

GOVERNMENT OF ANDHRA PRADESH
HEALTH, MEDICAL & FAMILY WELFARE DEPARTMENT

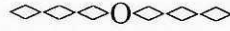
Order No. 109/COVID-19/2021

Dated: 26/04/2021

COVID Instant Order – 109

Sub: Guidelines on Oxygen for Management of COVID-19

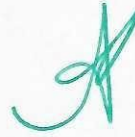
Ref: 1. Video Conference with Districts by Hon'ble Minister of Urban Development, GoAP on COVID-19, dt: 24.04.2021.
2. Video Conference with Districts on COVID-19 by the Chairman COVID-19 State Control Room and Principal Secretary of HM&FW, dated: 25.04.2021
3. Meeting of the AP State Expert Committee on Clinical Management of COVID-19, Dt 25.04.2021.



In view of current COVID-19 situation, Guidelines on Oxygen for Management of COVID-19 is hereby attached.

All Collectors & Special Officers are requested to take immediate necessary action. Collectors may get the audit sheet reviewed by a team of experts every day at his level and any shortcomings be brought to the notice of Hospital team for rectification.

Encl: Guidelines on Oxygen for Management of COVID-19



Principal Secretary To Government

To

The All Collectors and District Magistrates in the State for immediate action

The All Joint Collectors and Addl. District Magistrates (Development) for necessary action

All the DM&HO's in the State for necessary action and implementation



4/26/2021

Guidelines on Oxygen for Management of COVID-19

Clinical Protocol, Rational use &
Audit



AP State Expert Committee on Clinical
management of COVID-19
DOHM&FW, GOVT. OF A.P.

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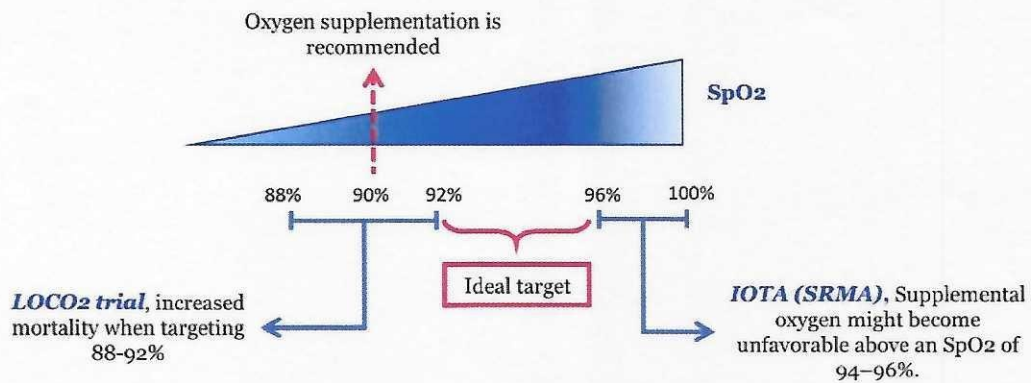
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Clinical Protocols

1. It is assumed that out of the 100 confirmed cases of Covid-19:
 - a. 80 cases will be Asymptomatic / Pre-Symptomatic or with “**Mild**” disease requiring home isolation or admission to Covid Care Centre (CCC).
 - b. Out of remaining 20 cases:
 - i. 17 cases will be of “**Moderate**” disease requiring hospitalization for 7 days on Non-ICU Oxygen Supported Beds. Districts would require to have oxygen storage capacity for all 17 Beds. However, for the purpose of calculation of Daily Oxygen consumption requirement, 50% of these Beds (i.e. 8.5) would be considered for computation purpose.
 - ii. 3 will be “**Severe**” cases requiring ICU Beds for 18 days in ratio of
 - 20% for Invasive Ventilation
 - 40% for Non-Invasive Ventilation (NIV) / High Flow Nasal Cannula (HFNC) and
 - Remaining 40% for oxygen therapy by Non-Re Breathing Mask (NRBM) etc.
2. For Moderate cases (SpO₂ level *between* 94%-90%) use humidifier always when delivering more than 4 liters of Oxygen as it is a dry gas and the respiratory secretions in the airways will be dried up. The indicative oxygen flowrate is:
 - a. 2-4 Liters/minute by nasal prongs
 - b. 4-6 Liters/minute by Venturi mask
 - c. 6-10 Liters/minute by facemask &
 - d. 10-15 Liters/minutes by Non-Rebreathing Mask (NRBM).
3. For Severe cases (SpO₂ level less than 90%), the indicative oxygen flow rate is:
 - a. 10 Liters/minute by Invasive Mechanical Ventilation
 - b. 25-60 Liters/minute by Non-Invasive Ventilation and
 - c. 10-15 Liters/minutes by NRBM.
4. HFNC device should be used only in ICU setting under supervision of a Respiratory Physician/Physician/Anaesthetist/Intensivist.
 - a. Patient should be put on HFNC only after approval of the senior most

Respiratory physician/Physician/Anaesthetist/Intensivist (Professor/head of the unit/HoD).

- b. Such directions is to be recorded in the case sheet of the patient duly obtaining ink signature of the Physician/Respiratory Physician/Anaesthetist/Intensivist.
5. Oxygen is a life-saving essential drug. The target **Oxygen saturation rate should be 94%-95%** for the hospitalized COVID 19 patient. Once this rate is achieved, flow of oxygen may not be increased as it may not provide any additional benefit to the patient.
6. The “improving oxygen therapy in acute illness” (IOTA), systematic review and meta-analysis concluded that in acutely ill adults, high quality evidence shows that liberal oxygen therapy increases mortality without improving patient important outcomes. Supplemental oxygen might become unfavourable above an SP02 range of 92-96%. These reports support the conservative administration of oxygen therapy.



Crit Care Med. 2020 Jun;48(6):e440-e469

Figure 1 Target SpO₂: 92% to 96% in General, 95% in Pregnancy & 94% in Children.

Starting oxygen therapy

- Ensure pulse oximetry is available to monitor response to oxygen therapy
- Document baseline observations including saturations, respiratory rate, blood pressure and pulse
- Note respiratory effort; colour of lips, fingers & toes for Cyanosis and level of consciousness
- Check that there is a prescription for oxygen with a stated target saturation range

- Ensure delivery device is connected via tubing to oxygen supply and turned on to the appropriate flow rate (if cylinder, check fill level of cylinder and be aware of duration)
- Explain procedure to the patient and gain consent where possible.
- Place the oxygen mask on the patient's face, adjusting the nose clip and elastic straps to ensure a close fit
- Reassure the patient – if the patient is very breathless, oxygen masks can feel very claustrophobic
- Monitor response to oxygen therapy – recheck oxygen saturations, vital signs, colour and level of consciousness
- Titrate oxygen according to oxygen saturations to maintain saturations within prescribed target range. Allow five minutes at each dose before further adjustment.

Ongoing care of patients requiring oxygen therapy

- Continue to monitor oxygen saturations at least four times a day. Always record saturations at rest. Realtime or at least hourly monitoring for critically ill patients.
- Help the patient to stay in an upright position to maximise ventilation unless contraindicated by underlying clinical problems, for example, spinal or skeletal trauma
- Observe potential pressure areas, particularly behind the ears, from nasal cannula tubing or mask elastic and ensure skin is protected and pressure is relieved by altering the position of the tubing or using padding
- Be aware of the drying effect of oxygen on oral and nasal mucosa; encourage patients to maintain adequate oral fluid intake where appropriate.

Prone position ventilation

Various acute lung diseases including covid result in hypoxemic respiratory failure. A clinical trial by name PROSEVA (**PR**oning **SE**vere **AR**DS patients) revealed that keeping a mechanically ventilated patient in prone position (sleep on belly) for 16 hours a day improves oxygenation. *In the COVID-19 era, this finding is extended to keep an awake patient on oxygen cannula, facemask, HFNC (high flow nasal cannula) or NIV (Non-invasive ventilation) in prone position to improve oxygenation status. It even delayed intubation (putting a tube in the trachea).*

The basis of prone position is that,

- The dorsal lung will expand well
- Compression of the lung tissue by the heart weight is relieved, and

- Secretions will be properly drained

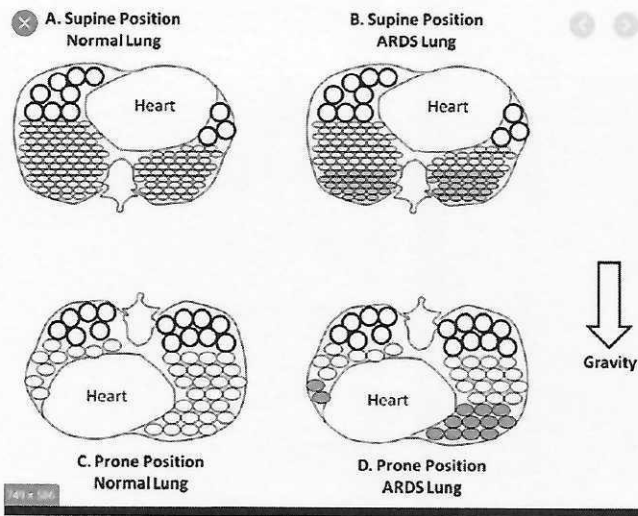


Figure 2 Comparative cross-sectional view of chest in Supine & Prone position



Figure 3 Illustrative picture of Prone position ventilation

Protocol

30 minutes prone, 30 min left lateral, 30 min supine semi recumbent, 30 min right lateral and then prone again. This cycle continues.

Review

- Patients are to be reviewed twice during morning & evening rounds to evaluate their oxygen requirements as well as oxygen saturation rates.
- Discontinue oxygen therapy once the patient has stable saturations (at least two consecutive recordings) within their target range. Monitor saturations for five minutes after stopping oxygen and recheck after one hour.
- Order discharge of patients as per discharge policy
- Discharge process to be complete within one hour

Rational use measures

Administrative structure

- The District Collector of the district must monitor the consumption including the rational use of oxygen in all facilities of the district on a daily basis.
- **Oxygen Monitoring Committee** is to be formed in every hospital to supervise inventory planning, oxygen consumptions etc. which may consist of Additional Medical Superintendent, Head of Anaesthesia, Head of Respiratory Medicine (Head of Internal Medicine in case Respiratory Medicine department does not exist) and Nursing Superintendent.
 - Duties:
 - O2 needs estimates and preparation of indent
 - Regular repair & Maintenance of bio-medical gas pipeline system, gas plant, and wall mounted gas outlets
 - Accessories for O2 administration
 - Supervision & maintenance of O2 supply chain
 - Reporting
- A team of one Nurse and one OT Technician may be designated as **Oxygen Monitoring Team** for each shift at each hospital/health facility level.
 - The team must inspect daily during their shift the gas pipeline, wall mounted gas outlets, as well as gas cylinders to detect and promptly address leakages.
 - Nurse in the team will check the oxygen mask on a regular basis & ensure that they are properly placed, not fallen down
 - Ensure closure of valves during “no-use” at all times.

Training

- Hands on training of every staff involved in handling Oxygen, from Attendants to head of the Department is necessary
- Capacity building to nursing staff on basic maintenance of O2 accessories & pipelines
- Regular training of OT Technicians and Nurse should be undertaken on proper oxygen administration and monitoring.
- Engineers and technical staff from different departments to be trained with the functioning and maintenance of Air Separation Unit & O2 supply chain & to monitor and report periodically the amount of O2 consumed, time left to replenish and accounting of cylinders.

Competencies required for delivering oxygen therapy

- Demonstrate an ability to use oxygen equipment safely, including an awareness of fire risks and cylinder use
- Demonstrate an ability to use a pulse oximeter to determine oxygen saturations
- Demonstrate accurate monitoring and recording of oxygen therapy
- Be able to recognise changes in a patient's respiratory status
- Demonstrate an understanding of target range prescriptions and applications to different patient groups
- Demonstrate an ability to assess suitability of delivery devices for individual patients and recognise when a change of device is needed
- Be able to correctly identify and set up a range of oxygen-delivery devices
- Demonstrate accurate recording of adjustments to the oxygen dose and the patient's response
- Recognise the need for escalation of treatment/medical review and further assessment

Monitoring

1. Oxygen therapy should be monitored under supervision even in night.
2. The attending Nurse or MNO/FNO of the ward should educate the patient to turn off the oxygen when the patient wants to use washroom or duly calls & seeks help to do so. In no case the Oxygen delivery device will be left unattended without turning off.

Infrastructure

1. Oxygen cylinders: Check the working condition of following and ensure its satisfactory functional status:
 - Pressure gauge regulators
 - Flowmeters
 - Humidifiers
2. Pipeline intra-hospital distribution networks
 - Maintenance check of pipelines including outlets to avoid leakage - every shift i.e. 8 hours
 - The inspection to be documented in shift register

Calculating Oxygen requirement

Table 1 Calculation of average Oxygen requirement

Sl. No.	Type of Oxygen Delivery device used	Average Oxygen Flow rate per minute	Number of patients on Oxygen therapy	Average Oxygen Flow rate per hour (L/hour)	Average Oxygen Flow rate per day (L/day)
1	Nasal prongs	3 L/minute	A	$(3*A*60)$	$(3*A*60*24)$
2	Venturi Mask	5 L/minute	B	$(5*B*60)$	$(5*B*60*24)$
3	Facemask	8 L/minute	C	$(8*C*60)$	$(8*C*60*24)$
4	Non-Rebreathing mask	13 L/minute	D	$(13*D*60)$	$(13*D*60*24)$
5	Non-Invasive Ventilation	42 L/minute	E	$(42*E*60)$	$(42*E*60*24)$
6	Invasive Ventilation	10 L/minute	F	$(10*F*60)$	$(10*F*60*24)$
Total					

Audit of O2 rational use

Table 2 Daily Oxygen Audit report

Sl. No.	Enquiries		
Supervision			
1.	Oxygen Monitoring Committee (OMC) has been formed?	Yes	No
1.a.	OMC's performance is satisfactory:	Yes	No
2.	Oxygen Monitoring team has been formed?	Yes	No
2.a.	OMT's performance is satisfactory:	Yes	No
Capacity Building			
3.	Bio-medical engineers, staff in-charge & other technical staff have been trained?	Yes	No
4.	Nursing staffs have been trained on basic maintenance and administration O2 to patients?	Yes	No
Stock Management			
5.	Oxygen needs assessment for next 24 hours has been done?	Yes	No

Sl. No.	Enquiries			
	As on 10 AM today			
5.b.	How much oxygen was as opening stock? As on 10 AM today			
5.c.	How much Oxygen stock received during last 24 hours? As on 10 AM today			
5.d.	How much oxygen consumed during last 24 hours? As on 10 AM today			
5.e.	What is the closing stock of oxygen? As on 10 AM today			
6.	For how many hours the existing stock is sufficient for based on current consumption pattern?			
7.	Is the functional accessories to administer O2 are sufficient in stock?		Yes	No
7.a.	Requirements of accessories, if any:	Name	Quantity	
		<ul style="list-style-type: none"> ▪ Pressure gauges ▪ Regulators ▪ Flowmeters ▪ Humidifiers ▪ Nasal canula ▪ Facemask ▪ NRBM ▪ NIV mask ▪ HFNO canula ▪ HME viral bacterial filtre for ventilators 		
Operations and monitoring				
8.	Has the O2 pipelines been checked in all 3 shifts? <ul style="list-style-type: none"> ○ Shift 1 register checked: ○ Shift 2 register checked: ○ Shift 3 register checked: 		Yes	No
8.a.	What all issues have been found	1. 2. 3.		
8.b.	What all issues have been resolved	1. 2. 3.		
9.	Unused mechanical ventilators found to be plugged into oxygen source?		Yes	No
10.	Unused mechanical ventilators has been unplugged?		Yes	No
11.	Number of COVID patients in:			
	IPD			
	ICU			
	Total			

Sl. No.	Enquiries		
12.	Total number of Moderate cases (SpO2 level <i>between</i> 94%-90%)		
	Number of Moderate cases receiving oxygen through:		
12.a.	Nasal prongs		
12.b.	Facemask		
12.c.	Non-Rebreathing Mask (NRBM)		
12.d.	Non-Invasive Ventilation		
12.e.	Other (specify)		
13.	Total number of Severe cases (SpO2 level less than 90%),		
	Number of Severe cases receiving oxygen through:		
13.a.	Invasive Mechanical Ventilation		
13.b.	Non-Invasive Ventilation		
13.c.	NRBM		
13.d.	Other (specify)		

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Sharma

26/4/21

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20202020

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