Feline Quality of Life

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Agenda

• The importance of measurement
• What is quality of life?
• The challenges
• Producing a scientifically robust instrument
• Examples
“I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind”

PLA, vol. 1, Electrical Units of Measurement, 1883

Measurement is the key to understanding
‘…people with chronic pain reported that most if not all aspects of their lives are significantly affected by chronic pain, particularly enjoyment of life in general, emotional well-being, fatigue, weakness, and sleep-related problems…’


Measuring QOL has become a major focus in the measurement of chronic pain in people
‘Quality of life is the subjective evaluation by the individual of its circumstances and the extent to which these meet its expectations, which results in an affective (emotional) response to those circumstances’

Wiseman-Orr et al., 2004

Health – related quality of life (HRQL) is concerned with those aspects of QOL that change as a result of ill health and the treatment of disease.

‘There is no fundamental difference between man and the higher animals in their mental faculties .... animals, like man, manifestly feel pleasure and pain, happiness, and misery’

Darwin
Non – verbal behaviour is a form of self-report
Anand & Craig, 1996

Owner reported behavioural changes associated with chronic and painful orthopaedic conditions in dogs & cats
Owner reported behavioural changes associated with chronic and painful orthopaedic conditions in dogs

<table>
<thead>
<tr>
<th>&gt; 50% of dog owners</th>
<th>&gt; 30%</th>
<th>&lt; 25%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
<td>Restlessness</td>
<td>Activity pattern *</td>
</tr>
<tr>
<td>Mobility</td>
<td>Sociability non family</td>
<td>Compulsive behaviour</td>
</tr>
<tr>
<td>Agility</td>
<td>Animal interactions</td>
<td>Night-time sleeping *</td>
</tr>
<tr>
<td>Daytime sleeping/rest</td>
<td>Attention seeking</td>
<td>Scent marking</td>
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<tr>
<td>Attitude/demeanor</td>
<td>Curiosity</td>
<td>Grooming *</td>
</tr>
<tr>
<td>Stamina</td>
<td>Aggression</td>
<td></td>
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<tr>
<td>Progressive change</td>
<td>Anxiety/fearfulness</td>
<td>Weight change</td>
</tr>
<tr>
<td>Playfulness</td>
<td>Obedience</td>
<td>Specific toileting</td>
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<tr>
<td>Pain vocalising</td>
<td>Excitability</td>
<td>Interest in food/appetite</td>
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<tr>
<td>Facial expression</td>
<td>Appetite</td>
<td>Purring/unusual vocalisation</td>
</tr>
<tr>
<td>Consistency</td>
<td>Clinginess</td>
<td></td>
</tr>
<tr>
<td>Sociability family members</td>
<td>Keeness to exercise</td>
<td></td>
</tr>
<tr>
<td>Posture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drinking</td>
<td></td>
<td></td>
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</tbody>
</table>

* Some changes indicated may have been influenced by pain, medication, or other factors.
FDA Guidance of Industry: Patient Reported Outcome Measures - on the subject of non-verbal populations

‘We discourage *proxy-reported outcome* measures for this population (i.e., reports by someone who is not the patient responding as if that person were the patient). For patients who cannot respond for themselves (e.g., infant patients), we encourage observer reports that include only those events or behaviors that can be observed’
Whenever we ask a question we risk a biased response

- Try to choose the ‘right’ answer
  - Please the vet
  - Minimises guilt
  - Fear of vet suggesting euthanasia over treatment
  - Excuse for euthanasia

Minimise respondent bias
Scientifically robust measurement scales – key properties

1. Validity:

• Content
  Items cover all aspects
  Established through methodology
  Assessed by experts

• Criterion
  Comparison with ‘gold standard’

• Construct - Series of tests
  Factor analysis – statistical analysis – groups related items – domains/factors - factor structure
  Formulate & test hypotheses relating to the construct – ‘known groups’
2. **Reliability**: ability of a scale to give repeatable results
   Inter-observer, intra-observer (test - retest)

3. **Responsiveness**: ability to measure change when change occurs

*Health care - ability of a scale to measure a clinically significant change over time*

Interpretable
Psychometric approach to instrument design

Phase 1
Identify pool of items (questions) from respondents

Phase 2
a) Select suitable items
b) Expert validation
c) Incorporate items into instrument
   layout, response options, instructions, delivery

Phase 3
a) Determine scoring system
b) Field test to evaluate psychometric properties
   validity, reliability & responsiveness


Measuring health – related quality of life

HRQL instruments

• Structured questionnaires for owner completion with formal scoring methodology
  • Single item score
  • Profile of scores
• Generic
• Disease-specific
Generic
Measure the impact of anything that affects QOL
• Chronic pain
• Chronic disease
• Lifestyle
• Wide application
• Only option if more than one condition exists

Disease – specific
• Restricted application
• More sensitive?

40/41 cats had 1-7 co-morbidities
Disease specific HRQL tools


Rush et al., Cardiac disease. J Vet Cardiol. 2015; 17(1): S341-8

Noli et al., skin disease Vet Dermatology 2016; 27: 247-258


Lynch et al., Cancer. Vet Comp Oncol. 2011; 9(3): 172-82


## Generic HRQL instruments for the cat

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Items</th>
<th>Domains</th>
<th>Validation</th>
<th>Key informants</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat HEalth &amp; Wellbeing (CHEW)</td>
<td>33</td>
<td>8 – mobility, emotion, energy, engagement, eyes, coat, appetite and fitness</td>
<td>Not in sick cats</td>
<td>Owners whose cats were healthy according to them</td>
<td>Freeman et al., Journal of Feline Medicine and Surgery 18, 689–701.</td>
</tr>
<tr>
<td>Feline QOL Tool</td>
<td>16</td>
<td>2 – healthy behaviours &amp; clinical signs</td>
<td>Not in sick cats</td>
<td>Owners whose cats were healthy according to them</td>
<td>Tatlock et al., The Veterinary Journal. 2017 Oct 1;228:22-32.</td>
</tr>
<tr>
<td>General Health QOL Measure</td>
<td>16</td>
<td>4 - general health, eating, behavior and management</td>
<td>Cats with CKD only</td>
<td>Owners of young cats that were healthy according to the owner &amp; vet assessment for old healthy cats</td>
<td>Bijsmans et al., Vet Intern Med 2016;30:183–191</td>
</tr>
</tbody>
</table>
Measures on a continuum

Functional limitation

Holistic - measures how the animal feels
So how do we measure an animal’s feelings?

Quality of Life

Causal variables
- Environment
- Nutrition
- Social relationships
- Health status

Indicator variables
- Happy or Depressed
- Doing the things it normally does
- Active or lethargic
- Playful or stiff
• Generic HRQL instrument delivered online – computer, tablet or phone
• Structured questionnaire completed by the owner in ~ 5min
• 20 questions for the owner
• Owner scores each question on a 0 – 6 scale
• Instantaneous computation of a profile of scores in Vitality, Comfort and EWB
• Instantaneous reporting to the vet (and owner)
• Measures emotional as well as physical health
Host server
- Automatically generates profile of scores via established algorithm

Pet owner
- Completes questionnaire for pet on-line

Owner output
- Automatic generation of e-mail
- Login details
- Secure password

Logs Pet owner into system
- Owner demographic details
- Pet details
- Frequency of questionnaires (e-mail reminders)

Vet in practice
- Comfort
- Emotional wellbeing

R & D database
- https://vimeo.com/257478523
VETMETRICA Assessment for fluffy

Please tell us how well this word describes fluffy as he is today: Active (Word definition)

6 - Couldn't be more active
5
4
3
2
1
0 - Not at all active

Continue
So does it possess the key properties? Is it Valid, Reliable, and Responsive to clinical change?
• Plots of scores for three domains of HRQL in 36 healthy cats and 58 sick cats

• Vitality, comfort and emotional wellbeing

Cats that are healthy will have higher HRQL scores than those that are sick
The HRQL profile of cats will decrease as the number of co-morbidities increase.

The Pearson Correlation coefficients were -0.64, -0.63 and -0.50 for Vitality, comfort and EWB respectively.
Reliability – Intra-rater – test retest

• 48 owners of healthy cats
• 2 assessments 14 days apart
• Intra class correlation (ICC)
  • Vitality 0.64
  • Comfort 0.72
  • EWB 0.85
Interpretability

Cat with a common chronic condition undergoing treatment

- 0 – 6 transformed to 0 – 100
- 50 = average healthy cat.
- 44.8 is the threshold above which 70% of healthy cats will score
Minimum Important Difference (MID)

...... the smallest difference in score in the domain of interest which patients perceive as beneficial and which would mandate, in the absence of troublesome side effects and excessive cost, a change in the patient’s management

MID
Vitality = 5
Comfort = 7.5
EWB = 5
Minimum Important Difference

MID
Vitality = 5
Comfort = 7.5
EWB = 5
Responsiveness

- 21 obese cats on a weight loss programme
- 5 assessments
- Clinically significant improvement
- in all 3 domains over time
Build a body of evidence supporting its validity in a variety of populations and circumstances.

Cats with mild OA will have higher HRQL scores than those with moderate/severe disease.
Applications in practice

- Routine monitoring of health status
  - Allows continuous assessment over time
  - Measures health improvement or decline
  - Alerts - early warning system
  - Gives owner confidence between visits
  - Makes the owner a partner in their cat’s healthcare

- Clinical monitoring
  - Efficacy of treatment
  - Obesity, OA, CKD

- Identification of humane endpoints
End of life decision making

18 year old female neutered Bengal cat with osteoarthritis and hyperthyroidism

FIGURE 5 | HRQL scores in Vitality, Comfort and Emotional Well-being for an 18 year old female neutered Bengal cat with osteoarthritis and hyperthyroidism. A score of 50 is the average healthy cat score and 70% of healthy cats will score above the 44.8 threshold.
Thank you ……..

Andrea Nolan
Marian Scott
Lesley Wiseman – Orr
Cory Noble

All vets & owners who have contributed to the development of the VetMetrica HRQL instrument

Dr Barr Hadar, Ontario Veterinary College, University of Guelph
Feeling no pain!