Web Appendix A. Extending closed-ended questions related factors with 53 latent topics

Table 1. Normalized effect of factors and 53 latent topics in predicting overall service satisfaction rating (TImp)

Factor	Latent Topic	Effect	Effect (Total)
Communication		0.659	**1.445**
	Topic16. Ineffective Communication of Pregnancy Changes	0.124	
	Topic15. Insufficient Communication Regarding Care	0.162	
	Topic6. Ineffective Staff to Patient Communication	0.201	
	Topic58. Dissatisfactory Communication with Consultant	0.177	
	Topic19. Need Active Listening by Doctors	0.123	
Respect & Dignity		1.000	**1.282**
	Topic50. Insensitivity of Doctors	0.156	
	Topic60. Sensitivity towards Patient	0.126	
Involvement		0.666	**0.933**
	Topic52. Information Support and Individualised Options	0.155	
	Topic29. Respect for Patients Personal Choices	0.111	
Confidence & Trust		0.590	**0.590**
Responsiveness		0.257	**0.449**
	Topic31. More Consideration of Women's Concerns	0.192	
Attention		0.100	**0.441**
	Topic13.Insufficient Checks Pre and Postnatal	0.199	
	Topic25. Post Delivery Mental Health Checks	0.141	
Pain Management		0.142	**0.216**
	Topic26_37_53. Access to Pain Relief	0.074	
Information		0.216	**0.216**
Clarity of Explanation		0.190	**0.190**
Personal Circumstance		0.002	**0.122**
	Topic21. Care Under Exceptional Circumstances	0.120	
Partner Involvement		0.000	**0.111**
	Topic41_47. Partner Participation	0.111	

Additional Insight			5.425
	Topic56. Holistic Care Experience	0.214	
	Topic59. Induced Labour Process	0.183	
	Topic20. Deficit of Hospital Resources	0.182	
	Topic36. Management of Visiting Times	0.181	
	Topic48_62. Need for Staff Empathy	0.180	
	Topic45_55. Integrated GP Care Services	0.179	
	Topic18. Labour Ward Access	0.174	
	Topic17. Ineffective Process Checks	0.174	
	Topic44. Postnatal Care Management	0.170	
	Topic14. Ineffective Post C-Section Care	0.170	
	Topic35. Quality of Food	0.166	
	Topic22_24_65. Positive Care Experience	0.165	
	Topic38. Unsatisfactory Comprehensive Care	0.161	
	Topic43_63. Need for Increased Breastfeeding Support	0.160	
	Topic7. Generally Positive but Capacity Related Concerns	0.159	
	Topic10. Insufficient Ancillary Services	0.158	
	Topic42. Rushed Care Experience	0.157	
	Topic39. Detection and Treatment of Infections	0.156	
	Topic54. Insensitive Accommodation Conditions	0.155	
	Topic49. Staff Attitude	0.154	
	Topic9. Inconsistent Care During Labour Stages	0.147	
	Topic27. Appropriate Washing Facilities	0.144	
	Topic28. Discharge Issues	0.138	
	Topic11. Labour Postnatal Support and Delayed Appointments	0.133	
	Topic4. Postnatal Care Consistency	0.132	
	Topic33. Monitoring of Baby Post Birth	0.130	
	Topic30. Overcapacity in Hospital Ward	0.130	
	Topic46. Patient Check-up Postnatal	0.126	
	Topic40_51_61_64. Consistent Advice	0.126	

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	Topic34. Need for More Prenatal Scanning	0.126	
	Topic57. Overburdened Midwives	0.108	
	Topic32. Need for Appointment Management System	0.099	
	Topic8. Doctors' Pre-visit Preparation	0.097	
	Topic5. Staff Shortages	0.092	
	Topic12. Night-time Care Conditions	0.089	
	Topic2. Unprofessional Nurse Attitude	0.074	
	Topic1. Insufficient Care Capacity	0.071	
	Topic3_23. Appointment Waiting Times	0.066	

As a result of manual assigning 53 latent topics to initial eleven (11) factors related to NMES closed-ended questions, 15 topics were aligned to eight (8) *Refined Factors*. Three out of 11 factors - Clarity of explanation, Confidence & Trust and Information were not aligned with any latent topics (Table 2). The remaining 38 latent topics were considered as an *Additional Insights*. To results of checking the validity of additional predictive power of latent topics in compare to factors related to NMES closed-ended questions, three Random Forest (RF) predictive models with overall maternity service satisfaction rating as a dependent variable were built. The numbers of observations (comments) is D=2470 observations (comments). The performance indicators of the RF model demonstrate a steady increase in the predictive power due to the enrichment of factors related to closed-ended questions by latent topics, and are presented in the Table 2.

Table 2. Checking the predictive power of closed-ended questions and extracted latent topics

Model	**Input parameters**	**MSE**	**R^2**
Model 1	11 initial factors	1.6043	0.5614 [1]
Model 2	8 factors, refined by 15 topics 3 initial factors	1.6009	0.5623
Model 3	8 factors, defined by 15 topics 3 initial factors 38 remaining latent topics	1.5965	0.5628

Figure 1 (i) visualize predictive power of closed-ended questions related factors and latent topics (the size of series) and (ii) demonstrates how the additional insights extracted from free-text feedback can increase the understanding of the core aspects that explain and impact on women's overall care satisfaction. In further analysis we will concentrated only on latent topics.

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[1] *Note that our goal is not to use the RF model for prediction, rather we are interested in estimating the importance of the topics.*
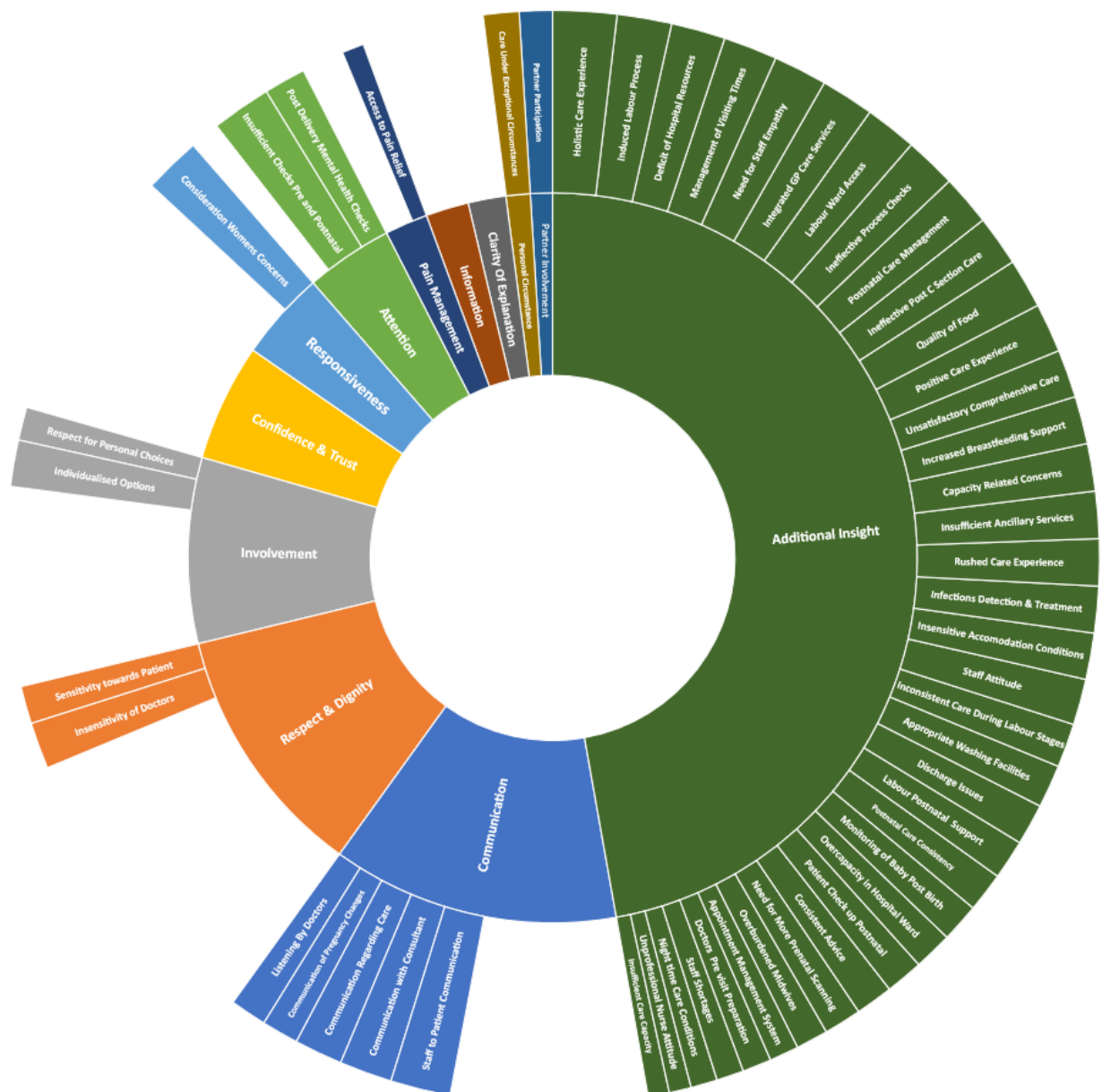
Figure 1. Additional insights from free-text feedback (53 topics)