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The Emerging Role of Artificial Intelligence to Improve Inventory Management of Pharmaceuticals Products and Medical Supplies in Gulf Countries

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Abstract

The Gulf Cooperation Council (GCC) countries face persistent drug shortages and inefficiencies in pharmaceutical inventory management across their healthcare systems, a problem exacerbated by heavy reliance on imports and rapid population growth that complicates demand forecasting. The study aims to understand level of Artificial Intelligence adoption in GCC healthcare systems in order to manage pharmaceutical inventory and the barriers of implementation. Using a mixed-methods approach of a cross-sectional online survey of 86 participants across all six GCC states (40 complete responses) and semi-structured interviews with key stakeholders, including healthcare providers, distributors, and manufacturers. Survey results confirmed frequent drug shortages, with 87% of respondents reporting patient care impacts and 92% rating the impact as moderate or high. Despite over 90% of participants recognizing AI's potential to enhance demand forecasting, adoption of AI tools remains low in practice across the sector, with only a minority of organizations having implemented AI solutions. Key barriers to AI adoption include limited funding, fragmented data systems, and integration challenges. The study also revealed gaps in stakeholder awareness; for example, healthcare providers perceived shortages' clinical impact more acutely than supply-side stakeholders, and the economic burden of shortages remains under-recognized due to weak cost-tracking systems. The study concludes that AI's potential for optimizing pharmaceutical inventory remains largely untapped in the GCC and that shifting from reactive crisis management to proactive, AI-driven supply chain resilience will require systemic changes in policy and practice.

Keywords
Pharmaceutical Supply Chain, Gulf Countries, Artificial Intelligence, Medical Supplies, Inventory Management

Biographies
Mohamed Akl serves as an Executive Board Member of MEDAYA, a startup specializing in AI healthcare solutions in the Middle East and also, he leads the Johnson & Johnson Innovative Medicine team in Oman. He is a licensed pharmacist and a Certified Balanced Scorecard Performance Improvement Professional with more than 15 years of progressive experience in the healthcare and pharmaceutical industry. Akl pursued his Executive MBA at the University of Strathclyde, UK, where his research focused on the emerging role of Artificial Intelligence in healthcare. He has also completed postgraduate studies in strategy, change management, and performance improvement at leading

institutions, including the Wharton School of Business (USA) and the Chartered Institute of Marketing (UK). Akl has led and collaborated with intercontinental teams across Europe, the Middle East, and Africa. His work has centered on aligning strategy with execution and driving measurable business impact in healthcare.

Mohamed Musa is a strategic marketing leader with a decade of experience in building brand growth and leading high-performing teams. In his current role as Regional Senior Marketing Manager with the British Council - MEA, he designs data-driven marketing strategies aimed at achieving growth, leading new product launches, and expanding into new markets. He is skilled in market research and analysis, stakeholder engagement, strategic planning, and financial management. His diverse background includes management roles with the British Council in Oman and the United Nations Development Programme (UNDP) in Egypt. Mohamed is currently pursuing an executive MBA degree from Strathclyde Business School.

Monthir Alzadajli is a telecom professional with over 15 years of experience in business development, connectivity solutions, and ICT innovation. Currently serving as Connectivity Solutions Manager at Omantel (Omantel Telecommunication Company), he leads the design and delivery of enterprise telecom strategies and ROI-focused projects. Previously, he held senior roles at Ooredoo Oman, including Radio Capacity Management Manager, where he contributed to Oman's 5G rollout and spearheaded advanced network projects. His career also spans leadership positions at Huawei (Kuwait) and Etisalat (UAE). Monthir holds a BSc in Telecommunications Engineering from Glasgow Caledonian University and is pursuing an MBA at Strathclyde University. Recognized with multiple awards, he combines engineering expertise, commercial acumen, and strategic foresight to deliver innovative telecom and ICT solutions.

Dr Mouhamad Shaker Ali Agha is an Associate Professor in the Department of Management Science, where he also earned his PhD and MSc. His research interests broadly lie in the areas of supply chain management and Operation Management. Specifically, he focuses on supply chain risk and resilience analysis, digital supply chains, health sector operations innovation. Dr Ali Agha leads a research group specializing in these areas. He also serves as the Director of the MSc Business Analysis and Consulting and the MSc International Master Project Management programs at Strathclyde Business School.