Collecting clinical experience of homeopathic support in COVID-19, newsletter 15

Bayesian analysis of symptoms, 14th issue

LMHI newsletter 10 August 2020

The previous newsletter was about cut-off values that influence the importance of a symptom, and hence LR: a higher cut-off value makes a symptom more significant, with lower prevalence and higher LR. A higher cut-off value is correlated to a greater intensity of the symptom. If the cut-off value is so low that almost everybody displays that symptom, it cannot differentiate between medicines and is therefore useless. In research we should apply the same cut-off values as we do in daily practice.

We have now released the second version of our min-repertory for COVID-19 app, where two medicines have been added: *Phosphorus (phos)* and *Pulsatilla (puls).* The addition of these two less frequently used medicines shows the real strength of a Bayesian repertory. This app can be found at the internet address:

https://hpra.co.uk/

With the app, the homeopathic practitioner can gain a first impression of the applicability of the five most frequently used medicines in this pandemic, based on frequently occurring symptoms. The underlying likelihood ratio (LR) values of the symptoms in the app are shown in this newsletter.

Second version of the app with five medicines

A new disease offers the opportunity to make new repertory-rubrics with state-of-the-art methods. We can now try to avoid long-standing problems such as the unknown quality and quantity of the underlying observations. Whilst we are now aware of the issue of underlying quality, we still have to improve this by analysing the quality of our own data. To date, we have discarded about one third of the incoming data before using these for LR calculations, but the criteria for discarding cases still require further development.

The most important advancement is that we now have quantitative data and we can calculate the *relative* occurrence of symptoms, whilst hitherto, repertory entries were based on *absolute* occurrence. Having added two less frequently prescribed medicines, we can see what this means in Table 1. The symptom 'Cough' occurred in 33 *Arsenicum (ars)* patients, 77 *Bryonia (bry)* patients, 23 *Gelsemium (gels)* patients, and in only 14 *phos* and 9 *puls* patients. However, looking at the percentages gives us an entirely different picture: the prevalence of the symptom 'Cough' is much higher in the *phos* population (77.8%) than in the *ars* population (38.4%), while the absolute numbers imply the opposite.

According to the traditional method of assembling a repertory, the rubric 'COUGH – In COVID-19 patients' would show *ars* in bold type and *phos* in italics, or, possibly, both medicines in bold type, because cough is repeatedly seen in patients who respond well to both medicines. The first option – noting more *ars* patients with cough than *phos* patients - would result in misleading entries; the second option – noting where the symptom is repeatedly seen – would result in useless entries.

Table 1: Absolute occurrence and prevalence (%) of symptoms in the whole COVID-19 population (column 'all') and in populations responding to five homeopathic medicines.

Symptoms	all	ars		bry		gels		phos		puls	
n=	%	86	%	115	%	51	%	18	%	19	%
cough	53.4%	33	38.4%	77	67.0%	23	45.1%	14	77.8%	9	47.4%
fatigue	50.5%	50	58.1%	50	43.5%	43	84.3%	10	55.6%	3	15.8%
fever	37.7%	31	36.0%	41	35.7%	26	51.0%	10	55.6%	8	42.1%
muscle/bone pain	34.9%	32	37.2%	48	41.7%	19	37.3%	3	16.7%	3	15.8%
headache	33.9%	21	24.4%	50	43.5%	25	49.0%	5	27.8%	6	31.6%
throat pain	32.7%	31	36.0%	45	39.1%	13	25.5%	2	11.1%	5	26.3%

Table 1 additionally shows the prevalence of the symptom in the whole population, such as cough in 53.4%. With this, we can see that the prevalence of cough in the population responding to *bry* (67.0%) and *phos* (77.8%) is above average, whilst for *ars* (38.4%)*, gels* (45.1%) and *puls* (47.4%) it is below average. Our homeopathic intuition would be that cough indicates *phos* and *bry*, but is a relative contra-indication in this disease for *ars, gels* and *puls*. This is exactly what Bayes' theorem tells us: posterior odds = LR x prior odds. The likelihood ratio, LR = ((prevalence in medicine population) / (prevalence in remainder of the population)), indicates whether the prevalence is higher or lower than in the average population by values greater or lesser than one respectively.

The next logical step is to use LRs in the modern repertory-rubric 'COUGH – In COVID-19 patients'. This Bayesian repertory-rubric is not only independent of the frequency of use of medicines but can also differentiate between medicines using only common symptoms, these being the two most important advantages of the Bayesian method.

Our mini-repertory contains only five out the 50 medicines which were used in this population of 416 patients. However, there is a steep decline in the usefulness of adding more medicines, see Figure 1. The three most used medicines were prescribed to 252 out of 416 patients (60.6%), the five most used medicines in 69.5%. Adding a sixth medicine could help another 3.4%, but the reliability of this addition is low because the numbers are small. We are now able to help nearly 70% of all patients, based on high quality data. When more patient records have been gathered we may be able to add more medicines.

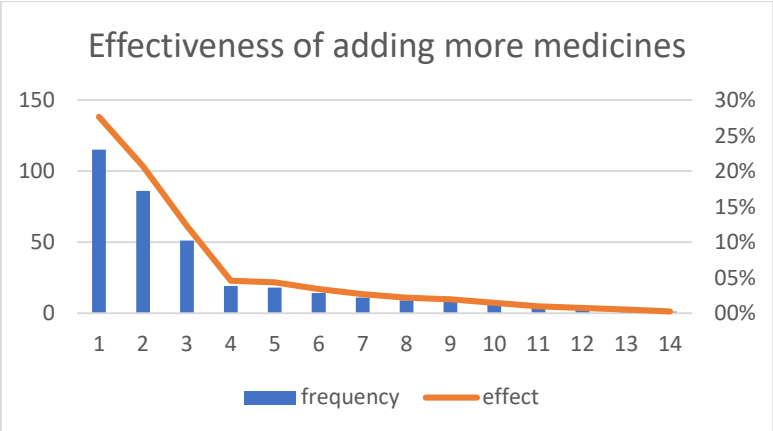

Figure 1; Absolute number (left vertical axis) and frequency (right vertical axis) of use of medicines.

Relevance to daily practice

Experienced homeopathic practitioners question the importance of the repertory in daily practice, because homeopathy should not become a cookbook method. They are right about this, but part of their objection derives from the low reliability of the present repertory, especially the representation of common symptoms in larger rubrics. This problem is solved using the Bayesian repertory.

The COVID-19 illness presents many different facets in different patients, it is not a disease with a single *genus epidemicus*. Would it not be interesting for an experienced practitioner to know that if cough is predominant in the case, *bry* and *phos* are more indicated than *ars, gels* or *puls*? This symptom is present in about half of his patients. Fatigue on the other hand – also present in half of the cases – is more indicative of *ars* and especially *gels*. He can be pretty sure about this because it is confirmed by the experience of many colleagues and this knowledge would not have been available without this data collection. Table 2 shows the mini-repertory underlying the app.

Table 2: Mini-repertory for COVID-19 symptoms

Symptoms	LRars	LRbry	LRgels	LRphos	LRpuls
fatigue	1.20	0.82	1.84	1.11	0.30
dry cough	0.73	1.70	0.82	1.20	0.49
productive cough	0.96	0.57	0.70	2.76	2.61
dyspnoea	0.49	1.15	0.81	2.24	0.22
headache	0.67	1.44	1.54	0.81	0.93
fever	0.94	0.93	1.42	1.50	1.12
chill	0.59	0.65	4.14	0.76	0.97
perspiration	0.70	1.16	2.15	1.84	1.74
diarrhoea	1.42	0.82	1.04	2.33	0.34
throat pain	1.13	1.29	0.76	0.33	0.80
muscle/bone pain	1.09	1.30	1.08	0.47	0.44
anxiety/fear	2.44	0.40	1.10	1.58	0.97
loss of taste and/or smell	0.66	0.96	0.27	1.44	2.58
thirst	1.61	2.38	0.21	0.88	0.41
thirstless	0.30	0.54	4.13	1.75	2.90
nausea	1.83	0.76	1.06	0.74	1.44
back pain	0.20	3.20	0.38	2.46	1.00
abdominal pain	0.89	1.19	1.02	1.47	2.98
chest pain < cough	0.21	2.91	2.56	2.60	1.00
> open air	0.30	1.45	0.55	1.00	1.61
restless	5.00	0.65	1.00	1.00	1.00
desire cold drinks	1.00	1.64	0.60	6.63	1.00

We hope that even experienced homeopathic practitioners can set their emotions about statistics aside and try the app to see what it does. They will see that it provides information which has never been available to them before. It also reflects their own experience if they have contributed to the database.

The database offers yet more information, such as symptoms which can be used for confirmation following the recommendation of the app, such as:

- *Arsenicum*: sleeplessness; desire for warm drinks; fear of death
- *Bryonia:* thirst for large quantities; cough < talking; cough < deep inspiration; desire for rest; motion aggravates
- *Gelsemium*: involuntary urination from cough; heavy eyelids – cannot keep eyes open; chilly back; headache > profuse urination
- *Phosphorus*: gasping for air; chest discomfort; fear of being alone
- *Pulsatilla*: loss of appetite; wants to be held; bitter taste

Of course, homeopathic practitioners have their own experience of confirming specific homeopathic medicines, but the above symptoms represent the combined experience of many doctors.

App as an ambassador for homeopathy

Probably the most unfortunate people in this pandemic are the elderly living in nursing homes. Homeopathic practitioners could reach out to doctors working in these homes by inviting them to try the app with their residents to select those most eligible for homeopathic treatment. Then the homeopaths could complete the homeopathic anamnesis for these patients and instruct the doctors at the nursing homes how to administer the medicine.

Recapping requisites for case descriptions

We recap the minimum necessary data for this project. We already had:

- Severity of COVID-19 illness: Mild – Moderate – Severe – critical
- Is COVID-19 confirmed?
- Medicine, with date of first intake
- Number of hours until onset of improvement and/or until absence of fever
- If possible at least 3-5 symptoms that were characteristic for the case
- Pneumonia on X-ray or CAT

Also check:

- Number of days between first symptoms and a deterioration of condition
- Prostration/exhaustion; where is the weakness seated
- Fear/anxiety
- Confusion
- Restlessness
- Fever, chill, or chill alternating with fever
- Thirst/thirstless
- Pain; where
- Cough, dry or productive
- Dyspnoea
- Throat pain
- Loss of taste and/or smell

- Diarrhoea

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Appendix

Table 3: Mini-repertory of COVID symptoms based on 276 records (20 July 2020), after removing questionable records

Symptoms	Count	LRars	LRbry	LRgels
n=	276			
fatigue	154	1.26	0.75	1.68
cough	144	0.70	1.24	0.89
dry cough	122	0.80	1.38	0.93
fever	109	0.98	1.05	1.06
muscle/bone pain	103	1.48	1.19	0.64
headache	99	0.70	1.44	1.48
throat pain	84	1.45	0.99	0.90
dyspnoea	76	0.40	1.00	0.78
chill	73	0.65	0.93	3.07
chest discomfort	68	0.62	0.95	0.89
anxiety/fear	65	3.51	0.42	0.32
dry mouth/throat	53	0.48	0.86	0.13
loss of taste and/or smell	53	1.66	0.77	1.01
diarrhoea	52	2.06	1.93	0.41
thirst	50	2.39	2.07	0.28
thirstless	29	0.17	0.69	3.51
chest pain	29	0.53	1.61	0.77
heat body	27	2.73	0.92	0.26
loss of appetite	23	3.56		1.00
nausea	21	1.09	0.44	0.33
back pain	20	2.49	0.88	1.18
chest pain < cough	19	0.26	3.62	
productive cough	18	0.27	3.29	2.56
taste altered	17	1.43	2.34	0.42
heaviness eyelids	15		0.96	10.00
cough < talking	14	0.00	0.44	86.67
> open air	14	0.77	1.97	
chill back	14	0.77	1.05	1.11
perspiration	13	0.39	1.64	0.56
desire cold drinks	13		1.64	0.56
thirst large quantities	12		28.95	
taste bitter	11	1.74	0.58	0.67
> lying	11	1.74	1.50	0.67
cough < deep respiration	11	0.46	4.61	0.67
desire warm drinks	11	1.03	7.02	
sleeplessness	10	10.81	0.66	
restless	10	1.99	0.66	0.74