Asthmatic patients treated with mepolizumab report stronger positive emotions than mepolizumab-naïve asthmatic patients

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BACKGROUND & OBJECTIVE

In asthma, the prevalence of depression is at least twice as much and anxiety is 3-10 times that of the general population. These psychological comorbidities might impair asthma self-management, treatment adherence and lead to worse patient outcomes and quality of life. Anxiety might induce asthma-like symptoms leading to overuse of medication and health care. Some depressive and anxiety symptoms overlap. The effectiveness of therapies to address these psychological comorbidities remain inconclusive[1,2,3].

Anxiety and depression are *mood states* and might be *composites* of a variety of unaddressed long-persisting *discrete emotions*[4,5]: in people with severe asthma, anxiety was associated with fear, hopelessness and anger. Depression was associated with fear, hopelessness, anger and shame. Evidence is emerging of complex biopsychological interactions between inflammation, mood states and feeling discrete emotions[6,7].

The objective of this study (Phase 1 of the **SAMBA** study) was to compare the emotions and mood states of participants with severe asthma treated with mepolizumab* (SAMBA group) with those of mepolizumab-naïve participant with severe and moderate asthma (NMPs).

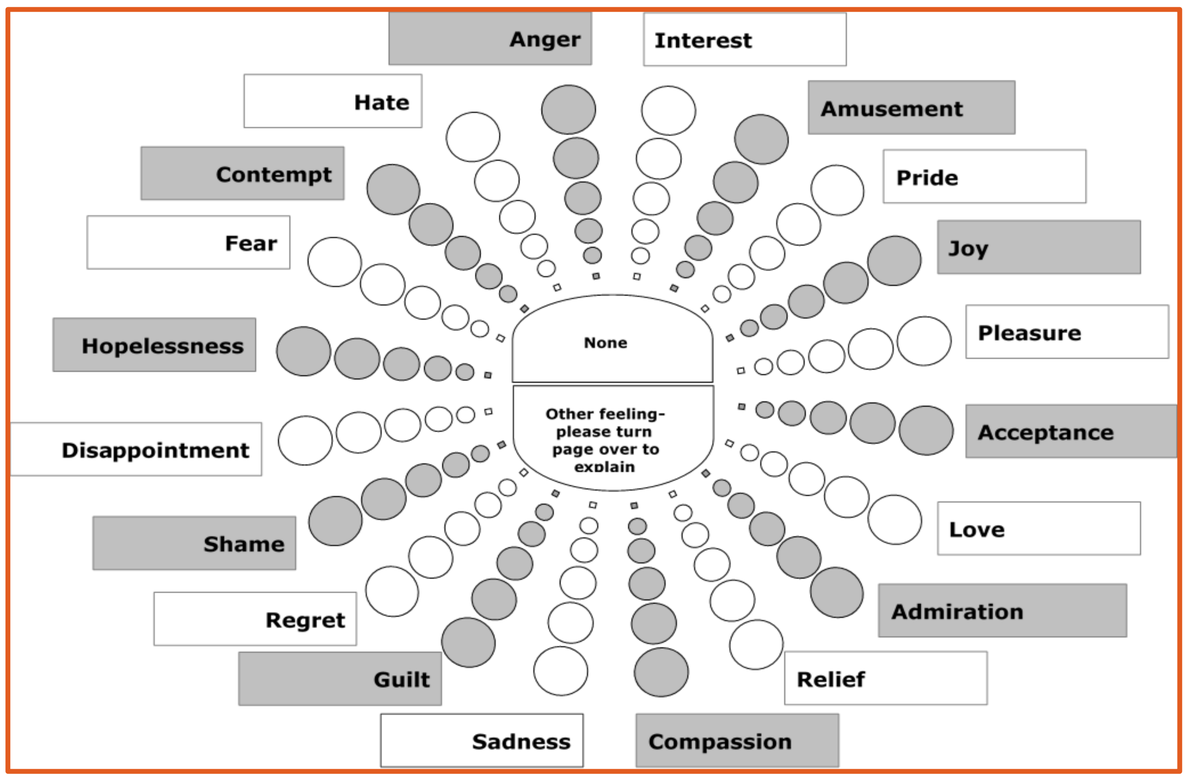
** 100mg injected under the skin once a month*

METHODS

This was a cross-sectional observational study. 30 adult SAMBA participants were recruited from two specialist mepolizumab prescribing centres. Outcomes assessed were:

- ✦ Mood (Hospital Anxiety and Depression Scale scores)
- ✦ Health-related quality of life (St Georges Respiratory Questionnaire composite score)
- ✦ Functioning (St Georges Respiratory Questionnaire sub-scales)
- ✦ Subjective Asthma Control status (6-item Asthma Control Questionnaire)
- ✦ Emotional composition (Geneva Emotion Wheel)

Geneva Emotion Wheel (GEW): *discrete emotions are depicted on the spokes of the wheel. The size of the circles correspond to the intensity of said emotion. Participants were asked to mark the emotions they felt in relation to their asthma by putting a cross in the appropriate intensity circle.*



These data were then compared with data of the same outcome measures obtained in a previous study from two groups of MNPs (participants with analysable data as shown in the result tables). One group was well. The other completed the questionnaires just after they had an asthma exacerbation.' Well' and 'unwell' was defined subjectively by participants themselves. Asthma severity did not make a difference in the above outcomes in this group.

RESULTS

- ✦ The SAMBA group had significantly better health-related quality of life and physical and emotional functioning (St Georges Respiratory Questionnaire: SGRQ) and better subjective asthma control (Asthma Control Questionnaire: ACQ) than unwell MNPs.
- ✦ The SAMBA group had better outcomes than MNPs on all other measures and compared with all groups apart from Hospital Anxiety and Depression Scale (HADS) depression subscale and ACQ in well MNPs that were equal. These differences however were not statistically significant.

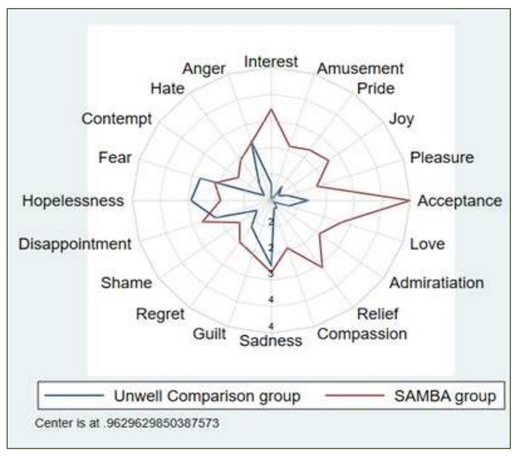
Comparison of clinical outcomes in the mepolizumab-treated (SAMBA) and mepolizumab-naïve study groups

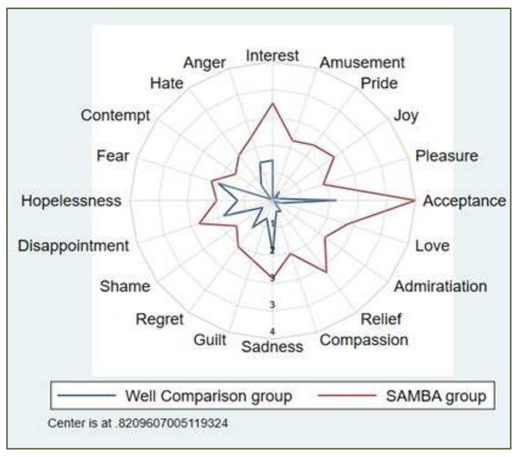
Higher scores indicate worse outcomes on all outcome measures

Outcome	SAMBA group n	SAMBA group Score	Unwell Comparison group n	Unwell Comparison group Score	P-value	Well Comparison group n	Well Comparison group Score	P-value
Health-related Quality of Life								
SGRQ total	29	36 ± 23	47	62 ± 19	**<0.001**	194	44 ± 23	0.11
Functioning								
SGRQ symptoms	30	48 ± 28	51	73 ± 20	**<0.001**	218	56 ± 25	0.08
SGRQ impact	30	27 ± 21	49	54 ± 19	**<0.001**	209	35 ± 22	0.08
SGRQ activity	29	47 ± 30	48	72 ± 25	**<0.001**	207	53 ± 30	0.38
Subjective asthma control								
ACQ	30	1.8 [0.7, 2.7]	52	3.6 [2.8, 4.5]	**<0.001**	227	1.8 [0.8, 2.7]	0.64
Mood								
HADS anxiety	30	7 [3, 9]	55	9 [3, 12]	0.18	230	6 [1, 11]	0.58
HADS depression	30	4 [1, 8]	55	6 [2, 10]	0.06	230	4 [1, 7]	0.98
HADS total	30	11 [5, 17]	55	15 [6, 23]	0.08	230	10 [4, 17]	0.77

Emotions in the SAMBA group in unwell and well comparison groups

The stronger the emotion, the closer it is to the circumference





- ✦ The intensity of discrete emotions were significantly different between the SAMBA participants and either group of MNPs.
- ✦ SAMBA participants felt almost all positive emotions significantly stronger than MNPs.

Intensity of discrete GEW emotions in the SAMBA and comparison groups

Higher scores mean emotion felt stronger

Emotion	SAMBA group n	SAMBA group Mean score ± SD	Unwell Comparison group n	Unwell Comparison group Mean score ± SD	P-value	Well Comparison group n	Well Comparison group Mean score ± SD	P-value
Positive valence								
Interest	30	3.2 ± 1.9	54	1.4 ± 2.0	**<0.001**	229	1.8 ± 2.3	**<0.001**
Amusement	30	2.3 ± 2.0	54	1.0 ± 1.7	**0.002**	229	0.8 ± 1.5	**<0.001**
Pride	30	2.5 ± 2.2	54	1.4 ± 2.0	**0.02**	229	1.1 ± 1.8	**<0.001**
Joy	30	2.6 ± 2.1	54	1.2 ± 1.9	**0.002**	229	0.9 ± 1.7	**<0.001**
Pleasure	30	2.1 ± 2.0	54	1.4 ± 2.0	0.08	229	1.0 ± 1.7	**0.001**
Acceptance	30	4.2 ± 1.6	54	1.8 ± 2.3	**<0.001**	229	2.3 ± 2.4	**<0.001**
Love	30	2.7 ± 2.4	54	1.4 ± 2.1	**0.01**	229	1.0 ± 1.8	**<0.001**
Admiration	30	2.3 ± 1.9	54	1.0 ± 1.7	**<0.001**	229	0.8 ± 1.6	**<0.001**
Relief	30	3.0 ± 2.0	54	1.2 ± 1.9	**<0.001**	229	1.1 ± 1.8	**<0.001**
Compassion	30	2.2 ± 2.0	54	1.2 ± 1.8	**0.01**	229	1.1 ± 1.9	**0.001**
Negative valence								
Sadness	30	2.7 ± 2.0	54	2.5 ± 2.5	0.78	229	2.1 ± 2.3	0.15
Guilt	30	2.3 ± 1.9	54	2.0 ± 2.2	0.25	229	1.3 ± 1.9	**<0.001**
Regret	30	2.2 ± 1.8	54	1.7 ± 1.8	0.15	229	1.6 ± 2.1	**0.04**
Shame	30	1.9 ± 1.7	54	1.4 ± 2.1	**0.03**	229	1.1 ± 1.8	**0.001**
Disappointment	30	2.6 ± 2.1	54	2.3 ± 2.4	0.36	229	2.0 ± 2.3	0.07
Hopelessness	30	2.1 ± 1.9	54	2.8 ± 2.6	0.26	229	1.6 ± 2.1	0.09
Fear	30	2.3 ± 1.7	54	2.7 ± 2.4	0.57	229	2.2 ± 2.3	0.42
Contempt	30	1.9 ± 1.9	54	1.2 ± 1.9	**0.03**	229	0.9 ± 1.5	**<0.001**
Hate	30	2.2 ± 2.1	54	1.4 ± 2.1	0.05	229	1.3 ± 2.0	**0.006**
Anger	30	2.4 ± 2.0	54	2.5 ± 2.0	0.89	229	1.8 ± 2.2	0.10

CONCLUSIONS

- ✦ Individuals living with severe asthma who received mepolizumab treatment had different emotional composition from those severe and moderate asthmatics who were mepolizumab-naive.
- ✦ Individuals on mepolizumab treatment reported significantly stronger positive emotions than participants in mepolizumab-naïve well and unwell comparison groups.
- ✦ Mepolizumab-treated individuals reported better or equal outcomes on all measures compared to mepolizumab-naïve individuals. The difference was statistically significant in health related quality of life, emotional, physical and social functioning and subjective asthma control when compared with non-mepolizumab treated individuals who were unwell.
- ✦ Based on these findings, the next phase of our **SAMBA** study is being conducted to better understand:
  - ✦ the emotional composition and experience associated with psychological comorbidities (mood states) of individuals living with severe asthma
  - ✦ the links between inflammation, emotions and psychological comorbidities (mood states) of individuals living with severe asthma
  - ✦ the links between inflammation, quality of life and psychosocial wellbeing of individuals living with severe asthma

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