The Assessment, Determinants & Economics of Medication Compliance & Persistence

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Bangor University, UK
Medication Compliance & Persistence
SIG: Working Group Leaders

Chair:
Dyfrig Hughes

Methods:
Elizabeth Manias

Economics:
Judith Shinogle

Determinants:
Femida Gwadry-Sridhar
## Medication Compliance & Persistence

### SIG: Goals

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<th>Methods &amp; Analyses Standards</th>
<th>Economic Issues</th>
<th>Determinants</th>
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Prospective Assessment of Medication Compliance and Persistence

Dyfrig Hughes PhD
Bangor University, UK

on behalf of ISPOR
Analyses Standards Leadership Group
Overview of current activities of the group: Prospective analyses paper

- Objectives of the paper:
  - To develop recommendations and guidelines for researchers conducting prospective compliance and persistence studies
  - To develop a checklist to act as an aid for evaluating key elements of prospective compliance and persistence studies
Prospective analyses paper

- Study design
  - Experimental
    - Randomization
  - Observational
    - Cohort
    - Case-control
    - Cross-sectional
  - Quasi-experimental
Prospective analyses paper

- Study population
  - Study sample and sampling method
  - Inclusion and exclusion criteria
  - Single site versus multi site sampling
  - Relationship of participants to actual practice
  - Generalizability of sample in relation to target population
Prospective analyses paper

- Enrolment
  - Process of recruitment and enrolment of participants
  - Verification of eligibility criteria
  - Process for sequence generation
  - Blinding
  - Standard procedure for data collection
Prospective analyses paper

- Intervention
  - Detailed description of the intervention including usual care.
  - How, when and by whom was it administered
  - Duration and frequency of intervention
  - IRB/Ethics Committee approval
  - Informed consent
  - Single or multi component intervention
  - Baseline and follow-up periods
  - Outcomes assessment schedule
Prospective analyses paper

- Measures of compliance
  - Self reports (e.g. Morisky Scale)
  - Clinical assessment
  - Pill count
  - Administrative pharmacy refill data
  - Biological markers
  - Electronic monitoring system (e.g. Medication Event Monitoring System (MEMS))
  - A combination of measures is advisable
Prospective analyses paper

- Quality of data
  - Prospective checklist of how to quantify the quality of a study
  - Number of elements relating to the method used for a particular research design and a total score assigned
Prospective analyses paper

- Analysis
  - Statistical methods to be used to examine primary outcomes and methods for additional analyses (e.g., subgroup)
  - Analyses for multiple types of interventions
  - Intention to treat analysis
  - Loss to follow-up
  - Sample size and power estimates
  - Addressing potential biases
Overview of current activities of the group: Distributional properties of compliance measures

- Assessment of distributional properties of compliance measures (manuscript in preparation)
  - Details different measures used in assessing compliance and the implications for their use.
  - Addresses some of the variants in the literature about measures used in assessing compliance.
  - Examines how these measures may impact on analyses.
Major achievements to date

- Publication: A Checklist for Medication Compliance and Persistence Studies Using Retrospective Databases.

Future activities

- Possible development of a short course in medication compliance and persistence at a future annual international meeting (in conjunction with Economics of Medication Compliance Working Group)

- Writing of an article for ISPOR Connections covering the work of the SIG as a whole
Working group team members

- Josh Benner, PhD
- Femida Gwadry-Sridhar, PhD, RPh
- Dyfrig Hughes, PhD
- **Elizabeth Manias, PhD, RN, RPh (Chair)**
- Michael Nichol, PhD
- Andrew Peterson, PhD
- Anuja Roy, MS
- Kristina Yu-Isenberg PhD, RPh
- Ying Zhang PhD
The costs of non-compliance

Rachel Elliott PhD
University of Nottingham, UK

on behalf of ISPOR
Economics of compliance & persistence working group
In search of evidence on the cost of non-compliance...

- In the USA:
  - Non-compliance with just 10 drugs cost the USA between $396 and $792 million each year¹
  - Total cost estimated as $100bn annually²

- These are dated, not evidence-based, not useful

What are the costs of non-compliance and non-persistence in osteoporosis, diabetes, hypertension, cardiovascular events, infectious diseases, asthma, rheumatoid arthritis, hypercholesterolaemia and schizophrenia?

Financial costs incurred by health care systems / payers on a population basis. i.e. direct medical costs, not personal out-of-pocket costs, or indirect costs.
Methodology - databases

- Medline
- EMBASE
- Cochrane Library
- Cumulative Index to Nursing and Allied Health Literature (CINAHL)
Methodology – search terms

- Costs
- Compliance
- Disease
Results – diabetes mellitus

- 50 abstracts were reviewed to select 10 cohort studies that fulfilled the inclusion criteria
- Most studies used medication possession ratio (MPR) as measure of compliance
- Mean non-compliance was 30%
- The rate of hospitalization increased to 10.3% when MPR was lower than 80%
- Rate of hospitalization increased to 15% when MPR was <40%
Continued..

- Non-compliance of 25%, 5% to 25%, and <5% was associated with total health care costs of US $5,706, $5,314 and $4,835, respectively.
- 10% relative increase in antidiabetic MPR was associated with 9%-29% reduction in annual health care costs.
- Patients with the highest persistence had annual pharmacy costs that were $300 higher per patient but this was offset by a $600 per patient savings on inpatient care.
Results – osteoporosis

- 52 papers were identified; 4 were relevant for inclusion
- 2 articles were retrospective cohort studies, and two were based on budget impact models
- MPR and/or persistence rates used as measures
- Medications include bisphosphonates and HRT
Medical charges were 35% higher in non-compliers compared with compliers.
Total monthly charges were 76% higher.
Based on modelling, persistence <50% at 12 months, extrapolated to 5 years results in £22m per annum fracture-related costs.
Conclusions

- Medication non-compliance and failure to persist with chronic treatments has substantial economic consequences.
- Increased non-compliance and non-persistence are associated with higher health care resource utilization and costs.
- Almost 20,000 excess fractures estimated over 10 years in the UK.
Major achievements to date

- Hughes DA, Cowell W, Koncz T, Cramer J. Methods for considering medication compliance and persistence in pharmaco-economic evaluations. Value in Health (Published online: 22-May-2007)

- Elliott RA, Shinogle JA, Peele P, Bhosle M, Hughes DA. Understanding medication non-compliance from an economics perspective. Value in Health 2008 (forthcoming)
Future activities

- Informing policy makers
- Potential data analysis, appropriate data collections for economic compliance
- Concordance
Working group team members

- Monali Bhosle
- Warren Cowell
- Joyce Cramer
- Rachel Elliott
- Dyfrig Hughes
- Tamas Koncz
- Maximilian Lebmeier
- Pamela Peele
- Maria Pisu
- Maribel Salas
- Judith Shinogle (chair)
Determinants of Compliance & Persistence

Femida Gwadry-Sridhar PhD
University of Western Ontario & McMaster University, Canada

Chair of ISPOR
Determinants of Compliance & Persistence Working Group
Working group team members

- Femida Gwadry-Sridhar (Chair)
- Maribel Salas
- Lincy Lal
- Anuja Roy
- Elizabeth Manias
- Joanne LaFleur
- Veronica Decker
- Sangeeta Budhia
- John Zeber
- Dyfrig Hughes
- Judy Shinogle
- Jasmanda Wu
- Monali Bhosle
Major achievements to date

- Systematic review
- Interventions from our papers
- Used commercial software
# MeSH terms for Review

<table>
<thead>
<tr>
<th>Patient compliance</th>
<th>Intervention</th>
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<tr>
<td><strong>MeSH headings:</strong></td>
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<tr>
<td>- patient compliance</td>
<td>- case management</td>
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<tr>
<td>- treatment refusal</td>
<td>- counseling</td>
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<tr>
<td>- patient dropouts</td>
<td>- disease management</td>
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<td>- health fairs</td>
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<td></td>
<td>- health promotion</td>
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<td></td>
<td>- family therapy</td>
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<td></td>
<td>- patient education</td>
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<tr>
<td></td>
<td>- reminder systems</td>
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<tr>
<td>- adherence (title and abstract)</td>
<td>- behaviour</td>
</tr>
<tr>
<td>- persistence (title and abstract)</td>
<td>- communication</td>
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<tr>
<td></td>
<td>- intervention</td>
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Problems

- Measurement of compliance (heterogeneous)
- Definition of interventions
Future activities

- Publication with osteoporosis, hypertension, acute respiratory disease, dyslipidemia
Hypothesized Conceptual Model
A Revised Pictorial Representation of how Variables may be Associated with Compliance

Demographics
- Age
- Gender
- Ethnicity

Family history of:
- Hypertension
- Co-morbidities
- Educational attainment
- Co-morbid disease

Measured Risk Factors
Behavioural
- obesity (body fat %)
- smoking status
- alcohol

Self Efficacy
- physical activity
- eating (diet)

Support from friends and relatives

HRQoL
- Depression

Therapeutic Alliance

Patient values and preferences

Perceived access to healthful food and physical activity facilities, costs

Key:
- Moderators
- Mediators

Compliance Outcomes
- Medication (CMA/SSAI)
- Adherence to diet
  - Dash
  - Low sodium
  - Mediterranean diet
- Adherence to daily moderate physical activity
  - 30 – 45 minutes of moderate intensity activity, 3 – 5 times per week

Systolic BP level
Determinants Framework
A pictorial representation of how variables are related

1. Depression
   - Social Support
   - Functional Support
   - Health Related Quality of Life
   - Compliance
   - Self Esteem

2. ?
   - Socio-Demographic
     - age
     - sex
     - race
     - education
   - Compliance
Determinants Framework
A pictorial representation of how variables are related

3.

Number of medications
Co-morbid disease
Co-payment (cost)
(Is this direct or are these mediators)

Compliance

4.

Self-efficacy

Diet
Increased Physical Activity
Compliance
Determinants Framework
A pictorial representation of how variables are related

5.

Smoke
Alcohol Use

Self-efficacy
(diet, physical activity)

Compliance

6.

Therapeutic Alliance

Medication
Lifestyle counseling

Compliance
Call for volunteers

- LEADERSHIP GROUP: the small group of SIG members who develop the SIG initiatives through actively participating in a Working Group

- REVIEW GROUP: the large group of SIG members who respond to / comment on 'work products' produced by the Leadership Working Group members

* You may belong to several review groups
Sign up..

- Please contact:
  Dyfrig Hughes, SIG Chair
  d.a.hughes@bangor.ac.uk

- Sue Capon, ISPOR Liaison
  scapon@ispor.org

- SIGN-UP SHEET with handout of slides
ISPOR MEDICATION COMPLIANCE AND PERSISTENCE SPECIAL INTEREST GROUP (MCP)

Chair:
Dyfrig Hughes PhD, MRPharmS, Senior Research Fellow in Pharmacoeconomics & Deputy Director, Centre for Economics and Policy in Health, University of Wales

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- Objectives

- Working Groups
  - Analyses Standards Working Group
  - Economics Of Medication Compliance Working Group
  - Determinants of Compliance & Persistence Working Group