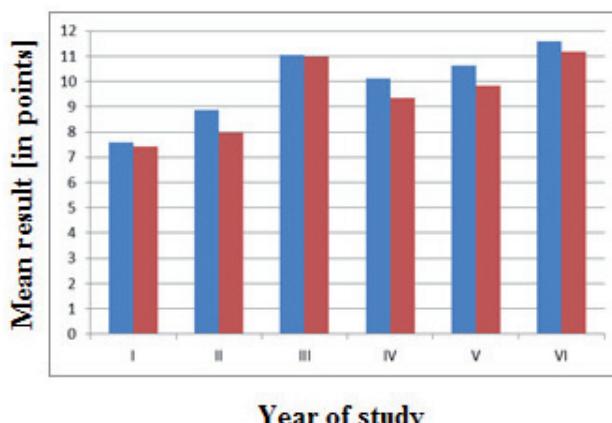


Chart 3. Average score of students declaring using or having partner who used OCPs [blue] and students who didn't use and didn't have a partner who used OCPs [burgundy] in points for each year ( $p < 0.001$ ).

Students who declared to have sufficient level of knowledge about OCPs, achieved average score of 11.08 points [92.33%] ( $p < 0.001$ ). Numbers of different years students and their scores are presented in the Table 1.

**Table 1.** Scores achieved by students who declared to have sufficient knowledge about OCPs in different years.

Year of study	Number of students who declared to have sufficient knowledge about OCPs	General number of respondents in each year	Average result in points [for 12]	Average result in percent
I	3	91	10,33	86,08%
II	6	100	9,5	79,17%
III	22	98	11,09	92,42%
IV	15	100	10,47	87,25%
V	25	100	10,76	89,67%
VI	50	100	11,66	97,17%

The number of students from each year who declared to recommend OCPs to future patients or not is presented in the Table 2. The average score among students who declared recommending this method was 10.46 points [87.17%] ( $p < 0.001$ ), students who refused to do so achieved 9.28 [77.33%] ( $p < 0.001$ ).

**Table 2.** Number of students who declared to recommend OCPs or not to their future patients.

Year of study	Number of students who declared they would recommend OCPs to the patients in the future	Number of students who declared they would not recommend OCPs to the patients in the future	General number of respondents in each year
I	18	20	91
II	25	16	100
III	41	22	98
IV	30	32	100
V	50	19	100
VI	55	18	100

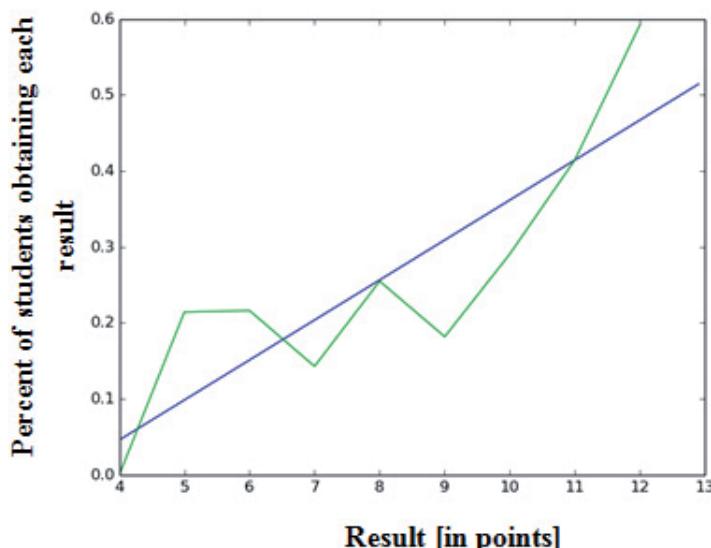
9 Ist year, 20 IIInd year, 49 IIIrd year, 38 IVth year, 62 Vth year and 30 VIth year students declare a need of increasing the number of classes concerning OCPs. Numbers of medical students giving opinion on proper presentation of this matters are presented in the Table 3.

Table 3. Students opinions on proper presenting issues concerning OCPs during university classes for each year.

Year of study	Number of students who declare that the issues concerning OCPs were presented properly	Number of students who declare that the issues concerning OCPs weren't presented properly	Number of students who declare that they do not know if issues concerning OCPs were presented properly	Number of students who states that there is need to enlarge number of hours dedicated to OCPs topic	Average result [points] of the student who states that there is need to enlarge the number of hours dedicated to OCPs topic ( $p<0,001$ )	General number of respondents in each year
I	0	13	78	9	6,22	91
II	2	10	88	20	7,85	100
III	24	53	21	49	11,22	98
IV	10	40	50	38	9,58	100
V	17	60	23	62	10,58	100
VI	29	56	15	30	11,33	100

The particular number of students who answered correctly each question with the percentage that they constitute in each year are presented in the Table 4.

Plot 2 presents the number of students who used or had a partner who used OCPs and their average results in points.

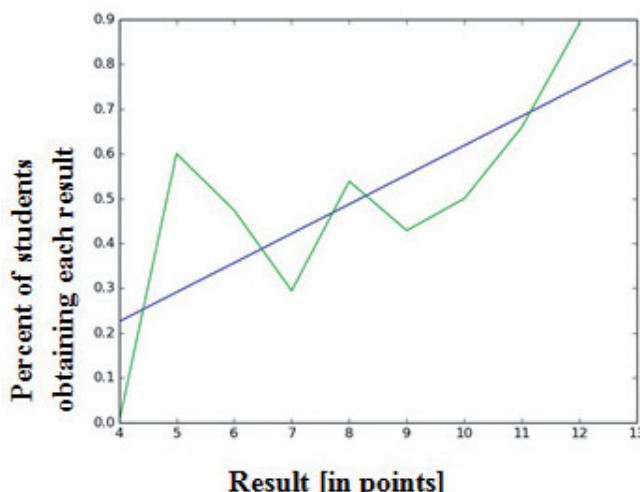


Plot 2. The number of students [in percent] obtaining particular result who used or had a partner who used OCPs with fitted linear regression [ $f(x) = -0.16480044 + 0.05265566 \cdot x$ ].

Table 4. Students who answered correctly each question [in numbers] with the percentage that they constitute in each year.

Issue concerned in a question Year of study	Prevention of pregnancy and STD [sexually transmitted diseases]: HIV, HPV	Average monthly cost	OCPs side effects	Mechanisms of action and effects	Main components of the COCP	Content of the POP	OCPs effects other than pregnancy prevention	Factors modifying effectiveness of the OCPS	General facts on OCPS	Process of proper drug selection	Activities contraindicated during COCPs therapy	Standard of behavior after improper drug usage
Ist year	89	49	60	49	33	36	62	70	68	66	29	62
	97,80%	53,85%	65,93%	53,85%	36,26%	39,56%	68,13%	76,92%	74,43%	72,53%	31,87%	68,13%
IIrd year	97	62	89	71	45	43	66	80	77	88	41	64
	97,00%	62,00%	89,00%	71,00%	45,00%	43,00%	66,00%	80,00%	77,00%	88,00%	41,00%	64,00%
IIIrd year	97	74	97	95	92	98	96	93	97	95	79	94
	98,98%	75,51%	98,98%	96,94%	93,88%	89,80%	87,76%	84,69%	93,98%	96,94%	80,61%	85,71%
IVth year	99	70	96	86	67	62	67	82	95	93	56	81
	99,00%	70,00%	96,00%	86,00%	67,00%	62,00%	67,00%	82,00%	95,00%	93,00%	56,00%	81,00%
Vth year	100	73	98	88	81	80	77	89	99	93	77	76
	100,00%	73,00%	98,00%	88,00%	81,00%	80,00%	77,00%	89,00%	99,00%	93,00%	77,00%	76,00%
VIth year	100	89	100	91	98	92	96	95	100	95	98	84
	100,00%	89,00%	100,00%	91,00%	98,00%	92,00%	96,00%	95,00%	100,00%	95,00%	98,00%	84,00%

The number of students who declare to recommend OCPs to their future patients associated with their level of knowledge is presented in the Plot 3.



Plot 3. The number of students [in percent] obtaining particular result [in points] who declare to recommend OCPs to their future patients with the fitted linear regression  $[f(x) = -0.03683531 + 0.0655171 \cdot x]$ .

## Discussion

Issues concerning students of medical universities and OCPs have been usually presented according to the number of students using OCPs [4, 5]; attempts to assess knowledge were either conducted parallelly with the assessment of other birth-control methods [6] or comparing knowledge of different faculties students [7, 8].

The results demonstrate that the level of students' knowledge concerning OCPs is generally tending upwards during the years of education. Outstanding score of the IIIrd year students is caused by new program of study. Completing courses that IVth and Vth year students didn't according to the old program [3] gives IIIrd year students knowledge about OCPs at earlier stage of education. Obtained results better than IVth and Vth year students supports this conclusion.

Woman, as in other published papers, presented broader knowledge concerning contraceptive methods [9]. Greater difference in knowledge between sexes is observed during first three years of education. The target group for OCPs are women; during medical education men learn about OCPs and have partners using this method, which may compensate this difference in the last years of study.

Personal use or having a partner who used OCPs increases the level of knowledge among students. 34.87% of the JUCM female medical students declare to use or have been using OCPs. Other research over polish female medical students show similar

result of 30.5% among students of University of Warsaw [5]. Obtained result is lower than among students in America (41%) [6] or Germany, Austria and Switzerland (72.2%) [10], higher than in Greece (4.9%) [11].

Presenting positive attitude towards recommending OCPs to their future patients also positively affects the obtained result.

The number of students satisfied with their knowledge concerning OCPs is varying among different years of study with maximum of 50% among VIth year students, yet only 29% of VIth year students states that the issues were presented properly during their education. 35.31% of the respondents states that there is a need for more hours of classes dedicated to the OCPs topic. It is very important for the future practice of the medical students to be familiar with issues concerning OCPs [12]. IIIrd, IVth and Vth year students who postulate that obtained better mean score than the average result for the whole year.

There are many contraindications to the COCPs therapy [13]. Only 31.87% of the Ist year, 41% of the IIInd year and 56% of the IVth year students realized that one of contraindications is smoking in women over 35 years [1, 14]. Students of the IIIrd and Vth year got the lowest score answering question about average monthly cost of OCPs (relatively 75.51% and 73% correct answers) [15]. Students of the VIth year committed the most mistakes answering question concerning standard behavior after improper drug usage, defined as missing one pill between 7. and 14. day of cycle in 21-days combined OCPs therapy (84% of proper answers). Improper drug usage modifies OCPs therapy efficacy [16].

Ist year students knew the most about factors modifying effectiveness of the OCPs: 76.92% answered properly (diarrhea, antibiotics, vomiting, large intake of St. John's wort extract) [17, 18]. 89% of the IIInd year students knew the side effect of the OCPs (reducing acne, heavy menstrual bleeding) [19, 20]. Question concerning them was also the best scored among IIIrd and IVth year students (relatively 98.98% and 96%). IIIrd year students obtained the same result answering question concerning general facts on OCPs. These subject was also the best scored among Vth and VIth year students (99% and 100% of respondents answered correctly). All VIth year students knew OCPs' side effects.

## Conclusions

The research showed that the level of medical education defined as the year of study influences medical students' knowledge concerning OCPs. The level of knowledge is tending upwards during the years of education, however most part of the students claims that issues concerning OCPs weren't presented properly during their education.

The new program of study, which places courses concerning OCPs earlier in students' education, gives students better knowledge about OCPs than the old

program. Female sex, usage of OCPs by student or his partner, positive attitude towards recommending OCPs to future patients affect the level of student's knowledge. Obtained results suggest that although student's knowledge about OCPs seems to be satisfying, student's see the need to increase number of hours dedicated to this topic during Pharmacology and Gynaecology courses.

### Conflict of interest

None declared.

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