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Homeopathic

APPLICATION OF BAYESIAN THEOREM IN VALIDATION OF RUBRICS FROM KENT'S REPERTORY

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ABSTRACT The reliability issues in the grading system of Kents repertory may be overcome by implementing the Bayesian statistical approach to calculate the likelihood ratio (LR) with 95% confidence interval (CI) and probability. Hence the values obtained for 7 analysed rubrics from a retrospective study were compared with the already set cut off values for validation. Prevalence of a symptom within the targeted population was (1.5 – 32.4%) and the rubrics size varying from 60- 226 in the Kent's repertory. Out of the 85 relevant outcomes obtained, 5.9% results showed probable occurrence with the existing entries while 30.6 % suggested the downgrading of the existing typeface. 63.5% results are still doubtful out of which 26% entries are likely to be weak indications for Roman typeface (LR>1, p>0.70) and 5.6% medicines which otherwise doubtful are present in the population (symptom present with cured medicine) but absent in the repertory.

INTRODUCTION

Repertories are indeed an impressive work as they are an index to Materia Medica with the symptoms converted in the form of rubrics. One such generally accepted and clinically used repertory in Homoeopathy is Kent's Repertory which contains hundreds of medicines under each rubric.[1]The importance of a symptom for the Homeopathic prescription according to the idea of repertorisation is expressed via its grading.[2] Grades are determined by the clinical evaluation of proving symptoms which is based solely on absolute occurrence rather than relative occurrence. Also, grades of rubrics merely show the frequency of symptoms in the proving remedy and not the important symptoms for that medicine. Herein lay the serious flaws of this repertory. To justify the reliability of the Repertory, a statistical approach through Baye's theorem has been taken based on theoretical data.[3,4]

In the year 1763, a new philosophy emerged which gave a different aspect to the statistical science. It deals mainly with the predictions from the past experiences and is named as Baye's philosophy.[5]It state that the chances of success of a medicine increase if a symptom is frequently present in the patients who were improved with that medicine as compared to remaining patients.[6] Likelihood Ratio is the mathematical illustration of Baye's philosophy and is formulated on conditional probability rules.[7,8]

LR values are measured with the use of prior and posterior chances of remedy effects for a particular symptom. LR is the frequency (occurrence) of a symptom within the population "cured" (progressed) by using a certain medicinal drug divided by using frequency of the identical symptom within the rest of the whole target population.[9] Therefore, it does no longer count if the medication is seldom or often prescribed. Another advantage of LR is that it gives a reform representation of regularly used medicines in huge rubrics. Within the existing repertory, there are numerous misguided entries of large remedies in many rubrics.[1]This retrospective study helps to validate the symptom by the Bayesian approach and all the values of LR were represented within their confidence intervals. LR values with their cutoff values

area better presentation for validating the existing repertory. To improvise the errors, representation within the form of LR was valuable.

MATERIALS AND METHOD
Study design and setting

Ethical committee approval was taken before starting our study. This study was done in Bharati Vidyapeeth Homoeopathic Hospital, Pune. The cases were collected from the Out Patient Department records from 2014 –2018. An observational retrospective study on 820 registered cases of different physicians was done to assess the patient's outcome response for the purpose of rubric validation.

Selection of Rubrics

LR values were derived to evaluate the rubrics present in Kent's Repertory. The symptoms which were commonly seen in the patients were assessed to arrive at the final selection of seven rubrics. They were ANGER, ANXIETY, THIRST, THIRSTLESS, SLEEPLESSNESS, HEARTBURN and SLEEPLESSNESS, thoughts activity of mind, from.
In this study, three-cut-off values were considered for each symptom. These were
0 = absent,   1 = moderate,   2 = strong

As a general principle, we assessed the symptom intensity for selecting the grades given above. These were
- Grade 2 (strong) - Those symptoms which were spontaneously mentioned
- Grade 1 (mild) – Those symptoms with less intensity
- Grade 0 (absent) – If a specific symptom is absent.

The presence of selected symptoms in the study should have an estimated prevalence > 1% in the population.

Data collection tool

Both acute and chronic cases of both sexes within the age group of 18 – 65 years with a single remedy prescription were included in the study. The last follow up recorded was assessed in acute cases. Chronic cases with a minimum of 2 follow-ups were taken for the study and the last follow up was

taken for assessment. All the cases were already repertorised with the help of Kent repertory available in RADAR 10 software.[10]

The demographic data such as race, gender, and age were recorded separately. The diagnoses were coded by using the international description of diseases. The treatment and the outcome of the cases were assessed by using 2 scales namely, ORIDL scale[12] and –1 to +5 scale.[11] Out of the 9 points mentioned in the ORIDL scale, only 3(0, 2,4) were used. Out of 5 points mentioned in the –1 to +5 scale, only 3 (0, 4, 5) were used. All data were directly recorded into Microsoft excel sheets.

Methodology
Only 15 remedies which were commonly prescribed in the selected cases were considered for validating the seven symptoms. Since each case had to be arranged in 2×2 configuration for finding the values of LR + and LR-, a 2 × 2 configuring table was constructed incorporating the following
a. The number of patients improved with the presence of certain types of symptoms by taking the medicine.
b. Rest of the population not responding even after taking the medicine and still present with the certain type of symptom
c. Number of patients still improved even with the absence of that symptom after taking medicine.
d. Rest of the population not responding even after taking medicine and without that symptom.

The value of LR obtained was further used for comparing the existed typefaces. Cutoff values for LR were as follows-
For Roman - $2.9 \geq LR \geq 1.5$
For Italic - $5.9 \geq LR \geq 3.0$
For Bold - $LR \geq 6.0$

If the LR obtained is according to the cut off values, then the probability that the remedies will work for that symptom increases.LR+ > 1 is better to include and LR- < 1 is better to exclude.[9]If the LR lies between 1-1.5, then those entries were considered as doubtful. The LR values for all the medicines were represented within their 95% CI and the p-value. For adding or discarding the entries, the following criterion was used –
For adding – p-value should be more than 0.70
For discarding – p-value should be less than 0.40[8]

Statistical techniques & Data analysis
The data was evaluated and analyzed using Microsoft's Excel® program. Graph pad prism 8.0.2 version was used for calculating Mean and Standard Deviation. LR+, LR- and CI of LR+ were measured by the Vassar Stats Statistical site (http://vassarstats.net/). For calculation of p-value, the exact

Binominal approximation of normal curve (two-tailed) was used if - (Number of patients improved by the medicine) × (expected prevalence of symptom) > 5. For a symptom with a specific medicine population the prevalence is calculated as a/ (a + c), a = symptom present with improved by medicine c = symptom absent with improved by medicine and also area under the curve by using Stata 15.

RESULTS
At the end of the study, 820 cases were included; 485 (59.1%) female and 335 (40.9%) male. The mean age was 31.46, standard deviation 11.99, range 18-65. The most prevalent age group is 18-27year. Various diseases pertaining to different systems were involved but 60.4% cases with ailment of GIT, 64.6% with ailment of respiratory, 60,9% with reproductive, 75% with visual, and above 50% with ailments of MS, CNS, Excretory were recorded with good response to the treatment given. In 820 cases, only 15 prescribed medicines were included for 55.6% with good response.

Anger
"Anger" was defined as "A strong feeling of displeasure".137 medicines are present in the rubric "Anger" in Kent's repertory. From the 14 selected medicines, Lach, Puls, Sil, are in roman, *Bell, Calc, Phos, Rhus-T* are in Italic and the remaining 7 are in Bold. The LR assessment exhibits 266 (prevalence 32.4%) patients present with this symptom. the result showed in the Table1.

In our assessment 2 remedies, *Bell* (p=0.674) and *NuxVom* (p=0.677) cross the minimum cutoff value for LR (≥1.5) but both the remedies did not cross the cutoff for *p*-value (>0.70). If the value of LR for the medicine is significant then the lower limit for 95% CI (more than 1) is considered. As per the assessment, only *NuxVom* can be entered in Roman which is otherwise present in the Bold typeface an existing repertory.

Bry (p=0.659), *Calc* (p=0.670), *Phos* (p=0.666), *Rhus T* (p=0.654), *Sil* (p=0.660) are possibly discarded from the repertory because of probability are <0.0001 shown in Table 1. But the chance for LR of the medicines >1.5 for these remedies are >65% to enter the rubric in Roman. Whereas 8 remedies *Bell* (p=0.674), *Lach* (p=0.671), *Lyc* (p=0.668), *Nat Mur* (p=0.670), *Puls* (p=0.670), *Sep* (p=0.672),*Staph* (p=0.674), *Sulph* (p=0.668)) are LR >1 and *p* value is not >0.70 and even does not match the discarded cutoff value <0.40 so it is still in doubtful entries but chance for these remedies are >66% for Roman rubric.

The results obtained for this rubric differs from the existing typefaces in Kent's repertory. *NuxVom* was downgraded, 13 medicines were still in doubtful.

Table 1
Assessment of "Anger" Rubric in each medicine population with its Prevalence 32.4%, N= 266

Medicine	a	b	c	d	Expected prevalence	LR+	LR-	CI for LR+	p - value
Belladonna	12	254	13	541	97.2	1.50	0.76	0.99-2.29	0.007
Bryonia	9	257	23	531	100	0.86	1.07	0.49-1.51	<0.001
Calcarea Carb	3	263	8	546	97.2	0.84	1.08	0.32-2.21	<0.001
Lachesis	7	259	11	543	48.6	1.20	0.90	0.67-2.17	0.65
Lycopodium	18	248	24	530	100	1.34	0.84	0.93-1.93	<0.001
Nat Mur	25	241	30	524	100	1.44	0.79	1.06-1.96	<0.001
NuxVom	31	235	30	524	100	1.64	0.71	1.25-2.15	<0.001
Phosphorus	7	259	15	539	97.2	0.98	1.01	0.53-1.82	<0.001
Pulsatilla	25	241	30	524	48.6	1.44	0.80	1.06-1.96	0.37
RhusToxicodendron	4	262	22	532	97.2	0.47	1.26	0.19-1.15	<0.001
Sepia	17	249	20	534	100	1.44	0.79	1.00-2.08	<0.001
Silicea	4	262	17	537	48.6	0.58	1.20	0.24-1.41	0.005
Staphysagria	7	259	8	546	100	1.45	0.79	0.84-2.51	<0.001
Sulphur	15	251	21	533	100	1.30	0.86	0.87-1.94	<0.001

a. The number of patients improved with the presence of a certain type of symptom by taking medicine.
b. Rest of the population not responding after taking the medicine but still present with the certain type of symptom
c. Number of patients still improved with the absence of symptoms by taking medicine.
d. Rest of the population not responding after taking medicine and without the symptom.

Anxiety

"Anxiety" is defined as "A feeling of apprehension about something with an uncertain outcome". 201medicines are present in the rubric "Anxiety "in Kent's repertory. From the 14 selected medicines, 6medicines, *Lach, Nat Mur, NuxVom, Sep, Sil, Sulph* are in italic and the remaining 8 remedies are in Bold type. The LR assessment exhibit127 (prevalence15.5 %) patients present with this symptom. The result is shown in Table2.

In 95% CI, 8 had been (LR >1.5 and p >0.70, matching with the cutoff value to be kept in Roman), *Bell*(p=0.829), *Bry* (p=0.826), *Calc*(p=0.839), *Lyc* (p=0.826), *Nat Mur* (p=0.817),

Phos (p=0.830), *Puls* (p=0.810), *Sil* (p=0.839) downgraded to roman.LR ranging from 1.58 (95% CI, 0.77-3.23) to 2.56(95%CI 1.45- 4.52) and p-value ranging from 0.810-0.839.

p-value indicate the chance that LRs of the medicine are >1.5 for *Lach* 83% (p=0.833), *NuxVom* 80% (p=0.798), *Rhus T* 82% (p=0.821), *Sep* 82% (p=0.82), *Staph* 83% (p=0.834), *Sulph* 81% (p=0.806). There is more than 80% chance to enter the rubric in Roman but LR value does not stand by the minimum cutoff value whereas the LR values for *Lach* (1.45), *Sep* (1.42), *Staph* (1.30) *NuxVom* (1.18) are >1 and also p>0.70 so there is a chance that Anxiety is a weak indication for *Lach, Sep, Staph , NuxVom*.

All the medicines with the rubric "Anxiety" are commonly present in the population. The results obtained for this rubric differs from the existing typefaces in Kent's repertory.8 medicines from 14 were downgraded and none were discarded whereas 6 were still doubtful. The result obtained suggests that the LR value for smaller rubric like sleeplessness thought activity of mind from is much better and preferable than a larger rubric.

Table 2
Assessment of "Anxiety" Rubric in each medicine population with its Prevalence 15.5%, N= 127

Medicine	a	b	c	d	Expected prevalence	LR+	LR-	CI for LR+	p - value
Belladonna	6	121	19	674	93	1.58	0.90	0.77-3.23	<0.001
Bryonia	8	119	24	669	93	1.66	0.88	0.89-3.09	<0.001
Calcarea Carb	3	124	8	685	93	1.78	0.86	0.67-4.73	<0.001
Lachesis	4	123	14	679	46.5	1.45	0.92	0.60-3.49	0.031
Lycopodium	13	114	29	664	93	2.11	0.81	1.30-3.42	<0.001
Nat Mur	16	111	39	654	46.5	2.00	0.83	1.28-3.14	0.006
NuxVom	11	116	50	643	46.5	1.18	0.97	0.67-2.07	<0.001
Phosphorus	7	120	15	678	93	2.12	0.80	1.12-3.99	<0.001
Pulsatilla	13	114	42	651	93	1.59	0.90	0.96-2.63	<0.001
RhusToxicodendron	3	124	23	670	93	0.74	1.05	0.25-2.17	<0.001
Sepia	8	119	29	664	46.5	1.42	0.92	0.75-2.69	0.001
Silicea	8	119	13	680	46.5	2.56	0.73	1.45-4.52	0.29
Staphysagria	3	124	12	681	46.5	1.30	0.95	0.47-3.62	0.03
Sulphur	2	125	34	659	93	0.35	1.12	0.09-1.35	<0.001

Expected prevalence: prevalence concerning entries existing in Kent's repertory, p-Value: the chance that existing entries are correct.

Thirst

Thirst" and Thirstless were considered based on a)More /less/absent/unquenchable, b)Quantity Large/small, c)Frequency – Long intervals/ short intervals, d)Nature of drink- Cold/ice cold/ warm, e)Any concomitant and any other peculiarity".211medicines are present in the rubric "Thirst" in Kent's repertory. From the 14 selected medicines, 3 medicines, *Bell, Lach, NuxVom*, are in italic,4 medicines, Lyco, Puls, Sep, Staph is in Roman and the remaining 7 remedies are in Bold type The LR assessment exhibit219 (prevalence26.7%) patients present with this symptom. The result is shown in Table3.

In 95% CI, *Calc* (LR-3.15, p= 0.741) had (LR >3 and p>0.70, matching with the cutoff value to be kept in italic) downgraded

to italic. 4 had *Bry* (p=0.740), *Nat Mur* (p=0.724), *Rhus T* (p=0.730), *Sulph* (p=0.726) are downgraded to roman. LR, ranging from 1.60 (95% CI, 1.07-2.40) to 2.34 (95%CI 1.71- 3.19) and p-value ranging from 0.724-0.740.

p-value indicate the chance that LRs of the medicine are >1.5 for *Bell* 72% (p=0.720), *Lach* 72% (p=0.723),*Lyc* 71% (p=0.709), *NuxVom* (p=0.695), *Phos* 72% (p=0.723), *Puls* 67% (p=0.673), *Sep* 70% (p= 0.700), *Sil* 73% (p=0.727), *Staph* 73% (p=0.726). There are more than 67% chance to enter the rubric in Roman but LR value does not stand by the minimum cutoff value whereas the LR values for *Sil* (1.44), *Phos* (1.20), *Bell* (1.05), *Lach* (1.04) is >1 and also p >0.70 so there is a chance that Thirst is a weak indication for *Sil, Phos, Bell, Lach*.

The results obtained for this rubric differs from the existing typefaces in Kent's repertory. 5 medicines from 14 were downgraded and none were discarded whereas 9 were still in doubtful.

Table 3
Assessment of "Thirst" Rubric in each medicine population with its Prevalence, 26.7%, N= 219

Medicine	a	b	c	d	Expected prevalence	LR+	LR-	CI for LR+	p-value
Belladonna	7	212	18	583	80.1	1.05	0.98	0.55-1.99	<0.001
Bryonia	19	200	13	588	100	2.34	0.54	1.71-3.19	<0.001
Calcarea Carb	9	210	2	599	100	3.15	0.25	2.33-4.26	<0.001
Lachesis	5	214	13	588	80.1	1.04	0.99	0.49-2.21	<0.001
Lycopodium	11	208	31	570	40.05	0.98	1.01	0.58-1.65	0.039
Nat Mur	24	195	31	570	100	1.71	0.76	1.24-2.37	<0.001

NuxVom	15	204	46	555	80.1	0.91	1.03	0.58-1.44	<0.001
Phosphorus	7	212	15	586	100	1.20	0.93	0.64-2.23	<0.001
Pulsatilla	3	216	52	549	40.05	0.19	1.32	0.06-0.58	<0.001
RhusToxicodendron	12	207	14	587	100	1.77	0.73	1.15-2.73	<0.001
Sepia	5	214	32	569	40.05	0.49	1.19	0.22-1.13	<0.001
Silicea	8	211	13	588	100	1.44	0.84	0.83-2.52	<0.001
Staphysagria	2	217	13	588	40.05	0.49	1.19	0.14-1.81	0.248
Sulphur	15	204	21	580	100	1.60	0.79	1.07-2.40	<0.001

Thirstless

As mentioned previously in Thirst about the consideration. 87medicines are present in the rubric "Thirstless" in Kent's repertory. From the 14 selected medicines, 4 medicines, *Bell, Lyc, Sep, Staph* are in italic,4 medicines Bry, Nat Mur, Phos, Sulph are in Roman, 2 remedies **Nux Vom and Puls** are in Bold type, remaining 4 are not mentioned. The LR assessment exhibit 169 (prevalence20.6%) patients present with this symptom. The result is shown in Table 4.

In 95% CI, *Puls* (LR-3.63, p>0.70,) had (LR >3 and p>0.70, matching with the cutoff value to be kept in italic) downgraded to italic. 2 had *Bell* (LR- 1.58, p=0.783), *Lyc* (LR- 1.80, p=0.779) are downgraded to roman.

p-value indicate the chance that LRs of the medicine are >1.5

for *Bry* 77% (p=0.770), *Lach* 78% (p=0.779), *Nat Mur* 75% (p=0.746), *NuxVom* 74% (p=0.744), *Phos* 78% (p=0.777), *Sep* 78% (p= 0.776), *Sil* 78% (p=0.776), *Staph* 78% (p= 0.780), *Sulph* 77% (p= 0.765).*Lach* and *Sil* are not present in Kent repertory but 78% of both remedies and remaining are more than 70% chance to enter the rubric in Roman but LR value does not stand by the minimum cutoff value whereas the LR values for *Sep* (1.47) and p value 0.776 is >1 and also p >0.70 so there is a chance that Thirstless is a weak indication for *Sep*.

The results obtained for this rubric differs from the existing typefaces in Kent's repertory. 3 medicines from 14 were downgraded and none were discarded whereas 9 were still doubtful.

Table 4
Assessment of "Thirstless" Rubric in each medicine population with its Prevalence 20.6%, N= 169

Medicine	a	b	c	d	Expected prevalence	LR+	LR-	CI for LR+	p - value
Belladonna	8	161	17	634	61.8	1.58	0.85	0.88-2.84	0.0006
Bryonia	6	163	26	625	30.9	0.91	1.02	0.44-1.89	0.093
Lachesis	3	166	15	636	-	0.81	1.05	0.28-2.28	
Lycopodium	15	154	27	624	61.8	1.80	0.80	1.17-2.77	0.0005
Nat Mur	8	161	47	604	30.9	0.7	1.08	0.36-1.33	0.004
NuxVom	10	159	51	600	100	0.78	1.06	0.44-1.40	<0.001
Phosphorus	4	165	18	633	30.9	0.88	1.03	0.36-2.16	0.143
Pulsatilla	35	134	20	631	100	3.63	0.44	2.82-4.67	<0.001
Sepia	11	158	26	625	61.8	1.47	0.88	0.88-2.46	<0.001
Silicea	3	166	18	633	-	0.69	1.08	0.24-1.98	
Staphysagria	2	167	13	638	61.8	0.64	1.09	0.18-2.35	<0.001
Sulphur	6	163	30	621	30.9	0.80	1.05	0.38-1.69	0.042

Sleeplessness:

Sleep" rubric was considered based on a)Time of falling as sleep, b)Time of waking up, c) Nature of sleep- Catnap/ Deep sleep/ dreaming sleep/sound sleep, d)Position in sleep- right/ left/ on abdomen/ on back/ hand on head, e)Modalities, f) Sleeplessness – causation/lifestyle /Age. 226 medicines are present in the rubric "Sleeplessness" in Kent's repertory. From the 14 selected medicines, 2 medicines, *Lyco, Nat Mur* are in italic and remaining are in Bold type. The LR assessment exhibit 49 (prevalence 6.0%) patients present with this symptom. The result is shown in Table5.

In 95% CI, 5 had (LR >1.5 and p>0.70, matching with the cutoff value to be kept in Roman) *Lach* (p=0.923), *Lyc* (p=0.899), *NuxVom* (p=0.885), *Phos* (p=0.918), *Staph* (p=0.927) are downgraded to roman. LR ranging from 1.54 (95% CI, 0.40-5.96) to 2.43 (95%CI 1.19- 4.94) and p-value ranging from

0.885-0.927.

p-value indicate the chance that LRs of the medicine are >1.5 for *Bell* 92% (p=0.915), *Bry* 90% (p=0.904), *Nat Mur* 88% (p=0.883), *Puls* 88% (p=0.878), *Sep*90% (p=0.898), *Sulph* 90% (p=0.904). There is more than 85% chance to enter the rubric in Roman but LR value does not stand by the minimum cutoff value whereas the LR values for *Sulph* (1.42), *Bell*(1.35), *Nat Mur*(1.24) are>1 and also p >0.70 so there is a chance that Sleeplessness is a weak indication for *Sulph, Bell, Nat Mur*.

The results obtained for this rubric differs from the existing typefaces in the Kent's repertory. 5 medicines from 14 were downgraded, none were discarded whereas 6 are still doubtful and the remaining 3 were not present in cured population with this rubric.

Table 5
Assessment of "Sleeplessness" Rubric in each medicine population with its Prevalence 6.0%, N=49

Medicine	a	b	c	d	Expected prevalence	LR+	LR-	CI for LR+	p-value
Belladonna	2	47	23	748	36	1.35	0.98	0.35-5.26	0.0015
Bryonia	1	48	31	740	36	0.51	1.03	0.07-3.60	<0.001
Lachesis	2	47	16	755	36	1.90	0.94	0.50-7.21	0.041
Lycopodium	4	45	38	733	18	1.65	0.96	0.62-4.36	0.103
Nat Mur	4	45	51	720	18	1.24	0.99	0.46-3.31	0.0065
NuxVom	8	41	53	718	36	2.43	0.92	1.19-4.94	<0.001
Phosphorus	2	47	20	751	36	1.54	0.97	0.40-5.96	0.0047
Pulsatilla	2	47	53	718	36	0.59	1.03	0.15-2.37	<0.001

Sepia	1	48	36	735	36	0.44	1.04	0.06-3.11	<0.001
Staphysagria	2	47	13	758	36	2.28	0.92	0.61-8.55	0.052
Sulphur	3	46	33	738	36	1.42	0.97	0.46-4.35	<0.001

Heartburn

"Heartburn" defined as "A feeling of burning springing up from stomach or the epigastric region to the neck". 118 medicines are present in the rubric "Heartburn" in Kent's repertory. From the 14 selected medicines, 4 medicines **Calc, Lyc, NuxVom, Puls** are in Bold, Bell is in Roman, Rhus T is not present in this rubric and the remaining 8 remedies are in italic typeface. The LR assessment exhibit 90 (prevalence 11 %) patients present with this symptom. The result is shown in Table 6.

In 95% CI, *NuxVom* (LR-6.54, *p*=0.891) was (LR >6 and *p*>0.70, matching with the cutoff value to be kept in **Roman**) in Bold typeface alike the existing entry. *Lyc* (LR-1.81, *p*=0.833) could be (LR >1.5 and *p*>0.70, matching with the cutoff value to be kept in Roman) downgraded to Roman.

p-value indicate the chance that LRs of the medicine are >1.5

for *Bell* 87% (*p*=0.865), *Bry* 86% (*p*=0.861), *Calc* 88% (*p*=0.879), *Lach* 87% (*p*=0.871), *Nat Mur* 83% (*p*=0.833), *Phos* 87% (*p*=0.868), *Puls* 83% (*p*=0.828), *Rhus T* 86% (*p*=0.861), *Sep* 85% (*p*=0.850), *Sil* 87% (*p*=0.870), *Sulph* 86% (*p*= 0.856). *Rhus T* is not present in Kent repertory but 86% and remaining are more than 80% chance to enter the rubric in Roman but LR value does not stand by the minimum cutoff whereas the LR values for *Bry* (1.15), *Sulph* (1.01) is >1 and also *p* >0.70 so there is a chance that Heartburn is a weak indication for *Bry*, *Sulph*.

The results obtained for this rubric *NuxVom* are alike as Kent's repertory and the remaining were different from the existing typefaces in Kent's repertory. *Lyc* is downgraded and none were discarded whereas 11 are still doubtful. *Staph* is not present in the cured population with this rubric.

Table 6
Assessment of "Heartburn' 'Rubric in each medicine population with its Prevalence 11%, N= 90

Medicine	a	b	c	d	Expected prevalence	LR+	LR-	CI for LR+	p-value
Belladonna	2	88	23	707	16.5	0.72	1.03	0.19-2.77	0.194
Bryonia	4	86	28	702	33	1.15	0.98	0.45-2.93	0.007
Calcarea Carb	1	89	10	720	66	0.83	1.02	0.13-5.41	<0.001
Lachesis	1	89	17	713	33	0.50	1.06	0.07-3.40	0.77
Lycopodium	8	82	34	696	66	1.81	0.90	0.94-3.48	<0.001
Nat Mur	4	86	51	679	33	0.65	1.04	0.25-1.70	<0.001
NuxVom	31	59	30	700	66	6.54	0.53	4.62-9.26	0.010
Phosphorus	2	88	20	710	33	0.82	1.02	0.22-3.14	0.010
Pulsatilla	2	88	53	677	66	0.32	1.09	0.08-1.25	<0.001
RhusToxicodendron	1	89	25	705	-	0.34	1.08	0.05-2.37	
Sepia	2	88	35	695	33	0.48	1.07	0.12-1.88	<0.001
Silicea	2	88	19	711	33	0.86	1.02	0.23-3.28	0.013
Sulphur	4	86	32	698	33	1.01	1.00	0.39-2.61	0.0024

Sleeplessness thought activity of mind from:

As mentioned previously in about the consideration. 60 medicines are present in the rubric "Sleeplessness thought activity of mind from" in Kent's repertory. From the 14 selected medicines, 3 medicines **Calc, NuxVom, Puls** are in Bold, Bell is in Roman, Nat Mur, Phos, Rhus T is not present in this rubric and the remaining 7 remedies are in italic typeface. The LR assessment exhibit 12 (prevalence 1.5 %) patients present with this symptom. The result is shown in Table 7.

Before we enter the medicine within the rubric there is a need for at least 2.25% (=1.5 × 1.5%) prevalence. for adding entries in italic and Bold, the minimum prevalence should be 4.5%

(=3 × 1.5%), and 9.0% (=6×1.5%) for later.

The entries is *NuxVom* (LR=8.89, *p*=0.923), *Bell* (LR=2.89, *p*=0.957) and *Lach* (LR=4.05, *p*=0.949), *Staph* (LR-4.88, *p*=0.970) are alike as Kent's repertory entry. 3 medicines *Bry* (*p*=0.949), *Lyc* (*p*=0.937), *Sep* (*p*=0.943) are downgraded to Roman.

The result obtained 3 out of 7 results were different from the existing Kent's repertory and the remaining 4 medicines for these rubrics were alike as Kent's repertory. 4 medicines were absent in the population.

Table 7
Assessment of "Sleeplessness, thought activity of mind, from" Rubric in each medicine population with its Prevalence 1.5%, N= 12

Medicine	a	b	c	d	Expected prevalence	LR+	LR-	CI for LR+	p-value
Belladonna	1	11	24	784	2.25	2.89	0.97	0.39-21.5	0.891
Bryonia	1	11	31	777	4.5	2.24	0.98	0.30-17	0.574
Lachesis	1	11	17	791	4.5	4.05	0.96	0.55-30	0.806
Lycopodium	1	11	41	767	4.5	1.68	0.99	0.22-13	0.430
NuxVom	5	7	56	752	9	8.89	0.93	2.91-27	0.526
Sepia	1	11	36	772	4.5	1.92	0.99	0.26-15	0.499
Staphysagria	1	11	14	794	4.5	4.88	0.95	0.67-35	0.855

DISCUSSION

In this study, the author validates the entries of the Kent's repertory with the help of statistical methods. The entry criterion method in Kent's repertory is not fundamentally correct as it is based on the absolute occurrence rather than the relative occurrence. All typeface entries were done as per the frequency of the symptoms present for that remedy during drug proving instead of the importance of medicine for that rubric. Hence consideration of the symptom intensity with the effect of medicine has to be taken into account. For this, a retrospective study was done and Baye's theorem was applied for finding the LR value with 95% CI and *p*-value.

Out of 98 procured results, 85 medicines were present in the population responding well to the medicines with the presence of the symptom while 13 were absent in the same population. Out of these 13, there were 8 such medicines for the rubrics Sleeplessness, Heartburn, Sleeplessness, thought activity of mind, from which present in the repertory but absent in the population whereas 5 medicines for the rubrics Thirstless, Sleeplessness, thought activity of mind, from were neither present in the cured population nor were present in the repertory.

Out of 85 results yielded from this study after analysis, 5.9% of results showed probable occurrence with the existing entries in the repertory while 30.6% were suggestive of downgrading the existing typeface. 63.5% of those were still doubtful among which 26% entries were likely to be a weak indication for Roman typeface (LR >1, p >0.70) and 5.6% medicines which otherwise doubtful were present in the population (symptom present with cured medicine) but absent in the repertory. Few new medicines can be added with these rubrics when the target population is large.

Our main aim was to assess the large rubrics with the commonly prescribed medicine of the Kent's repertory for validation. For Anger- *Nux Vom*, for Anxiety – *Bell, Bry, Calc, Lyc, Nat Mur, Phos, Puls, Sil* for Thirst – *Bry, Calc, Nat Mur, Rhus t, Sulph*, for Thirstless –*Bell, Lyco, Puls*, for Sleeplessness –*Lach, Lyco, NuxVom, Phos, Staph*, for Heartburn- *Lyco, NuxVom* and for "Sleeplessness, thought activity of mind, from"- *Bell, Bry, Lach, Lyco, NuxVom, Sep, Staph*, qualified the minimum cutoff value for adding the rubric (LR $\geq$1.5, $p \geq$ 0.70). Most of the remedies did not qualify the actual cutoff value for typeface, Only *NuxVom* (6.54) for Bold in Heartburn rubric and *Bell* (2.89) for Roman, *Lach* (4.05), *Staph* (4.88) for italic, *NuxVom* (8.89) for Bold in "Sleeplessness, thought activity of mind, from". Comparatively better result was attained in "Sleeplessness, thought activity of mind from" than the other 6 rubrics. On the other hand, rubric Anger yielded more defects. Much divergence was present in the prevalence of the symptom, like "Anger" 32.4% and "Sleeplessness, thought activity of mind, from"1.5% hence For better assessment, prevalence of a symptoms shouldn't be less than 1% and should not be more than 27% as LR values obtained in these case were not greater than 2, even if the patients related to the relevant medicine population had those symptoms.

The threshold value for LR> 4 or 5 could also be used for the bold typeface or LR> 1.3 for plain type.[8] Hence many medicines of anger and anxiety, Thirst (*Sil*), Thirstless (*Sep*), and Sleeplessness (*Bell* and *Sulph*) can be entered in Roman typeface. In this study, after assessing the LR+ value with 95% CI and probability, none of the medicine qualified the cutoff value for discarding entries. In adding the new entries like *Sil* (p=0.776) for Thirstless and *Rhus T* (p=0.861) for heartburn even these LR+ were insufficient but chances to enter the Roman typeface were above 75%. In the assessed population, 8 medicines were absent in few rubrics which were otherwise present in Kent's repertory and these can probably be discarded.

This kind of retrospective evaluation for the symptom prevalence and LR values (cases improved with the presence of symptom) is indeed a better means for future prospective studies.

The Repertory could be improved gradually if the results obtained from LR research are documented excellently. Our medicine validation indicates the most important symptoms with their prevalence in the population with a good response to the treatment. To make the repertory reliable, wider application of Bayesian Statistics should be done to enter or discard the medicines, ensuring that the previous entries are handled carefully without disregarding the important information.

CONCLUSION
LR value with 95% CI and *p*-value help add and discard the entries Hence LR assessment was done on frequently prescribed medicines for symptom-rubrics. It was observed that various entries in Kent's repertory were incorrect in the form of typefaces, especially for larger rubrics. The present entries in the repertory were not sufficient enough to match with the LR values obtained but the expected prevalence of each remedy for rubric validation and the outcome obtained through a retrospective study was not sufficient. Hence the results cannot be generalized. This can be overcome by conducting a prospective study in a large sample with proper recording of the case information.

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