Appendix A. Comprehensive Knowledge Base

Relationship	Interpretation of the relationship between factors	References
F1-F2	Setting up guidelines and protocols for well-functioning medical equipment to ensure safe and reliable oxygen therapy	(73–75)
F2-F1	Ensuring guidelines and protocols are in place for efficient and reliable performance of well-functioning medical equipment	(74–77)
F1-F5	Setting up guidelines and protocols for efficient use of medical oxygen to minimize wastage and prioritize critical patients	(4,78)
F5-F1	Ensuring guidelines and protocols are in place for the efficient use of medical oxygen to minimize wastage and prioritize critical patients	(4,78)
F9-F1	Leveraging expertise and resources to ensure the highest quality and purity of medical oxygen and medical equipment procured from other countries and international organizations	(4,10,79,80)
F10-F1	Leveraging expertise and resources to ensure the highest quality and purity of medical oxygen and medical equipment procured from private players	(4,10,79,80)
F1-F14	High technical standards essential for patient safety, efficacy, reliability, and standardization of oxygen therapy care	(41,81)
F9-F2	Address the global support for managing shortages in production and availability of medical equipment; international guidelines for usage and maintenance	(4,82,83)
F10-F2	Incentivize private players to address the shortage of medical equipment, improve accessibility and quality, enhance maintenance and repair services	(84,85)
F2-F14	Sufficient availability and proper functioning of medical equipment required for ensuring safe, efficient, and timely access to medical oxygen to patients	(86,87)
F4-F3	Keeping a check of licensing and permits, imports and exports, quality of medical oxygen, pricing, and other aspects to ensure oxygen is available to those in need	(56,69)
F3-F6	Reduce delays, wait times, and disruptions in the supply chain of medical oxygen that is produced	(3,4,57)
F3-F7	Minimize inefficiencies, mismanagement, and disparities in oxygen management by acquiring oxygen supplies when existing capacity is insufficient	(3,4,9)
F11-F3	Accurate and real-time understanding and information about the demand and supply of medical oxygen required and available	(25,88)

F3-F12	Keep a check on existing capacity to plan and prepare for any unforeseen increase in oxygen demand in the future	(77,89,90)
F12-F3	Necessary oxygen supply in place to ensure to meet the steep rise in demand for oxygen therapy during the crises and in future contingencies	(89,101,102)
F4-F11	Information and guidance about the standards for the quality, safety, and efficacy of oxygen supplies as well as monitoring to respond effectively in a crisis	(91,92)
F11-F4	Ensuring compliance with guidelines, protocols, and regulations to be prepared and equipped to deal with contingencies and crises	(4,91,92)
F4-F12	Safe and effective management of oxygen to reduce shortages, contingency planning to be prepared to respond to any steep rise in demand	(93,94)
F4-F13	Rapid deployment of digital technologies for implementation, management, and monitoring of oxygen therapy	(79,92)
F10-F5	Ensure availability of oxygen to reduce the burden on the public healthcare system's oxygen supplies; pool resources, expertise, and knowledge to improve the availability and distribution while minimizing wastage	(4,95)
F5-F14	Prioritize oxygen allocation to critical cases and minimize wastage of medical oxygen	(16,23)
F6-F7	Effectively and efficiently secure and distribute essential oxygen supplies that need to reach the final health facilities in a cost-effective and timely manner	(3,4,98)
F7-F6	Ensure that the logistics network is well-stocked with the required resources and supplies in a cost-effective manner	(3,4,86)
F6-F8	Providing resources, supplies, and training needed by frontline workers to perform their jobs effectively	(60,96,97)
F8-F6	Capacity building and training programs for frontline workers to ensure staff has sufficient skills and knowledge to manage the distribution of oxygen supplies in crises	(60,96)
F6-F9	More international collaborations to develop new distribution systems to improve the efficiency and speed of oxygen delivery. E.g. Air bridges, solidarity oxygen express	(4,9)
F6-F10	More PPP to manage logistics; more effective response in logistics management by the private sector	(9,98)
F12-F6	Planning and forecasting oxygen demand for drawing up an elastic oxygen supply chain and distribution system	(65,99)
F13-F6	Plethora of digital tools and platforms to map and distribute oxygen supplies	(4,57)

F7-F9	Procurement and acquisition strategies for acquiring oxygen generation and storage capacity from other countries through imports or donations	(13,100)
F7-F10	Procurement and acquisition strategies for acquiring oxygen generation and storage capacity within the country through private sources; incentivize MSMEs and private players	(13,101)
F12-F7	Track, identify, and forecast procurement needs for medical oxygen, equipment, and consumables (vis a vis existing capacity)	(4,102)
F8-F10	Collaborations with the private sector to ensure healthcare workers have the skills, knowledge, and resources required to manage oxygen supplies effectively	(4,68)
F12-F8	Training staff for any future crises, oxygen therapy ecosystem, SOPs, and guidelines on various aspects of clinical treatment of patients on oxygen therapy	(65,103)
F13-F8	Medical and paramedical staff and volunteers provided training through digital tools and learning management systems; to have appropriate knowledge and skills to treat patients requiring oxygen therapy	(104,105)
F9-F10	Bringing together the resources, expertise, and knowledge of both public and private sector organizations and other countries as well as international organizations	(4,66,106)
F10-F9	Bringing together the resources, expertise, and knowledge of both public and private sector organizations and other countries as well as international organizations	(4,15,66)
F11-F12	Early detection of oxygen needs will help in proactive planning and management of the contingencies; and allow more response time to mitigate the impact	(107–109)
F11-F13	Setting up digital tools to enable active monitoring of oxygen demand and supply	(109,110)
F12-F13	Setting up digital tools to enable a more strategic and effective oxygen response	(111,112)
F13-F12	Effective planning and forecasting of oxygen demand and landscaping oxygen production capabilities; active monitoring of essential commodities	(111–113)