Integrated clinical pharmacology and therapeutics for medical students: multidisciplinary approach for flipped classroom using video resources

Common Clinical case

- Donald T.
- 72 y.
- Anxiety-depression
- CKD-specific program for CKD
- Diabete-Specific program for Diabete
- ...
Background

• High prevalence of polypharmacy for patients with multimorbidity
• Fragmentation in health care (and teaching) remains the rule
• Consequences at different levels: patient, society

! Every doctor, whatever his speciality, share the responsibility
! Important to integrate therapeutics needs in the education of each future doctors.

Aim

To design, implement and evaluate a method of clinical pharmacology and therapeutics (CPT) learning
• through a multidisciplinary and integrated process
• using a motivating approach
• for final-year medical students

Public

• Last year of the cursus
  • Basics knowledges in CPT & introduction to complexity
  • 220 medical students in ULiege
Methods: pedagogical leitmotifs

Student’s motivation through effective learning
- Meaningful activities
  - Close to reality and daily practice, moderate complexity
- Active learning
  - Reflection, action & decision
- Accessibility and quality of resources
- Feedback to students

Integration through multidisciplinary collaboration
- At all stages
  - Design, implementation, regulation
- Isomorphic method
  - “we do what we want students do”

→ Flipped classroom using video resources and integrated clinical cases
  « Lectures at home and homework in class »

Methods: flipped classroom

4 modules: interdisciplinary preparation by teachers

4 modules: interdisciplinary debriefing by teachers

Multidisciplinary approach
- Individual preparation
- Small groups
- Clinical cases
- Discussion MCQ, individual answers
- Feedback with multidisciplinary panel, commented answers to MCQ
- Plenary session

Students

Coord.

GP

Internal medicine

Gynecology

Geriatrics

Pediatrics

Small groups

Discussion MCQ, individual answers

Plenary session

Feedback with multidisciplinary panel, commented answers to MCQ

Ancillary preparation

Clinical cases

MCQ, individual answers

Plenary session

Commented answers to MCQ

Coord.

GP

Internal medicine

Gynecology

Geriatrics

Pediatrics

... classroom
Methods: flipped classroom

4 modules:
- Interdisciplinary preparation by teachers
- Interdisciplinary debriefing by teachers

Multidisciplinary approach
- Individual preparation
- Small groups
- Clinical cases
- Discussion MCQ - Individual answers
- Plenary session
- Feedback with multidisciplinary panel
- Commented answers to MCQ

Small groups
- Video
- Clinical cases
- Individual preparation
- Discussion MCQ - Individual answers
- Plenary session
- Feedback with multidisciplinary panel
- Commented answers to MCQ

Results

Learning devices
- 4 CPT lessons on 4 domains (pediatry, geriatry, internal medicine, women’s health) on 4 months
- 46 experts from several medical specialities produced 64 videos with multidisciplinary validation

Student’s participation
- 95% of video visualizations and MCQ answers
- 50% attendance at plenary session without any incentive

Qualitative evaluation
- Students: highly satisfied about videos, clinical cases and plenary sessions. Lack of time and lack of teacher’s consensus during debriefing.
- Teachers: enthusiastic about creating video supports and participating to whole process of flipped classroom. Although time- and money- consuming.
Conclusion

Motivation and integration

• Learning device = innovative method for participants, generating motivation for students and teachers, consistency with the topic

• Multidisciplinary approach = innovative way to tackle complexity of CPT for real patients (complexity, multimorbidity) and bringing integrated answers

Limits

• Time for effective student’s preparation

• Diversified CPT resources: introduced
  • according to flipped classroom method

• Resistance to innovation among medical teacher’s

Conclusion and future

Pour aller plus loin...

- Encourager le travail interdisciplinaire entre étudiants de différentes filières
- Développer les occasions d’intégrer les matières tout au long du cursus médical

• Promote working together of students from different disciplines
• increase opportunities for integrated learning in the medical cursus
Integrated clinical pharmacology and therapeutics for medical students:
multidisciplinary approach for flipped classroom using video resources

Thank you for your attention

JeanLuc Belche: jbelche@uliege.be
Electronic platform
- Accessibility of resources
- Forum for discussion

Videos conformed to a pedagogic-determined format:
- 6 to 9 minutes,
- Talking head with expert
- Slides in the background

Workshop-small groups of student (15)
- Analysis of clinical cases
- Individual answers on MCQ/electronic platform

Multidisciplinary teacher’s group:
- Analysis of the students’ answers to MCQ
- Tailored adaptation of plenary debriefing
Debriefing session
- Feedback on MCQ
- Interaction with multidisciplinary teachers team

Flipped classroom

<table>
<thead>
<tr>
<th>double topics</th>
<th>traditional</th>
<th>flipped classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the class with teachers</td>
<td>Without the class, without teachers</td>
<td>Content learning video</td>
</tr>
<tr>
<td>Lectures</td>
<td>Transfert</td>
<td></td>
</tr>
<tr>
<td>On topics</td>
<td>Exercices</td>
<td></td>
</tr>
</tbody>
</table>

Knowledge sharing
Regulation of learning between peers
Loss of the monopoly of the expertise by the teacher (teacher = accompanist)
Interactivity during learning between leaners and between teachers and leaners
Contextualization of learning
Problem based learning
Apprentissage en profondeur
Stimulation de l’autonomie
Respect des styles d’apprentissages des étudiants
Promouvoir la différenciation pédagogique

(Dumont A., Berthiaume, la pédagogie inverse, De Boeck, 2016)
impact levels of a dispositive

**Kirkpatrick’s Training Evaluation Model**

- **Level 1: Reaction**
  - To what degree participants react favorably to the training event.

- **Level 2: Learning**
  - To what degree participants acquire the intended knowledge, skills, and attitudes based on their participation in the learning event.

- **Level 3: Behavior**
  - To what degree participants apply what they learned during the training when they are back on the job.

- **Level 4: Results**
  - To what degree the targeted outcome occurs, as a result of the learning event(s) and subsequent reinforcement.

**Description of Kirkpatrick’s Four-Level Training Evaluation Model**

- **Level 1: Reaction**
  - This level measures how the learners react to the training. Attitude questionnaires are often used. This level measures the learner's perception (positively) of the course. This level is not indicative of the training’s performance potential as it does not measure what new skills the learners have acquired or what they have learned that will transfer back to the working environment.

- **Level 2: Learning**
  - This is the extent to which participants change attitudes, improve knowledge, and increase skills as a result of the learning process. The level requires some type of post-testing to ascertain what skills were learned during the training. The post-testing is only valuative when combined with pre-testing. Measuring the learning that takes place in a training program is important in order to validate the learning objectives.

- **Level 3: Behavior**
  - This evaluation involves testing the students' capabilities to perform learned skills while on the job, rather than in the classroom. Evaluation can be performed formally (testing) or informally (observation). It determines if the correct performance is now occurring by answering the question, “Do people use the newly acquired skills on the job?”

- **Level 4: Results**
  - This level of evaluation measures the training program’s effectiveness, that is, “What impact has the training achieved?” Impact informs you in return of how the organization receives from the training. Decision-makers prefer this.

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**Modules de Thérapeutique 2017-2018:**

**vers la thérapeutique intégrée**

Groupe de travail constitué de R. Radermecker, G. Scantamburlo, AS Parent, P Emonts, R Louis, JF Brichant, J Petermans, JL Belche

Coordination JL Belche
Comorbidité de 10 conditions courantes parmi les patients de soins de santé primaires en Angleterre.

<table>
<thead>
<tr>
<th>Condition</th>
<th>% de patients avec la condition</th>
<th>Mean No of conditions in people aged 65 years with condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronary heart disease</td>
<td>8.8</td>
<td>3.4</td>
</tr>
<tr>
<td>Hypertension</td>
<td>21.9</td>
<td>2.5</td>
</tr>
<tr>
<td>Heart failure</td>
<td>2.8</td>
<td>3.9</td>
</tr>
<tr>
<td>Stroke/transient ischaemic attack</td>
<td>6.0</td>
<td>3.6</td>
</tr>
<tr>
<td>Mental ill health condition</td>
<td>6.5</td>
<td>3.3</td>
</tr>
<tr>
<td>Diabetes</td>
<td>17.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Chronic obstructive respiratory disease</td>
<td>14.3</td>
<td>6.5</td>
</tr>
<tr>
<td>Painful condition</td>
<td>12.7</td>
<td>5.1</td>
</tr>
<tr>
<td>Depression</td>
<td>23.4</td>
<td>2.6</td>
</tr>
<tr>
<td>Dementia</td>
<td>5.3</td>
<td>4.1</td>
</tr>
</tbody>
</table>

*Percentage who do not have one of 39 other conditions in the full count.

Contexte

Approche/enseignement par maladie

Mais faible prévalence des situations en mono-pathologie ...

La multimorbidity est la règle!


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Patiente de 79 ans, avec ostéoporose, arthrose, diabète de type 2 contrôlé, HTA modérée, BPCO modérée

- GPC adaptés à Personnes âgées dans 4/15
- 12 médications différentes, en 19 prises sur 5 moments de la journée (en plus de salbutamol à la demande et l'alendronate 1x/semaine)
- risques d’interactions médicamenteuses
- 14 activités d’autosoin, dont certaines contradictoires


Table 3. Treatment Regimen Based on Clinical Practice Guidelines for a Hypothetical 79-Year-Old Woman With Hypertension, Diabetes Mellitus, Osteoporosis, Osteoarthritis, and COPD.

<table>
<thead>
<tr>
<th>Time</th>
<th>Medication</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 AM</td>
<td>Isoprotine, metered dose inhaler 70 mg of albuterol</td>
<td>Check feet sit upright for 30 min on day when ambulation is limited</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>500 mg of calcium and 300 IU of vitamin D 12.5 mg of hydrochlorothiazide 45 mg of lisinopril 25 mg of aspirin 250 mg of ibuprofen</td>
<td></td>
</tr>
<tr>
<td>12:00 PM</td>
<td>Isoprotine, metered dose inhaler 50 mg of calcium and 200 IU of vitamin D</td>
<td></td>
</tr>
<tr>
<td>5:00 PM</td>
<td>Isoprotine, metered dose inhaler 200 mg of ibuprofen 40 mg of diuretics 350 mg of aspirin</td>
<td></td>
</tr>
<tr>
<td>7:00 PM</td>
<td>Isoprotine, metered dose inhaler 500 mg of calcium and 300 IU of vitamin D 25 mg of aspirin 250 mg of ibuprofen</td>
<td></td>
</tr>
<tr>
<td>11:00 PM</td>
<td>Isoprotine, metered dose inhaler</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Potential Treatment Interactions for a Hypothetical 79-Year-Old Woman With 5 Chronic Diseases.

<table>
<thead>
<tr>
<th>Type of Disease</th>
<th>Medications With Potential Interactions</th>
<th>Medication and Other Disease</th>
<th>Medications for Different Diseases</th>
<th>Medication and Fixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes, arthrosis</td>
<td>Hydrochlorothiazide, lisinopril</td>
<td>Aspirin plus calcium, increased risk of osteoporosis, increased risk of bleeding</td>
<td>Gabapentin, placebo, aspirin, and ibuprofen</td>
<td>NA</td>
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Public et contexte du cours

• étudiants Master 3-dernière année
• tout futur médecin
• dans le cadre des journées de retour
• 6 cours de 4h (jeudi PM)
• d’octobre à mars

Objectif général

Initier une réflexion sur l’acte thérapeutique, médicamenteux ou non, dans des situations courantes, d’un niveau de complexité nécessitant l’intégration de connaissances