



Public Hospital Gas Management System: Health, Risk, Economic Implication – A Practical Experience 2015-2020

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Abstract

In this work is described a practical experience related a managerial performance related hospital gas management System. After an introduction related some normative rules involved are provided a description of activities. Then an analyses of results obtained is reported. Result fined: related this specific experience of 5 years all endpoint was obtained: clinical, economic and risk.

Keywords: Educational elegance; Management research; Educational benefaction; Management prospect

Introduction

The management of hospital medicinal gas system need various management skills. This kind of speciality need to respect various normative rules: European, Italian, regionals, technical and safety prescription as well as economic budget law oblige. The medical gases are under medicinal rules, medical devices rules or galenic ones. The pharmacopeia European and Italian: provide prescription of quality but also many other technical normative (ISO – EN- UNI international, European, or Italian) are involved in. So the management of this complex world for assure oxygen-therapy of patient, ventilation in ICU or for imaging, med lab or for some kind of surgery need a high level of managerial competencies. This managerial competencies are also required to directors of complex healthcare structure in hospital and to do this is necessary to add management basis courses and a project work related. The basis management course for directorship of health complex structure in Italy must cover this [1-17].

Area

- organization e gestione dei servizi sanitary Health Care Services Organization

- indicator di qualità dei servizi e delle prestazioni total quality management
- Gestione delle risorse humane e organization del lavoro Human Resource Management And Work Organization
- criteria di finanziamento e bilanci health care public financial system and financial reports

This courses must follow: Active didactics methodology, frontal lessons, practical cases discussion, incident analysis, role playing, simulations, analysis of data, focus groups. At the end it must be presented a written related project work. According this rules it is submitted a project work named involved in hospital medicinal gases management.

Methods

With and prospected (from 2015 to 20120) and observational (in retrospective way from 2020 to 2015) way many data related medicinal gas management in pc hospital was recorded to produce complete data for the final analyse.

Source of data

Official applicative program of hospital, database, albo praetorian for economic data, regional healthcare data for gas product use.



Description of Experience and Results

Location- settings

PC AREA 3 public hospital and 2 other structure linked in the same provincial network. About more than 700 beds.

Organization

Departmental, wards, complex units, simple units

Central organization

General Director, health directors, administrative director HR director, other technical office, SPP prevention protection service.

Staff: ICT, budget control, Economy buying office and other

Many wards: Emergencies, ICU, medical and surgical, ambulatory

Different kind of medical speciality: Surgery, nematology, oncology, infectious disease, cardiology, nephrology Obstetrics-gynaecology, paediatrics, - trauma orthopaedic, neurology, psychiatry, Otorino, oculist, allergology, imaging, med lab and, addictions services and many other Also transplant are performed. (Staminal cells- molecular biology and other).

Time of observation: From 2015-2020

Kind of service managed: Public hospital gas management

Position observed: hospital pharmacist involved officially in medicinal gas management

Role: Execution director of hospital medical gases contract with external provider- quality control of medical gases officially- pharmacist responsible for gas management

Title of observed position: Applied pharmacologist, ward clinical pharmacist university title, hospital pharmacist manager, director of execution contract Dec: medical gases providing system and Dec for contract internal transport of mobile container of gases.

Qualified as: hospital pharmacist and territorial manager level, complex structure directorship level (idoneita alle funzioni) 2020 public selection Cremona hosp.

Updating and formative management courses followed during 2015-2020

Several courses relate management topics like: strategic management project management, TQM, Risk management, MBO, problem solving, time management, budget analysis, economic and financier, Healthcare economy, pharmacy-economy, economic analysis, ICT, gas medical management-regional level courses), communication technique, team building topics, SWOT analysis, DATA management and many other.

Risk analysis: In the observed period from 2014-2020 NO adverse event or incident or other relevant was observed.

Cost analyse: During the period 2016-2020 the medical gases budget was approved by general manager, and monitoring of the amount ordered was performed and no overload of ordered products. The cost of medicinal gases was according the rules accepted in official buying procedure of area vista. No any kind of official contrast between hospitals direction ship and external private gas Provider Company.

Clinical results: In the observed period no any clinical adverse event was observed and registered about medicinal gases used in this hospital.

Quality control: In the observed period no any periodic analysis on quality of gases provided was out of official Italian pharmacopeia specific. Only 1 cases related medical air due to also pre-analytical problem but solved in few time.

Control of documentation: In the observed period all documentation for archive was done Certificate of analysis, written memorandum, contract, recall, communications and all related.

Revision of documentation: During this period was introduced DGO operative gestational document or medicinal gases system (in collaboration with technical office and prevention protection system office and medical directors) officially adopted on going the producing of other related procedure but cited in the DGO.

Emergency management: Related covid-19 emergency it was needed to increase the availability of medical gases like oxygen introducing other new tank near the poli-chirurgic of the hospital and to add to the central system various packs units. All this measure added to a great increase in provided medical gases mobile container and liquid oxygen or concentrators make possible to overcome the great emergencies.

Description of role observed: according Italian rule named codice degli appalti there is a specific position named Dec execution director of contracts that have a substantial project manager role. This figure is a real link between the extern provider of medical gases and the hospital management. This figure must execute the official contract with the winner of the buying procedure of area vasta (an association of various provincial hospital). All this according principle of transparency, equal condition, celerity, under economic and risk evaluation with the aim to keep the continuity of patient therapy for their need of medical gases and oxygen therapy. This figure is related so whit buying office, the hospital general managers, directors of clinical units, technical offices, prevention protection service and external provider. Other function officially played: quality control of provided gases. Periodic analysis was performed every 6 month for oxygen and medical air and azote. The sample was sanded to officially recognized laboratory and the final report was accepted and then under archive procedure.

Updating procedure: It was organized a first course for top managers of hospital

Related medicinal gases management (co-organized with technical office engineer and director of prevention protection system). This future also performed as: hospital pharmacist manager responsible for medicinal gases. (Ordering procedure, buying procedure, internal transport of mobile tanks of oxygen recall, tracing system of mobile tanks and other related activity). In the first phase of this last contract of providing gases it was needed to change all the big tanks of cryogenic oxygen in the 3 principal hospital. It was officially assigned an engineer to Dec medical gases as technical support for system problems. After this complex change procedure was written and signed officially a report for central office of hospital. To adequately manage this systems it was needed and 24/24 hours every day and for all the year to cover the emergencies. A rapid communication system was adopted to communicate with all the players.

Control activities

During this period was centrally and peripherally controlled the amount of gases provides also using informatics on distance system named telemetry: in this way by remote was possible to verify the data about the tank level added.

Day by day activity: Contacts with clinical wards, external provider, buying office, medical ventral office, technical office and other related. Verify or ADR adverse event reaction due by medical gases before sends it to pharmacology-vigilance center of the hospital. Recall activity according the alert provided by authorities or by manufactures industries.

Official visit: Activity with written report to verify correct condition of stoking of mobile containers. In wards and in central storage.

Cost managed: About 350.000 euro by year related cost of provide gases (1.750 .000 euros by 5 years), about more the 50.000 euro by year for internal transport by year of mobile container other service managed as DEC mobile tanks verify and expiration data for 2020 about 40.000 euros. Total costs managed in 5 year: about 2.200.000 euro but it must be added also cost avoided due by a safety use of medical gases management system without risks (explosion, burn and other are very expensive and difficult to evaluate before).

Gases managed: Oxygen (compressed, liquid and cryogenic), Medical air (produced inside hospital with compressor, azote liquid, argon, CO₂, NO, helio).

Kind of physical gases: Compressed for mobile tanks for acute therapy or transport liquid for chronic therapy

Congenic: For central system of providing

Use: : Therapeutic (oxygen, no, medical air) , imaging helio for RM, laboratory CO₂ , surgery (argon), crio conservation of sample N₂, mixture of gases for otorino and spirometry, oxygen therapy, ventilation in ICU diagnostic and surgery procedure (cryosurgery,

laparoscopic procedure) motor gases for instruments to refrigerate magnate resonance medicine laboratory

For all this activates was used various managerial techniques like

- Project management
- Time management
- HR management
- Budget analyst
- Risk analysis
- ICT management
- MBO
- TQM
- Soft Skills management
- Communication management

And many management techniques: like problem solving, brainstorming, what if analysis, zero vision Eisenhower matrix, FMECA, ishikawa diagram, critical path methods. Using not also an historic way but also a prospectic approach.

Financier aspect: This practical experience is related a public setting of a provincial hospital PC AREA and related other presidium so the patient involved are under the cover of public financial providing.

Reimbursement policy

According national Italian rules a national system regulate LEA essential level of cure for all patient and then from national level was decide level of financier cost reimbursed to the single regions. The regional institution provide to the local hospital the amount needed of money.

Monitoring activity

During observed period was performed various activity

- Monitoring of amount provided of gases
- Monitoring of quality of gases
- Monitoring of total costs of gases- economic evaluation- budget impact
- Monitoring of ADR
- Monitoring of recall and non-conformity
- Monitoring of official documents
- Monitoring of revision of procedure
- Monitoring of official data flux for region
- Monitoring of correct informatics codify of products
- Reimbursement procedure

Periodic management evaluation

In the global period observe every year positive evaluated by the central hospital management of HR the budged for medicinal



gases was respected. No any controversy with external providers. No any written report related ADR on near miss event and other.

Result and Discussion

The experience presented cover a long period of time like 5 year and during this period all end points was obtained. (Clinical, economic, risk) The continuity of cure was guaranteed. Risk was controlled no ADR, near miss event or other (only 1 cases related expiration time for some mobile tanks linked to the central pipeline-tertiary source, rapidly resolved). No controversy between external provider and hospital management. No problems of security with patient, healthcare professionals, technical and caregivers. In the first phase of this was necessary to create a team multi-professional and for this reason many managerial technique was used. In emergency settings was introduced a task force multi-professional to manage it. All communication activity was correctly performed.

Risk analysis was performed for all activity with prevention protection service. Actually under evaluation also the new BIG TANKS for cryogenic oxygen introduced during emergency covid 19.

Conclusion

USING correctly deep management techniques was obtained all kind of endpoint in the period observed.

Signed the original version by the author value

This project work is produced to be submitted for international evaluation for basis course of management of health care complex unit directorship.

Reference Documents

- DGO officially adopted PC AREA Hospital
- Quality control officially adopted pc area hospital
- Hospital Medicine Gas Management System: The Pharmacist Role in a Pharmaceutical-Chemistry Setting-Results of a Practical Experience in an Advanced Country Adv Bioeng Biomed Sci Res, 2019 Volume 2 | Issue 3 | 1 of 10 Opast editor
- Annually official economic report PC area hosp. as officially published
- Official report of ADR related medical gases uses PC AREA HOSP
- LEA according national Italy legislative government program
- Regional annual health care budget EMILIA ROM RER
- Official written agreement for providing medical gases
- Internal procedure related medical gases management
- Official designation DEC medical gases providing
- Official designation of quality control manager hospital PC

- European official CV of observed role 2020
- ALBO preventorium of institution cited
- Research article management instrument in pharmaceutical care and clinical pharmacy
- Research article Attitudes and Skills in Business Working Settings: A HR Management Tool Business and Economics Journal
- Poster abstract co-author pharmaceutical care e high risk situations il farmacista ospedaliero e le metodologia HTA applicata alla logistica antidotica nei medical teams
- Official VIDEO of updating course hospital gas management systems for hospital top managers. Scientific organizer for official Formation course hospital gases management PC hospital 2019 (in progress and soon next publication)
- Official communication Electronic PEC related formative managerial pattern followed by Luisetto M July 2020
- European and Italian normative rules for Drugs, Medical Devices, Hospital Management
- Hospital gas management , technical rules , economic-financier healthcare rules
- Pharmacovigilance and medical devices vigilances rules
- Recall rules
- Preventing and risk containment rules
- Official disaster plan of hospital – official plan for fire containment
- Official technical and risk schedule of the single gases
- Official pharmacopeia
- formative rules for gas assay and analytical technique – specific of methods
- Official quality manual of hospital
- Official hospital organization system and roles
- official ATTO AZIENDALE hospital with mission and vision
- Official performance evaluation of managers of hospital: annual and every 5 year.

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