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Review

A proposal for a psychopharmacology-pharmacotherapy catalogue of learning objectives and a curriculum in Europe

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Abstract

Objectives: Post-graduate training for specialisation in psychiatry and psychotherapy is part of a 4 to 6 year program. This paper aims to inform on the general situation of teaching and training of psychopharmacology-psychopharmacotherapy in Europe. It presents the need for a psychopharmacotherapy education in psychiatric training programs. Arguments as well as a proposal for a catalogue of learning objectives and an outline of a psychopharmacologic curriculum are presented.

Methods: Based on their experience and on an analysis of the literature, the authors, experts in psychopharmacology-pharmacotherapy teaching, critically analyze the present situation and propose the development of a curriculum at the European level.

Results: Teaching programs vary widely between European countries and generally, teaching of psychopharmacology and pharmacotherapy does not exceed two-dozen hours. This is insufficient if one considers the central importance of psychopharmacology. A psychopharmacology-psychopharmacotherapy curriculum for the professional training of specialists in psychiatry and psychotherapy is proposed.

Conclusions: As the number of hours of theoretical teaching and practical training is insufficient, a catalogue of learning objectives should be established, which would then be part of a comprehensive curriculum at the European level. It could be inspired partly by those few previously proposed by other groups of authors and organisms.

Keywords: postgraduate training, psychopharmacology-pharmacotherapy-curriculum, residents in psychiatry, learning catalogue, Europe

1. Introduction

In most European countries post-graduate training for specialisation in psychiatry and psychotherapy is acquired over the course of 4 to 6 year programs (Mayer et al. 2014). In the European Union, qualification in one country is recognized within other countries of the Union. However, despite efforts to standardize post-graduate training, the curricula in different European countries vary greatly. This variability limits comparability between countries and international exchange while carrying consequences in the breadth and quality of education that trainees receive. We thus conclude that there is a need for standardization and possibly regulation of psychiatric education across the EU and are proponents of a European certification in resident psychiatric training.

Studies have demonstrated that, in particular, insufficient time and focus is placed on psychopharmacologic training. A recent survey on medical specialization training across Europe revealed that all 22 participating countries include training in psychopharmacology and pharmacotherapy as part of their psychiatric training programs (Lotz-Rambaldi et al. 2008). However, a closer look at the situation (using information available by internet resources) in some countries such as Austria, France, Germany, Hungary and Switzerland shows that postgraduate teaching occurs decentralised and it is organised by individual regions. In addition, teaching catalogues are generally rather vague with regard to the number of hours of psychopharmacology teaching. Nevertheless, it may be concluded that the number of hours declared as psychopharmacology teaching does generally not exceed two-dozen hours within in a five-year resident teaching program. We consider this amount to be insufficient if one considers the central importance of psychopharmacology as a therapeutic tool in psychiatry. On the other hand, there is clearly a lack of data in the scientific literature on this important topic.

In this paper, we propose a standardized European wide curriculum for psychopharmacologic training. While we provide insight into the current European situation in psychopharmacologic teaching we also argue the benefits of standardizing education. Though the proposed curriculum may be a “catalogue of learning objectives” at its core, it also includes a detailed statement on its objectives and aims, describes the forms of teaching, and informs on the teaching time-plan. Finally, it includes information on how teaching and learning should be evaluated.

2. Pharmacotherapy of psychiatric patients: Challenges for the treating psychiatrist

Due, in part, to increasing awareness for the relevance of quality of life in psychiatric disorders and their treatment, management of psychopharmacotherapy has increasingly become a complex and demanding task. Psychiatrists are faced with multiple challenges requiring extensive psychopharmacologic knowledge in the strive towards effective, safe, and tolerable treatment options for their patients.

For example, on the one hand, monotherapy of mental diseases represents the generally recommended treatment strategy due to associated benefits regarding safety and side effects. However, psychiatric comorbidities and poor response to single treatment regimens often prompts psychiatrists to prescribe polypharmacy (Blier 2014; Diaz-Caneja et al. 2014; Fleischhacker and Uchida 2014; Millan 2014; Moller et al. 2014). For example, schizophrenia is associated with high rates of somatic and psychiatric comorbidities such as substance abuse (lifetime prevalence: 47%), anxiety, and depressive symptoms (estimated prevalence: 15% for panic disorder, 29% for PTSD, 23% for OCD). Furthermore, about 50% of schizophrenic patients suffer from comorbid depression (Buckley et al. 2009). As a consequence, therapeutic drugs often must be combined in order to treat the symptoms of each disorder. Pharmacoepidemiological studies such as those performed by the AMSP, the German drug surveillance program, show that more than 50 % of patients suffering from schizophrenia are comedicated with 2 antipsychotics. 25% of inpatients are simultaneously prescribed at least 4 psychotropic drugs (Moller et al. 2014). However, combination therapy bears the risk of pharmacodynamic and pharmacokinetic interactions. Furthermore, the importance of emphasizing monotherapy in a teaching curriculum is demonstrated by recent studies suggesting that antipsychotic polypharmacy for schizophrenia is frequently overemphasized and that educational interventions should stimulate pharmacotherapists to switch from polypharmacy to monotherapy (Fleischhacker and Uchida 2014). The current schism between an increasing emphasis on the benefits of monotherapy on the one side, with complex psychiatric patients and clinical experiences of non-response on the other demonstrates the challenges faced by psychiatrists in balancing empiric evidence, clinical experience, and the facts of clinical necessity in multimorbid patients. Such hurdles might be counteracted using structured, therapeutic decision processes. Such thought processes focussed on effective and safe treatment should be conveyed as part of psychopharmacologic education as they may serve as essential tools in daily clinical practice.

In a first step, the treating physician must consider handbooks and summaries of product characteristics (SPC) of available drugs. This first step may be limited for some of the above-mentioned pathologies, such as substance abuse (cocaine, cannabis, etc.) or symptoms of personality disorders, as on-label medications are not available. Next, guidelines, which are available for the majority of pathologies and are written by experts, most often members of working groups of international (e.g. World Federation of the Societies of Biological Psychiatry (WFSBP) (e.g. (Aigner et al. 2011; Hasan et al. 2012; Grunze et al. 2013; Hasan et al. 2013) (www.wfsbp.org/educational-activities/wfsbp-treatment-guidelines-and-consensus-papers.html)) or national scientific societies (e.g. (Yatham et al. 2013; Katzman et al. 2014)), should be utilized. However, for difficult to treat patients, drugs are frequently recommended in off-label conditions (Baldwin and Kosky 2007). This approach may be contradictory to regulations dictated by national drug authorities and risks exposing the treating physician to ethical and legal problems. Furthermore, on label medications in a particular country qualify as off label in other countries and vice versa. As a consequence of globalisation, psychiatrists may practice in other countries than in those in which they commenced their training. This is in line with the postulate about the free movement of workers throughout Europe (Lotz-Rambaldi et al. 2008).

In addition, genetic and environmental factors responsible for inter-individual differences in drug metabolism should be considered in each patient. This pharmacotherapeutic step is of increased relevance in polymedicated patients, in which risk of pharmacokinetic interactions is higher (Haueis et al. 2011). Placing a focus on drug-metabolism is of particular importance in elderly patients and in patients with somatic comorbidities. In this regard, therapeutic drug monitoring and particularly pharmacogenetic tests (Kirchheiner et al. 2004; Hiemke et al. 2011) may be of interest and great clinical relevance. Furthermore, as long term and even lifelong treatments are consistently recommended by guidelines and frequently prescribed, treatment must be adapted to changes in comorbidities and comedication, as long term treatment is also required in a number of chronic diseases in somatic medicine, such as asthma, diabetes mellitus or hypertension.

The recent developments in psychopharmacotherapy show that many drugs initially introduced for a particular pathology, are now also available for the treatment of other disorders (e.g. antidepressants for anxiety disorders). As a consequence, the hitherto valid classification of psychotropic drugs became obsolete and confusing. This prompted some international organizations specialised in psychopharmacology to develop a new nomenclature based on 4 axes (pharmacological target and mode of action, approved

indications, efficacy and side effects, neurobiology)(Zohar et al. 2013; Zohar et al. 2014). This new nomenclature will help the pharmacotherapist to choose an optimal treatment, but still requires adequate training in psychopharmacology.

Likely as a result of the challenges described above, medication errors are frequent. However, insufficient teaching in basic sciences including pharmacology is likely to increase the risk of such mistakes (Keijsers et al. 2012). An older study revealed that the incidence of serious and fatal adverse drug reactions in hospitalized patients was 6.7% and 0.32%, respectively, in the USA between 1966 and 1996. According to these statistics, fatal adverse drug reactions are between the 4th and 6th leading cause of death in the USA. The nature and extent of medication errors varies widely. For example drugs other than those prescribed may be administered. Furthermore, wrong dosages, in wrong frequencies, at the wrong time may be prescribed. Patients may miss doses, treatment effect and safety monitoring may be deficient, administration may be abruptly discontinued, or interacting drugs may be given without sufficient monitoring, which might contribute to an increase in the risk of adverse effects (Ito and Yamazumi 2003; Mann et al. 2008; Soerensen et al. 2013). Specially designed treatment programs help to reduce such errors (Jayaram et al. 2011). As a result, recommendations aiming at preventing medication errors by teaching and training have been published (Likic and Maxwell 2009; Members of Emerge et al. 2009) and should be emphasized in psychopharmacology training.

Planning, recommendation and prescription of pharmacological treatments also represents a challenge for physicians as periodically treatment efficacy in particular of antidepressants (Kirsch et al. 2008) is questioned by some groups of authors. On the other hand, placebo controlled studies show that differences in clinical efficacy between psychotropic drugs and placebo are often low. The validity of such studies is then questioned by others (Fountoulakis and Moller 2010). Furthermore, a recent analysis revealed that potentially inappropriate prescribing is frequent if physicians experience excessive pressure to please patient's non-medically founded wishes or as a consequence of the patient having an inappropriate role in deciding for a most appropriate therapy (Cullinan et al. 2014). Physicians may also feel compelled to give preference to personal and empirical experience in situations in which they do not find guidelines convincing. In situations in which collaboration between the specialist and the general practitioner is needed, there may also be fear to communicate critical comments about pharmacotherapeutic practices, as not to jeopardise otherwise fruitful cooperation. Such conflicts and resulting effects on prescription practices underline that postgraduate

psychopharmacological treatment programmes must emphasize pharmacotherapy that is appropriate to specific situations, yet respects a patients' environment. We propose that the challenges addressed above may be combated by intense psychopharmacologic training. Effective and safe psychopharmacologic treatment requires thorough and extensive knowledge on which confident decisions can be based.

3. Present situation of postgraduate psychopharmacology teaching

The topic of training in psychopharmacology is rarely addressed in the literature, with the exception of the journal *Academic Psychiatry*, which deals regularly with this important subject (Balon 2005; Blanco et al. 2005; Dubovsky 2005; Ellison 2005; Georgiopoulos and Huffman 2005; Glick and Zisook 2005; Jefferson 2005; Jibson 2005; Louie et al. 2005; Mintz 2005; Osser et al. 2005; Salzman 2005; Weiden and Rao 2005; Zisook et al. 2005; Kontos et al. 2006; Zisook et al. 2009; Deligiannidis et al. 2012; Mohr et al. 2012; Prabhakar et al. 2012).

In the USA, a questionnaire was recently sent to 621 general psychiatry residency directors. Among the 100 members who responded, 93% replied to have a separate psychopharmacology curriculum at their institutions and 90% considered having such a curriculum "very important" (Prabhakar et al. 2012). Interestingly, 66% reported that teaching comprised more than 30 hours within 4 years of overall training, while only 2% devoted less than 10 hours to psychopharmacology.

There is no overall statistical information available on postgraduate teaching of psychiatry and the respective percentages of time and emphasis devoted to psychotherapy and psychopharmacology in Europe. Of the 22 European countries that were surveyed, all offered structured theoretical training in psychopharmacology, though no details on the number of hours dedicated to its teaching were reported (Lotz-Rambaldi et al. 2008). Nevertheless, it seems that within 5-year postgraduate teaching programs, about 20 – 40 hours are typically specifically devoted to theoretical psychopharmacology teaching and a similar number of hours are generally dedicated to practically oriented teaching. This estimate is based on inquiries in European countries including Austria, Germany, France, Hungary and Switzerland. Certainly, courses focused on individual psychiatric pathologies and their treatment may emphasize pharmacological treatments within a general treatment plan. However, we estimate that the overall percentage of time centred on psychopharmacotherapy is not likely to exceed 5 %, while psychotherapy teaching frequently exceeds 1000 hours (Laux 2014). For example, in Germany, training in psychiatry has undergone important changes and the specialisation is no longer defined

as “psychiatry” but as “psychiatry and psychotherapy” (Naber and Hohagen 2008). Training includes 100 hours of theoretical courses in psychotherapy, 120 hours of therapy in a primary method and 80 hours in a secondary method, in addition to further requirements for participation in a comprehensive psychotherapeutic curriculum. In contrast, the German system only proves a 40 hour course on basic teaching of pharmacological and other biological therapy procedures, in addition to case-related advanced training. Clearly, this number of hours dedicated to “classroom teaching” is too low, and it should be increased by additional 300 to 400 hours centred on practical bedside teaching provided by senior psychiatrists and other experienced colleagues within daily clinical practice.

Literature on psychopharmacology or psychopharmacotherapy teaching and evaluation of the clinical practices of psychiatric residents is scarce. A study performed in the USA evaluated the practice patterns of psychiatric residents who had achieved postgraduate year levels 3 and 4 in their treatment of patients with bipolar disorder. The survey was performed in 769 residents, though only 23% replied to the questionnaire. The survey revealed that more than a quarter of residents did not initiate treatment with a mood stabilizer including lithium, lamotrigine or valproate. Surprisingly, the reason for the lack of confidence in prescribing these treatments was due to insufficient opportunity and experience in treating bipolar patients (Rakofsky and Dunlop 2012). The authors conclude that many residents do not receive adequate training opportunities, but also state that there is no clear definition of “adequate training” of pharmacological treatment of bipolar patients. These results highlight the necessity of classroom and patient-based teaching to foster resident’s confidence in treating patients.

4. Present situation concerning curricula of psychopharmacology

Several European countries provide catalogues of psychopharmacologic learning objectives, but only rather general statements defining the knowledge the candidate must acquire before they present for a board examination for specialization are given. These exams are generally organised at the country level and, as a result, the programmes are often influenced by regional customs or practices at individual institutions. Nationwide programmes do not appear to be the rule. Frequently, the content of the programme is primarily defined by a few available teachers, who are often specialised in particular fields of psychopharmacotherapy. This bears the risk that some issues are not dealt with in particular curriculums. Difficulties associated with the lack of a central organizing body are

illustrated by the state of psychopharmacologic training in Germany (Laux 2014), in which various small regions or even single institutions have unique curricula. It is therefore questionable whether each institution is capable of offering comprehensive teaching of all relevant domains of psychopharmacotherapy, either because certain fields are not a focus of the institution or because teachers from particular fields are not available. Notably, the role of “Big Pharma” in teaching postgraduate level psychopharmacology should also be considered in this context (Peglow et al. 2014; Riese et al. 2014). A recent European study on the interaction between residents in psychiatry and representatives of pharmaceutical companies showed that trainees in psychiatry attribute an educational role to the pharmaceutical industry (Riese et al. 2014). Furthermore, other authors (Peglow et al. 2014) reported that in their hospital, the access to newer drugs is limited and therefore, the trainees could not learn from clinical experience, but their knowledge was provided by sponsored CME-sessions. These seem to be extreme situations but they, nevertheless, demonstrate the importance of structured psychopharmacologic training in order to provide well-rounded education independent of the influence of the industry.

In Germany in 1995, the Association of Neuropsychopharmacology and Pharmacopsychiatry (Arbeitsgemeinschaft für Neuropsychopharmakologie und Pharmakopsychiatrie; AGNP) previously published a detailed catalogue of learning objectives about psychopharmacology education for residents (Breyer-Pfaff et al. 1995a, b). Very recently, the working group “Research and Science” from the German Medical Director Conference of Psychiatric Hospitals, headed by Gerd Laux, also published a proposal for a psychopharmacology curriculum in Germany (Laux 2014). However, most other psychopharmacology catalogues of learning objectives or comprehensive curricula were published by American medical societies (Prabhakar et al. 2012). The American Society of Clinical Psychopharmacology (ASCP) published the 8th edition of the ASCP Psychopharmacology curriculum (www.ascpp.org/wp-content/uploads/2012/11/Volume-I-8th-Edition-TOC-Only-1-23-2015.pdf; http://psychopharmcurriculum.com/preview/8thTOC.pdf). The VIIIth edition of the ASCP Model Psychopharmacology Curriculum for Training Directors and Teachers of Psychopharmacology in Psychiatric Residency Programs includes over 80 lectures in PowerPoint format. The material covers a basic course (postgraduate years I and II) and in an advanced course (postgraduate years III and IV) plus supplementary lectures. Special features have been added, including recommendations of outstanding texts, journals, web sites, P450 interactions, algorithms. Pre- and post-test questions are available for most lectures in order to help evaluate competency. www.ascpp.org/resources/educational-resource/ascp-model-psychopharmacology-

curriculum-seventh-edition). A sample lecture (Psychopharmacology in the emergency room) may be downloaded: http://psychopharmcurriculum.com/preview/Sample.pdf. Other curricula, such as “The Psychiatry Milestone Project” developed by the Accreditation Council for Graduate Medical Education and The American Board of Psychiatry and Neurology (https://www.acgme.org/acgmeweb/Portals/0/PDFs/Milestones/PsychiatryMilestones.pdf) also outline skills that should be attained during education.

Therefore, the ASCPP curriculum, which was developed by a committee composed of about a dozen well-known authors, represents quite an ambitious work. It may, in fact, be considered a gold standard and was utilized as a basis for the European curriculum proposed in this paper.

5. Arguments for a curriculum in psychopharmacology in Europe

As stated by the ASCP committee, the fundamental purpose of such a curriculum is to provide a basis for planning and teaching psychopharmacology in a psychiatric residency program (Glick et al. 2012). The lack of a European-wide, comprehensive, and standardized psychopharmacologic curriculum suggests that psychopharmacologic education does not receive necessary focus in psychiatric post-graduate education. The lack of a curriculum differentiates psychiatry and psychopharmaology from other medical disciplines. Despite experiences made in the USA with the ASCP curriculum, which it is more rarely used than expected (Zisook et al. 2009), a curriculum will be valuable as a basis for the development of instruments that can be further adapted to individual countries or regions.

On a fundamental level, a well-designed curriculum presents the material that is to be taught in a structured and straightforward manner. However, a psychopharmacology curriculum would also emphasize the importance of psychopharmacology as an integral therapeutic tool in psychiatric practice. On the one hand, this point can be communicated in the aims and objectives of the document, which should, as stated above, not only consist of a list of learning tools but also underline the curriculum’s focus and goals. In addition, the time and energy invested by international experts emphasizes psychopharmacology’s relevance and its weight in psychiatric education.

Harmonization of curricula across regions is essential considering rapidly increasing mobility of the academic workforce. Physicians and in particular psychiatrists who migrate

within Europe to realise their post-graduate training in psychiatry are of course also affected. Many settle in the host country and work either in public institutions or in private practice as trained psychiatrists. Standardisation of post-graduate teaching, in this case in the field of psychopharmacotherapy would therefore be welcome.

The patient related benefits of a psychiatric and specifically psychopharmacologic curriculum in improving the quality of psychiatric care are evident. A curriculum fosters standardization and quality control on multiple levels. Firstly, the quality of education can be assessed across various countries, regions, and centres through testing. Secondly, the curriculum emphasizes a structured therapeutic decision process, which is likely to positively benefit treatment safety. Lastly, the curriculum stresses regular assessment of treatment response and drug tolerability, hereby improving patient wellbeing.

From a trainee point of view, a structured psychopharmacologic curriculum greatly improves learning efficiency. Psychopharmacologic practices vary throughout regions, centres, and even among mentors, as they are currently strongly influenced by physician experience and empirical information. Trainees therefore spend large amounts of time and effort sifting through input and comparing learned information to international guidelines. A curriculum that emphasizes teaching guideline and evidence-based psychopharmacology and ensures that trainees receive this information as a fundament (this may of course be supplemented by personal and mentor experience), may circumvent or simplify this step. Streamlining of psychopharmacological education therefore also provides more room for clinical practice and patient based learning. A curriculum would also foster bilateral accountability between institutions and their residents. While residents must fulfil curriculum requirements and demonstrate their comprehension of the material, which may be assessed through testing, centres are required to provide access to necessary expertise either within their staff, or by supporting resident mobility. Furthermore, by familiarizing trainees with guidelines and learning resources, a curriculum provides the tools necessary for long-term learning across a career. Physicians can therefore adapt their practices to the evolving literature, guidelines and recommendations.

6. A curriculum in psychopharmacology-psychopharmacotherapy: proposal and a conclusion

Based on this presentation of the current situation of psychopharmacology teaching at a postgraduate level for specialists in psychiatry we concluded that the number of hours of

theoretical teaching as well as for practical training is clearly insufficient. It is beyond the scope of this paper to propose a detailed learning catalogue and a curriculum. An approach in 2 steps is proposed: Firstly, a catalogue of learning objectives should be established, which would then be part of a comprehensive curriculum as defined in the Introduction. A European curriculum could be inspired partly by those few previously proposed by other groups of authors and organisms (Breyer-Pfaff et al. 1995a, b; Glick et al. 2012; Prabhakar et al. 2012; Laux 2014). The authors of the present paper propose that the curriculum published recently in German by one of us (GL), could be a starting point for the development of a European curriculum: Table 1 presents the English version of a consensus established in 2014 by the German Medical Director Conference of Psychiatric Hospitals (Laux 2014). It comprises the proposal that about 160 hours should be dedicated to theoretical teaching, presentations and discussions of case vignettes and to CME-quizzes, while an additional about 300 hours should be centered on bedside teaching of psychopharmacotherapy.

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Table 1. Proposal of a Psychopharmacology-Psychopharmacotherapy Curriculum for the Professional Training of Specialists in Psychiatry and Psychotherapy [1]

Theme	hours
I. Basic principles and general pharmacology	**38**
1. Pharmacokinetic and pharmacodynamic principles (resorption, distribution, metabolism, elimination of pharmaceutical agents; dose-effect relationships; assessment of plasma drug levels / therapeutic drug monitoring; receptor pharmacology, imaging techniques: fMRT, PET); pharmacogenetics	6
2. Neurobiological principles (neurotransmitters, psycho-neuro-endocrinology)	4
3. Experimental psychopharmacology (animal experimentation, pharmaco-EEG, pharmaco-psychology)	2
4. Methodology: Clinical studies/trials, assessment of efficacy (statistics; meta-analyses; recommended procedures) Drug registration processes (in Germany: Institute for Quality and Efficiency in Health Care [IQWiG], Federal Joint Committee [G-BA], Act to Reform the Pharmaceutical Market [AMNOG])	6
5. Psychopathometry (Rating scales for assessment of mental status)	4
6. Compliance, doctor-patient relationship, psychoeducation	4
7. Issues associated with placebo and nocebo effects	2
8. Side effects/adverse drug reactions (ADRs), intoxications	4
9. Pharmacological interactions	2
10. Control investigations, pharmaco-vigilance	4
ll. Psychopharmacological agents (general)	**6**
1. Definition, classification	1
2. Overview of the history of psychotropic substances	2
3. Pharmaco-epidemiology (pharmaceutical agent usage statistics)	2

4. Significance of and attitude to psychopharmacological agents	1
lll. Special psychopharmacotherapy	**52**
1. Antidepressants • Definition • Classification • Pharmacology and biochemistry • Indications • Course and duration of therapy, withdrawal syndromes, resistance to therapy • Side effects and contraindications, interactions • Differential indications • Specific agents • Guidelines	12
2. Mood stabilizers • Definition • Classification • Pharmacology and biochemistry • Indications • Course and duration of therapy, withdrawal syndromes, resistance to therapy • Side effects and contraindications, interactions • Differential indications • Specific agents • Guidelines	**6**
3. Antipsychotics/Neuroleptics • Definition • Classification • Pharmacology and biochemistry	**8**

• Indications • Course and duration of therapy, withdrawal syndromes, resistance to therapy • Side effects and contraindications, interactions • Differential indications • Specific agents • Guidelines	
4. Tranquilizers/Anxiolytics • Definition • Classification • Pharmacology and biochemistry • Indications • Course and duration of therapy, withdrawal syndromes, resistance to therapy • Side effects and contraindications, interactions • Differential indications • Specific agents • Guidelines	**6**
5. Hypnotics • Definition • Classification • Pharmacology and biochemistry • Indications • Course and duration of therapy, withdrawal syndromes, resistance to therapy • Side effects and contraindications, interactions • Differential indications • Specific agents • Guidelines	**4**
6. Anti-dementia medications	**6**

• Definition • Classification • Pharmacology and biochemistry • Indications • Course and duration of therapy, withdrawal syndromes • Side effects and contraindications, interactions • Differential indications • Specific agents • Guidelines	
7. Psychostimulants • Definition • Classification • Pharmacology and biochemistry • Indications • Course and duration of therapy, withdrawal syndromes • Side effects and contraindications, interactions • Differential indications • Specific agents • Guidelines	**4**
8. Agents for treatment of withdrawal and dependency • Definition • Classification • Pharmacology and biochemistry • Indications • Course and duration of therapy, withdrawal syndromes • Side effects and contraindications, interactions • Differential indications	**4**

• Specific agents • Guidelines	
9. Miscellaneous psychopharmacological agents • Agents for treatment of sexual disorders • Anti-Parkinsonian agents • Anti-epileptic agents	**2**
IV. Implementation of psychopharmacotherapy	**20**
1. Combination therapies	2
2. Substance abuse, dependency, withdrawal syndromes	2
3. Procedures for switching between pharmacological agents	1
4. Effects of psychopharmacological agents upon general safety and driving ability	1
5. Psychopharmacological agents during pregnancy and nursing Gender-related aspects	2
6. Psychopharmacotherapy in aged patients	2
7. Psychopharmacological agents in child and adolescent psychiatry	3
8. Trans-cultural aspects (therapy in migrants)	1
9. Ethical and legal aspects (patient rights, informed consent, off-label prescribing, legal responsibility, prescribing guidelines)	2
10. Combined pharmaco- and psychotherapy	4
V. Applied psychopharmacotherapy	**44**
1. Therapy of acute and chronic organic disorders (delirium, dementia)	4

2. Therapy of schizophrenic psychoses and psychotic disorders	4
3. Therapy of depressive disorders	6
4. Therapy of bipolar affective disorders	4
5. Therapy of anxiety and panic disorders	4
6. Therapy of compulsive disorders	1
7. Therapy of neurotic, stress-related, and somatoform disorders	2
8. Therapy of eating and sleep disorders, and of disorders of sexual function	2
9. Therapy of chronic pain syndromes	1
10. Therapy of personality and conduct disorders	2
11. Pharmacotherapy in patients with intellectual deficits	1
12. Psychopharmacotherapy of ADHD	2
13. Psychopharmacotherapy in patients with tic and other motor disorders	1
14. Therapy of withdrawal syndromes and addiction disorders, substitution therapies	2
15. Emergency psychiatric therapy (agitated states, acute suicidality, acute anxiety and panic disorder, delirium)	6
16. Pharmaco-economics, cost effectiveness	2
Total	**160**

[1] : Working Group Biological Psychiatry/Science and Research (Head: Gerd Laux) of the Conference of Medical Directors of German Hospitals for Psychiatry and Psychotherapy [Bundesdirektorenkonferenz - BDK] (cf Laux 2014).

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