



ಕರ್ನಾಟಕ ಸರ್ಕಾರ



DRINKING WATER & HEALTH

Drink Sufficient water for Good Health

KARNATAKA STATE SAFETY INSTITUTE®

DEPARTMENT OF FACTORIES, BOILERS, INDUSTRIAL SAFETY AND HEALTH

SPONSORED BY

NATIONAL SAFETY COUNCIL, KARNATAKA CHAPTER®

DRINKING WATER AWARENESS

Edition : 1st Edition

Year : 2022

Printer : Sri Ganesh Offset Printers

52/109, 8th Cross, Pukhraj Layout, R.D.Nagar

Banerughatta Road, Bengaluru - 560030

Mob: 99451 34090 | 9945109021

Author

Dr. Rudraswamy HK, MBBS, AFIH

Occupational Health Physician

Volvo Group India Private Limited, Bangalore

Publisher

Karnataka State Safety Institute[®]

Department of Factories, Boilers, Industrial Safety and Health,

2nd Floor, Kalyana-Suraksha Bhavan,

Near Dairy Circle, Bannerghatta Road, Bengaluru - 560029

Telephone : 080 2925 3051

Website : <https://esuraksha.karnataka.gov.in/>

Email : directorfbish@gmail.com

jdfbng1@gmail.com

karnatakakssi@gmail.com

ONLY FOR FREE DISTRIBUTION. NOT FOR SALE.

ಕರ್ನಾಟಕ ರಾಜ್ಯ ಸುರಕ್ಷತಾ ಸಂಸ್ಥೆ (ರಿ)

ಕಾರ್ಖಾನೆಗಳು ಬಾಯ್ಲುಗಳು ಕೈಗಾರಿಕಾ ಸುರಕ್ಷತೆ ಮತ್ತು ಸ್ವಾಸ್ಥ್ಯ ಇಲಾಖೆ

2ನೇ ಮಹಡಿ, ಕಲ್ಯಾಣ-ಸುರಕ್ಷಾ ಭವನ, ಬನ್ನೇರುಘಟ್ಟ ರಸ್ತೆ, ಡೈರಿ ಸರ್ಕಲ್ ಹತ್ತಿರ,
ಬೆಂಗಳೂರು - 560029

ಕರ್ನಾಟಕ ರಾಜ್ಯ ಸುರಕ್ಷತಾ ಸಂಸ್ಥೆಯು, ಕಾರ್ಖಾನೆಗಳು, ಬಾಯ್ಲುಗಳು, ಕೈಗಾರಿಕಾ ಸುರಕ್ಷತೆ ಮತ್ತು ಸ್ವಾಸ್ಥ್ಯ ಇಲಾಖೆಯ ಅಂಗ ಸಂಸ್ಥೆಯಾಗಿರುತ್ತದೆ. ಈ ಸಂಸ್ಥೆಯು ಮುಖ್ಯವಾಗಿ ಕೈಗಾರಿಕೆಗಳಲ್ಲಿ ದುಡಿಯುವ ಕಾರ್ಮಿಕರು ಹಾಗೂ ಸುತ್ತಮುತ್ತ ವಾಸಿಸುವ ಸಾರ್ವಜನಿಕರಿಗೆ, ಕಾರ್ಖಾನೆಯ ಆಡಳಿತ ವರ್ಗದವರಿಗೆ ಸುರಕ್ಷತೆ ಮತ್ತು ಆರೋಗ್ಯದ ಬಗ್ಗೆ ಅರಿವು ಮೂಡಿಸುವ ಅಭಿಯಾನದಲ್ಲಿ ತೊಡಗಿರುತ್ತದೆ.

ಸಂಸ್ಥೆಯ ಕಾರ್ಯಚಟುವಟಿಕೆಗಳು

1. ತರಬೇತಿ ಕಾರ್ಯಕ್ರಮಗಳು

- ಕಾರ್ಮಿಕರಿಗೆ / ಮೇಲ್ವಿಚಾರಕರಿಗೆ ಒಂದು ದಿನದ ಸುರಕ್ಷತಾ ತರಬೇತಿ ಕಾರ್ಯಕ್ರಮಗಳು
- ಆಡಳಿತ ವರ್ಗದವರು ಮತ್ತು ಹಿರಿಯ ಅಧಿಕಾರಿಗಳಿಗೆ ಕಾನೂನು, ಸುರಕ್ಷತೆ, ಆರೋಗ್ಯ, ವ್ಯಕ್ತಿ ವಿಕಸನ ಇತ್ಯಾದಿ ಸಂಬಂಧಪಟ್ಟಂತೆ ವಿಚಾರ ಸಂಕಿರಣ / ಕಾರ್ಯಾಗಾರ
- ತುರ್ತು ಯೋಜನೆಗಳ ತಯಾರಿ, ನಿರ್ವಹಣೆ, ವೈದ್ಯಕೀಯ ನೆರವು, ಸಂಬಂಧಪಟ್ಟ ವಿಷಯಗಳ ಬಗ್ಗೆ ಕಾರ್ಯಾಗಾರಗಳು
- ತುರ್ತು ಯೋಜನೆಗಳ ಅಣುಕು ಪ್ರದರ್ಶನ ಮತ್ತು ತರಬೇತಿ
- ಸುರಕ್ಷತಾ ಅಧಿಕಾರಿ, ಕಲ್ಯಾಣಾಧಿಕಾರಿ ಮತ್ತು ವೈದ್ಯಾಧಿಕಾರಿಗಳಿಗೆ ತರಬೇತಿ
- ಮಹಿಳಾ ಕಾರ್ಮಿಕರಿಗೆ ಕಾನೂನು ಅರಿವು
- ಕಾರ್ಖಾನೆಗಳ ಆಪೇಕ್ಷೆಗನುಗುಣವಾಗಿ ವಿನ್ಯಾಸಗೊಳಿಸಿದ ತರಬೇತಿ ಕಾರ್ಯಕ್ರಮಗಳು

2. ಪ್ರಕಟಣೆಗಳು

- ಸುರಕ್ಷತಾ ಕಾರ್ಯ ವಿಧಾನ ಮತ್ತು ಚುಟುಕಗಳ ಕೈಪಿಡಿ, ಪಾಂಛೆಟ್
- ಸುರಕ್ಷತಾ ಬಿತ್ತಿ ಪತ್ರ, ಬ್ಯಾನರ್‌ಗಳ ಮುದ್ರಣ ಮತ್ತು ಸರಬರಾಜು

3. ಇತರೆ ಚಟುವಟಿಕೆಗಳು

- ರಾಷ್ಟ್ರೀಯ ಸುರಕ್ಷತಾ ದಿನಾಚರಣೆ, ರಾಸಾಯನಿಕ ದುರಂತ ನಿವಾರಣಾ ದಿನ ಕಾರ್ಯಕ್ರಮಗಳನ್ನು ಆಯೋಜಿಸಿ ನಡೆಸುವುದು
- ಸುರಕ್ಷತಾ ಉಪಕರಣಗಳ ವಸ್ತುಪ್ರದರ್ಶನ

ಹೆಚ್ಚಿನ ಮಾಹಿತಿಗಾಗಿ

ಕಾರ್ಯದರ್ಶಿಗಳು

ಕರ್ನಾಟಕ ರಾಜ್ಯ ಸುರಕ್ಷತಾ ಸಂಸ್ಥೆ (ರಿ.)

ದೂರವಾಣಿ ಸಂಖ್ಯೆ : 080 2975 3051

ವೆಬ್‌ಸೈಟ್/Website : <https://esuraksha.karnataka.gov.in/>

ಇಮೇಲ್/E-mail : directorfbish@gmail.com

kssikarnataka@gmail.com

jdfbng1@gmail.com



TABLE OF CONTENTS

1. Why is water important for life?	9
2. Urine color chart	13
3. What does water contain ?	14
4. When is water considered safe for drinking?	17
5. What disease can occur if we consume unsafe water?	18
6. What general precautions to be taken before using drinking water?	22
7. What are the methods to make water potable?	24
8. How much water is to be consumed per day?	28
9. What will happen if we drink less water?	30
10. Frequently asked questions regarding drinking water	37
11. What precautions to be taken during summer to prevent dehydration	39
12. Requirements of Factories Act 1948 and Rules on Drinking Water	40
13. Drinking water standards in India	41
14. Summary	33

ಅರಬ್ಬಿಲ್ ಶಿವರಾಮ್ ಹೆಬ್ಬಾರ್
ಕಾರ್ಮಿಕ ಸಚಿವರು ಹಾಗೂ
ಹಾವೇರಿ ಜಿಲ್ಲಾ ಉಸ್ತುವಾರಿ ಸಚಿವರು



ಕೊಠಡಿ ಸಂಖ್ಯೆ : 206-207
2ನೇ ಮಹಡಿ, ವಿಕಾಸ ಸೌಧ
ಬೆಂಗಳೂರು-560 001
ದೂ. : ಸಂ : 080-22252636
22034501

ನಂ.ಕಾ.ಸ/772/2022

ದಿ: 27.05.22

ಶುಭ ಸಂದೇಶ

ಕಾರ್ಖಾನೆಗಳು, ಬಾಯ್ಲರುಗಳು ಕೈಗಾರಿಕಾ ಸುರಕ್ಷತೆ ಮತ್ತು ಸ್ವಾಸ್ಥ್ಯ ಇಲಾಖೆಯು ಕಾರ್ಖಾನೆಗಳಲ್ಲಿ ಕೆಲಸ ನಿರ್ವಹಿಸುವ ಸಾಮಾನ್ಯ ಕಾರ್ಮಿಕರಿಗೆ ಕುಡಿಯುವ ನೀರಿನ ಬಗ್ಗೆ ಅರಿವು ಮೂಡಿಸಲು “ಜಲಪಾನ” ಕೈಪಿಡಿಯನ್ನು ಹೊರತಂದು ಕುಡಿಯುವ ನೀರಿನ ಬಗ್ಗೆ ಅರಿವು ಹೆಚ್ಚಿಸಲು ಸದರಿ ಉಪಯುಕ್ತವಾಗಿರುತ್ತದೆ.

ಕಾರ್ಮಿಕರ ಆರೋಗ್ಯದ ಕುರಿತು ಅರಿವು ಮೂಡಿಸುವ ಈ ಪ್ರಯತ್ನಕ್ಕಾಗಿ ಕಾರ್ಖಾನೆಗಳು, ಬಾಯ್ಲರುಗಳು, ಕೈಗಾರಿಕಾ ಸುರಕ್ಷತೆ ಮತ್ತು ಸ್ವಾಸ್ಥ್ಯ ಇಲಾಖೆಯ ಅಧಿಕಾರಿಗಳಿಗೆ ಅಭಿನಂದನೆಗಳು.

ಇಲಾಖೆಯ ಅರಿವು ಮೂಡಿಸುವ ಅಭಿಯಾನವು ಯಶಸ್ವಿಯಾಗಿ ಕೈಗಾರಿಕೆಗಳಲ್ಲಿ ಸುರಕ್ಷಿತ ಮತ್ತು ಆರೋಗ್ಯಕರ ವಾತಾವರಣ ಮೂಡಲಿ ಎಂದು ಹಾರೈಸುತ್ತೇನೆ.

ದಿ: 27.05.22

ಬೆಂಗಳೂರು

ಶುಭ ಹಾರೈಕೆಗಳೊಂದಿಗೆ

ಅರಬ್ಬಿಲ್ ಶಿವರಾಮ ಹೆಬ್ಬಾರ್

ಮನೋಜ್ ಜೈನ್, ಭಾ.ಆ.ಸೇ

ಸರ್ಕಾರದ ಕಾರ್ಯದರ್ಶಿ
ಕಾರ್ಮಿಕ ಇಲಾಖೆ



MANOZ JAIN, I.A.S

Secretary to Government
Labour Department

ಸಂದೇಶ

ಕಾರ್ಖಾನೆಗಳು ಮತ್ತು ಬಾಯ್ಲರುಗಳು ಕೈಗಾರಿಕಾ ಸುರಕ್ಷತೆ ಮತ್ತು ಸ್ವಾಸ್ಥ್ಯ ಇಲಾಖೆಯು ಕರ್ನಾಟಕ ರಾಜ್ಯ ಸುರಕ್ಷತಾ ಸಂಸ್ಥೆಯ ಮೂಲಕ ಕಾರ್ಮಿಕರಿಗೆ ಸುರಕ್ಷತೆ ಮತ್ತು ಆರೋಗ್ಯದ ಕುರಿತು ಅರಿವು ಮೂಡಿಸಲು ತರಬೇತಿ ಕಾರ್ಯಕ್ರಮಗಳನ್ನು ನಡೆಸುತ್ತಿದೆ.

ಇದನ್ನು ಮುಂದುವರಿಸಿ ಕಾರ್ಖಾನೆಗಳಲ್ಲಿ ಕೆಲಸ ನಿರ್ವಹಿಸುವ ಸಾಮಾನ್ಯ ಕಾರ್ಮಿಕರಿಗೆ ಕುಡಿಯುವ ನೀರಿನ ಬಗ್ಗೆ ಅರಿವು ಮೂಡಿಸಲು “ಜಲಪಾನ” ಕೈಪಿಡಿ ಯನ್ನು ಹೊರತರುತ್ತಿರುವುದು ವಿಶೇಷವಾಗಿರುತ್ತದೆ.

ಈ ಕೈಪಿಡಿ ಹೊರತರಲು ಶ್ರಮಿಸಿದ ಇಲಾಖೆಯ ಅಧಿಕಾರಿಗಳು ಹಾಗೂ ಲೇಖಕರಾದ ಡಾ|| ಹೆಚ್.ಕೆ. ರುದ್ರಸ್ವಾಮಿ ಹಾಗೂ ರಾಷ್ಟ್ರೀಯ ಸುರಕ್ಷಾ ಪರಿಷತ್ ಕರ್ನಾಟಕ ಇಲಾಖೆಯ ಪದಾಧಿಕಾರಿಗಳಿಗೂ ಅಭಿನಂದನೆಗಳನ್ನು ತಿಳಿಸುತ್ತಾ ಕಾರ್ಮಿಕರಿಗೆ ಕುಡಿಯುವ ನೀರಿನ ಬಗ್ಗೆ ಹೆಚ್ಚಿನ ಅರಿವು ಮೂಡಿಸುವ ಇಲಾಖೆಯ ಅಭಿಯಾನವು ಯಶಸ್ವಿಯಾಗಲಿ ಎಂದು ಹಾರೈಸುತ್ತೇನೆ.

ದಿ: 27.05.22

ಬೆಂಗಳೂರು

ಶುಭ ಇಚ್ಛೆಯೊಂದಿಗೆ,

ಮನೋಜ್ ಜೈನ್, ಐ.ಎ.ಎಸ್.,
ಸರ್ಕಾರದ ಕಾರ್ಯದರ್ಶಿ,
ಕಾರ್ಮಿಕ ಇಲಾಖೆ.

ಮುನ್ನುಡಿ

ರಾಜ್ಯದಲ್ಲಿ ಸುಮಾರು 17,000 ನೊಂದಾಯಿತ ಕಾರ್ಖಾನೆಗಳು ಕಾರ್ಯನಿರ್ವಹಿಸುತ್ತಿದ್ದು ಇವುಗಳಲ್ಲಿ 6.00 ಲಕ್ಷ ಮಹಿಳಾ ಕಾರ್ಮಿಕರನ್ನೊಳಗೊಂಡಂತೆ 17.00 ಲಕ್ಷ ಕಾರ್ಮಿಕರು ಕೆಲಸ ನಿರ್ವಹಿಸುತ್ತಿರುತ್ತಾರೆ. ಇದರಲ್ಲಿ ಕಡಿಮೆ ವಿದ್ಯಾರ್ಹತೆ ಹೊಂದಿರುವ ಕಾರ್ಮಿಕರು ಬಹಳಷ್ಟು ಸಂಖ್ಯೆಯಲ್ಲಿದ್ದು ಇವರಿಗೆ ಕೈಗಾರಿಕಾ ಸುರಕ್ಷತೆ ಮತ್ತು ಆರೋಗ್ಯದ ಕುರಿತು ಅರಿವು ಮೂಡಿಸುವ ಅಗತ್ಯವಿರುತ್ತದೆ.

ಈಗಾಗಲೇ ನೊಂದಾಯಿತ ಕಾರ್ಖಾನೆಗಳ ಕಾರ್ಮಿಕರು, ಐಟಿಐ ವಿದ್ಯಾರ್ಥಿಗಳು ಹಾಗೂ ಅತಿ ಸಣ್ಣ ಕಾರ್ಖಾನೆಗಳ ಮಾಲೀಕರಿಗೆ “ಕೈಗಾರಿಕೆಗಳಲ್ಲಿ ಸುರಕ್ಷತೆ ಮತ್ತು ಆರೋಗ್ಯ” ಹಾಗೂ “ಸುರಕ್ಷತೆಯ ಅರಿವು” ಕೈಪಿಡಿಗಳ ಮೂಲಕ ಅರಿವು ಮೂಡಿಸುವ ಅಭಿಯಾನದಲ್ಲಿ ನಿರತವಾಗಿದೆ. ಇದನ್ನು ಮುಂದುವರಿಸಿ ಸಾಮಾನ್ಯ ಕಾರ್ಮಿಕರಲ್ಲಿ ಕುಡಿಯುವ ನೀರಿನ ಕುರಿತಂತೆ ಜಾಗೃತಿ ಮೂಡಿಸಲು “ಜಲಪಾನ” ಕೈಪಿಡಿಯನ್ನು ಹೊರತರಲಾಗುತ್ತಿದೆ.

ಈ ಕೈಪಿಡಿ ಹೊರತರಲು ಪ್ರೇರಣೆ ಹಾಗೂ ಪ್ರೋತ್ಸಾಹ ನೀಡಿದ ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ಮಾನ್ಯ ಕಾರ್ಮಿಕ ಸಚಿವರು ಹಾಗೂ ಸರ್ಕಾರದ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕಾರ್ಮಿಕ ಇಲಾಖೆ ಇವರಿಗೆ ಕೃತಜ್ಞತೆಗಳನ್ನು ಅರ್ಪಿಸಲಾಗಿದೆ.

ಈ ಕೈಪಿಡಿಯನ್ನು ಇಲಾಖೆಯ ಪರವಾಗಿ ತಯಾರಿಸಲು ಇಲಾಖೆಯ ಜೊತೆಗೂಡಿ ವಿಶೇಷವಾಗಿ ಶ್ರಮಿಸಿ ಅಗತ್ಯ ಸಂಖ್ಯೆಯ ಪ್ರತಿಗಳನ್ನು ಮುದ್ರಿಸಿ ಒದಗಿಸಿದ ರಾಷ್ಟ್ರೀಯ ಸುರಕ್ಷಾ ಪರಿಷತ್, ಕರ್ನಾಟಕ ಘಟಕದ ಪದಾಧಿಕಾರಿಗಳಿಗೆ ಹಾಗೂ ಪುಸ್ತಕವನ್ನು ವೈಜ್ಞಾನಿಕ ದೃಷ್ಟಿಕೋನದಲ್ಲಿ ಬರೆದ ಡಾ. ಹೆಚ್. ಕೆ. ರುದ್ರಸ್ವಾಮಿ MBBS, AFIH. ಇವರಿಗೆ ವಿಶೇಷ ಅಭಿನಂದನೆಗಳು

ಅಗತ್ಯವಾದ ಪ್ರಮಾಣದಲ್ಲಿ ನೀರನ್ನು ಸೇವಿಸದಿದ್ದಲ್ಲಿ ಉಂಟಾಗಬಹುದಾದ ಪರಿಣಾಮಗಳು ಮತ್ತು ಪೂರಕ ವಿಷಯಗಳ ಬಗ್ಗೆ ವೈಜ್ಞಾನಿಕ ದೃಷ್ಟಿಕೋನದಿಂದ ಸಾಮಾನ್ಯ ಕಾರ್ಮಿಕರಿಗೆ ಸರಳವಾಗಿ ಮನವರಿಕೆ ಮಾಡಲು ಉದ್ದೇಶಿಸಿದ್ದು, ಇದರಿಂದ ಕಾರ್ಮಿಕರಿಗೆ ಹೆಚ್ಚಿನ ಅರಿವು ಉಂಟಾಗಿ ಆರೋಗ್ಯಕರ ಜೀವನ ನಡೆಸಲು ಸಹಕಾರಿಯಾಗುತ್ತದೆಂದು ಆಶಿಸಿದೆ.



ಕೆ. ಶ್ರೀನಿವಾಸ

ನಿರ್ದೇಶಕರು

ಸ್ಥಳ : ಬೆಂಗಳೂರು

ದಿನಾಂಕ : 27.05.2022

ಕಾರ್ಖಾನೆಗಳು, ಬಾಯ್ಲರುಗಳು, ಕೈಗಾರಿಕಾ
ಸುರಕ್ಷತೆ ಮತ್ತು ಸ್ವಾಸ್ಥ್ಯ ಇಲಾಖೆ, ಬೆಂಗಳೂರು

ಸಂದೇಶ

ಕುಡಿಯುವ ನೀರು ಮಾನವನ ಮೂಲಭೂತ ಅವಶ್ಯಕತೆಯಾಗಿರುತ್ತದೆ. ಕುಡಿಯಲು ಶುದ್ಧವಾದ ನೀರು ಲಭ್ಯವಾಗದೇ ಇದ್ದಲ್ಲಿ ಅಥವಾ ಅಗತ್ಯ ಪ್ರಮಾಣದಲ್ಲಿ ನೀರನ್ನು ಕುಡಿಯದೇ ಇದ್ದಲ್ಲಿ ಹಲವಾರು ಆರೋಗ್ಯದ ಸಮಸ್ಯೆಗಳಿಗೆ ಕಾರಣವಾಗುತ್ತದೆ.

ಕಾರ್ಖಾನೆಗಳು, ಬಾಂಧ್ವರುಗಳು, ಕೈಗಾರಿಕಾ ಸುರಕ್ಷತೆ ಮತ್ತು ಸ್ವಾಸ್ಥ್ಯ ಇಲಾಖೆಯು ಕುಡಿಯುವ ನೀರಿನ ಬಗ್ಗೆ ಕಾರ್ಮಿಕರಲ್ಲಿ ಅರಿವು ಮೂಡಿಸಲು “ಜಲಪಾನ” ಕೈಪಿಡಿಯನ್ನು ಹೊರತರುತ್ತಿದ್ದು ಈ ಅಭಿಯಾನದಲ್ಲಿ ರಾಷ್ಟ್ರೀಯ ಸುರಕ್ಷಾ ಪರಿಷತ್ ಕೈ ಜೋಡಿಸುವುದು ಸಂತಸದ ವಿಷಯವಾಗಿರುತ್ತದೆ.

“ಜಲಪಾನ” ಕೈಪಿಡಿಯು ಕುಡಿಯುವ ನೀರಿನ ಕುರಿತಂತೆ ಅಗತ್ಯವಾದ ಪ್ರಾಥಮಿಕ ತಿಳುವಳಿಕೆ ಮತ್ತು ಅರಿವು ನೀಡುವ ನಿಟ್ಟಿನಲ್ಲಿ ಉಪಯುಕ್ತವಾಗುತ್ತದೆಂದು ಆಶಿಸಿದೆ.

ಇಲಾಖೆಯ ಉತ್ತಮ ಅಭಿಯಾನಕ್ಕಾಗಿ ರಾಷ್ಟ್ರೀಯ ಸುರಕ್ಷಾ ಪರಿಷತ್‌ವತಿಯಿಂದ ಅಭಿನಂದನೆಗಳು. ಸಂಸ್ಥೆಯು ಸಹ ಈ ಅಭಿಯಾನದಲ್ಲಿ ಪಾಲುದಾರರಾಗಿ ಅರಿವು ಮೂಡಿಸುವ ಕ್ರಮಗಳನ್ನು ಮುಂದುವರೆಸುತ್ತದೆ ಎಂದು ತಿಳಿಸಲು ಇಚ್ಛಿಸುತ್ತೇನೆ.

ದಿ: 27.05.22

ಬೆಂಗಳೂರು

ಶುಭ ಇಚ್ಛೆಯೊಂದಿಗೆ

ಪಿ.ಸಿ. ವೆರಕಟೇಶ್ವರರು

ಕಾರ್ಯದರ್ಶಿಗಳು,

ರಾಷ್ಟ್ರೀಯ ಸುರಕ್ಷತಾ ಸಂಸ್ಥೆ

(ಕರ್ನಾಟಕ ಘಟಕ)

About the Author

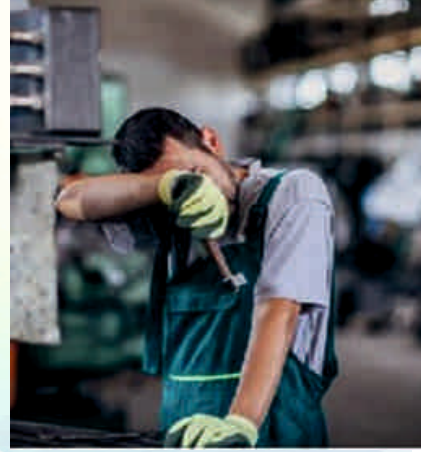
Dr. Rudraswamy HK, MBBS, AFIH is an Occupational Health Physician currently working with Volvo Group India Private Limited, Bangalore and has worked in several factories since 2007. During his tenure as a factory medical officer in various factories, he has seen the hardships of the workers from a close quadrant and has put a lot of effort to improve their health. To this end, the book "Practicing Occupational Health in Industries" is written about how doctors and nurses working in the field of occupational health can provide quality services. In addition, through his website **occupationalhealth.in**, he regularly shares articles on occupational health and encourage everyone to participate in knowledge sharing. The author has happily joined hands with the department of factories boilers industrial safety and health in their effort to make workers more aware of the drinking water.



1. WHY IS WATER IMPORTANT FOR LIFE?

Case-1

On a hot sunny afternoon, Mr. Siddappa, a 39 year old worker in the steel industry reported to the occupational health center within the company premises with complaints of feeling dizzy, weak, inability to concentrate at work and headaches. Upon examination, the doctor found a dry tongue, rapid pulse, and low blood pressure. The doctor took a detailed history and found that Mr. Siddappa engaged in physically intense work from morning and was sweating. He forgot to drink water in between as he was completely engrossed with work. The doctor explained to Mr. Siddappa that his symptoms were due to dehydration and this happens when we don't drink enough water required by the body. This could easily have been prevented if he drank water in between work. The doctor also added that not drinking enough water can lead to more serious problems hence the need to pay more attention to adequate hydration. He further asked Mr. Siddappa to drink water in between work and monitor his urine color - which should be light yellow or clear- and drink more water. The doctor advised the nurse to immediately provide drinking water with oral rehydration salts to the employee.

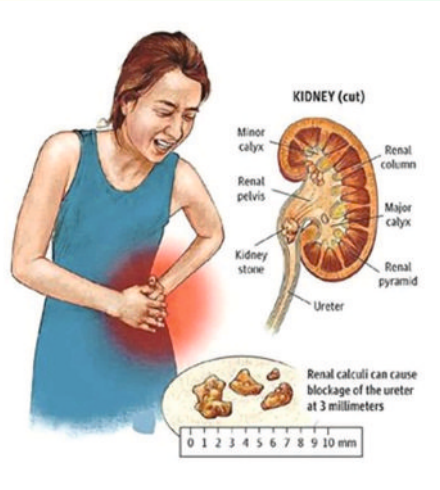


Case-2

Ms. Sujata, a 35-year-old woman working as a marketing executive for a private company was admitted to a hospital with severe abdominal pain. She also had a complaint of recurrent

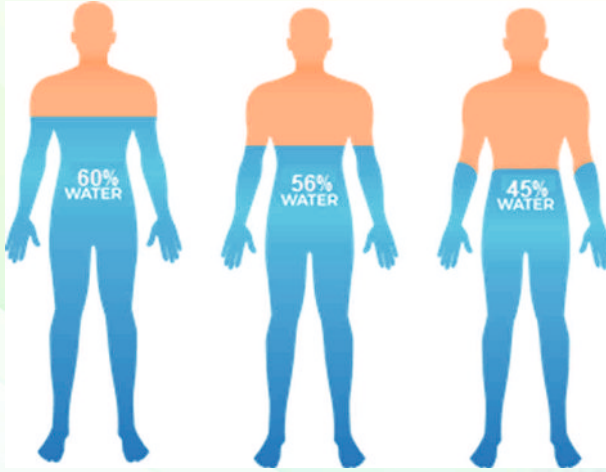
urinary tract infections and constipation. After examination and tests, she was diagnosed to have kidney stones which was responsible for her severe abdominal pains. The doctor asked about her diet as well as the quantity of water she consumes. Ms. Sujata explained that her marketing job did not afford her adequate time to

plan her meals, she ends up eating outside most of the time, and does not drink enough water as she does not have access to drinking water often, which has become a habit now. The doctor explained the short- and long-term health effects of drinking less water and this explained her current condition. He asked the patient to carry along water with her always and drink enough water and gave medication for the current medical condition.



Why water is important for life?

Water makes up 60-75% of human body weight. A loss of just 4% of total body water leads to dehydration, while a loss of 15% can be fatal. Likewise, a person can survive a month without food but wouldn't survive 3 days without water. This crucial dependence on water broadly governs all life forms. Water is vital for survival, but what makes it so necessary?



ಸಾಮಾನ್ಯ

ನಿರ್ಜಲೀಕರಣ

ಮಾರಕ

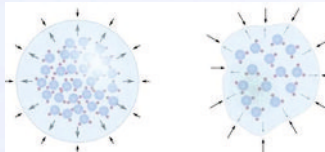
Water is the “Universal Solvent”

Biologically, water's role as a solvent helps cells transport and use substances like oxygen or nutrients. Water-based solutions like blood help carry molecules to the necessary locations. Thus, water's role as a solvent facilitates the transport of molecules like oxygen for respiration and has a major impact on the ability of drugs to reach their target organs or tissues. Water is crucial for excreting toxins from the body through urine and other modes.

Water Supports Cellular Structure

Water allows everything inside cells to have the right shape at the molecular level. As the shape is critical for biochemical processes, this is also one of water's most important roles.

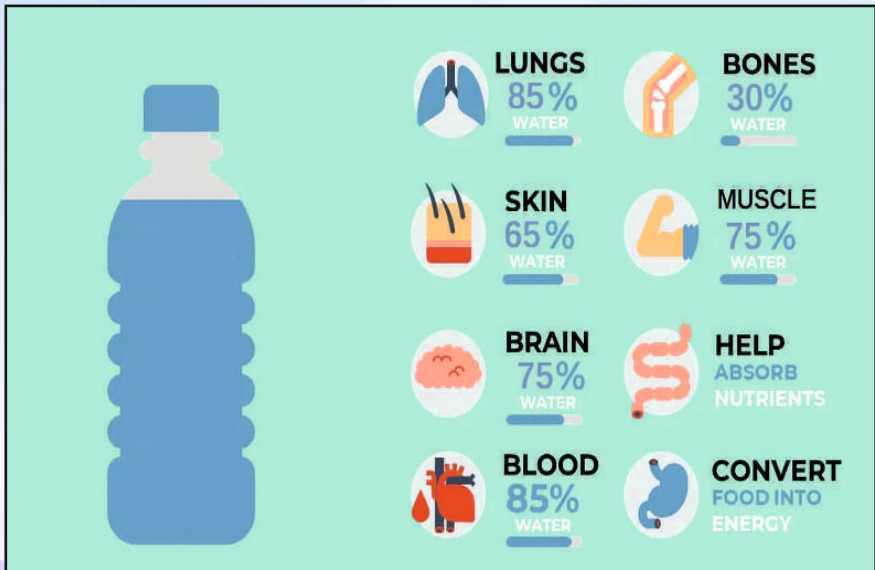
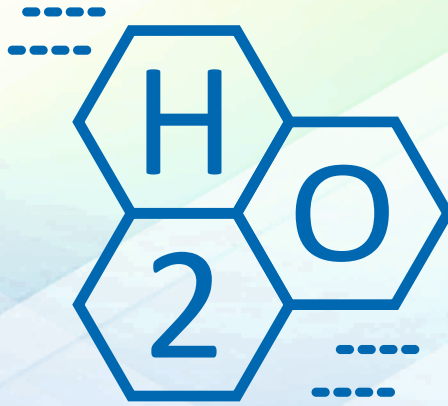
(Hydrated cell)



(Dehydrated cell)

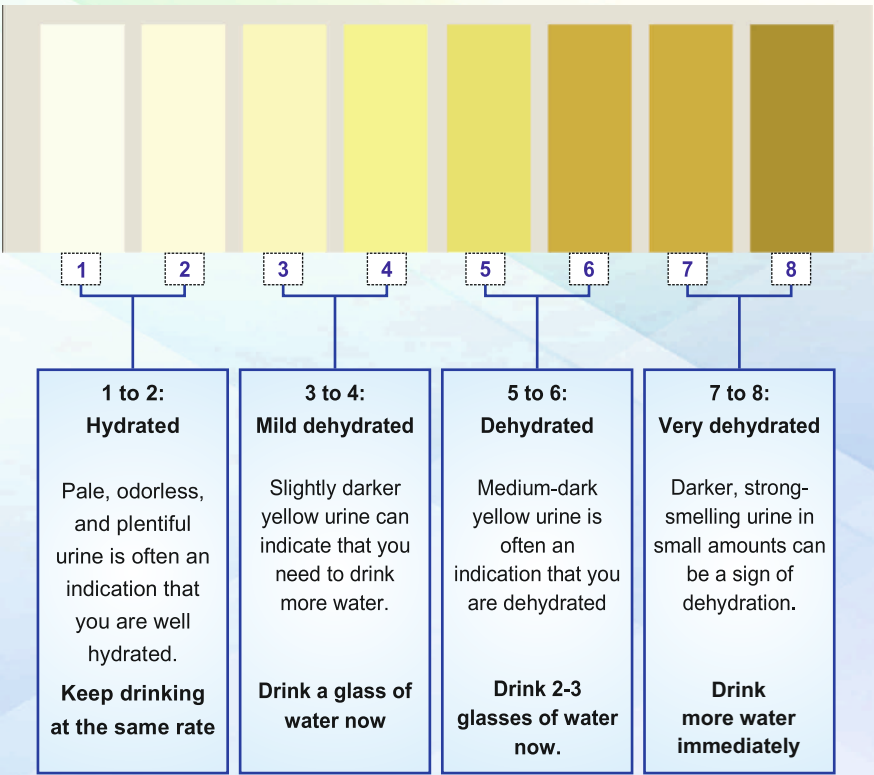
Chemical Reactions of Water

Water is directly involved in many chemical reactions to build and break down important components of the cell. Photosynthesis, the process in plants that creates sugars for all life forms, requires water. Water also participates in building larger molecules in cells.



2. URINE COLOR CHART

Usually, the color of urine varies from light-yellow to brown-yellow, depending on how much water we drink and many other factors. One can make an estimate of how much water we've had by looking at urine color.



Important Note: Certain foods, medications and vitamin supplements may change your urine color even if you are not dehydrated. The colors on this chart should only be used as a guide and should not replace the advice of a health professional. Speak to your doctor if you are worried about the color of your urine, the amount of water you drink, or your level of hydration.

3. WHAT DOES WATER CONTAIN

Naturally occurring salts & other dissolved solids



Calcium, Magnesium, Sodium, Chlorides, Potassium, Sulfates, Bicarbonates are commonly found in water. Depending on the source of water, the concentration of these may vary. When present in higher concentrations, water becomes salty and less tasty. Few of these are essential minerals and do

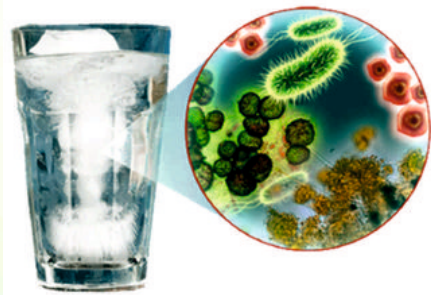
not pose health risks in the concentration found in drinking water.

Chemical contaminants

Various harmful contaminants may also be present in water. Heavy metals (mercury, lead, arsenic), pesticides, industrial pollution and other chemicals are common contaminants found in water. These can pose health risks when their levels cross acceptable limits. If you suspect your drinking water source might be contaminated or test results show high levels of these, then a suitable method of water purification should be adopted before drinking. Reverse osmosis can effectively filter chemical contaminants.

Disease-Causing germs

Germs may be present when there is contamination of a water source with a sewer line, fecal matter from humans or animals. These germs can be easily killed by boiling water or by other methods of purification like chlorination and filtration.



What is TDS?

TDS or Total Dissolved Solids means concentration of dissolved particles or solids in water. TDS comprises of inorganic salts such as calcium, magnesium, chlorides, sulfates, bicarbonates, etc., along with a few other inorganic compounds that easily dissolve in water.

TDS impacts the salinity of the water. If you feel that water at your home tastes salty and is not very tasty, your source of water is likely to have an elevated level of TDS. At very high levels of TDS, it becomes difficult to consume water without purification.

What is an acceptable level of TDS?

Though high TDS reduces the palatability of water, completely removing all solids is also not recommended, as we can lose important minerals essential for body functions. The lower limit is not mentioned in WHO guidelines for drinking water quality standards or Indian Standard Drinking Water -Specification IS 10500:2012.

Standard / Guideline	Acceptable Limits of TDS
WHO Guidelines for Drinking Water - Quality	Less than 600 (Not on health grounds but palatability grounds)
IS 10500 : 2012 Indian Standard Drinking Water - Specification	Less than 500



How can we reduce TDS?

It is important to keep TDS levels as per the guidelines to make water palatable but going too close to the extreme end of the spectrum is not advisable even though no guidelines are available for lower limits. Reverse osmosis is an effective way of reducing TDS. It removes germs and harmful chemicals to a great extent. But it may be important to consider options of re-mineralization with essential minerals after the reverse osmosis process to ensure essential minerals are added back.

TDS checking



4. WHEN IS WATER CONSIDERED SAFE FOR DRINKING?

Safe drinking water is defined as water that does not present any significant risk to health over a lifetime of consumption.

Properties of safe drinking water



Should be free of tastes and odors that would be objectionable

Should be free of colors that would be objectionable



Should be free of disease-causing microorganisms

Should be free from harmful chemicals



Should be free from radionuclides

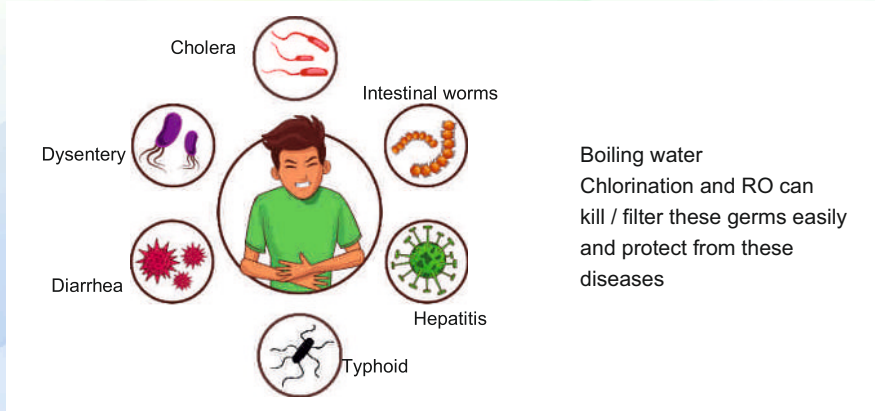
Drinking unsafe water can cause health problems. It may lead to unbearable illness and also has the potential to be an economic burden. It is strongly advisable to make all the arrangements to get safe drinking water.

5. WHAT DISEASE CAN OCCUR IF WE CONSUME UNSAFE WATER?

Contaminated water is estimated to result in more than half a million deaths per year. Contaminated water is a major cause of illness and death. Water quality is a determining factor in human poverty, education, and economic opportunities.

Infectious diseases

Unpurified water may contain germs that are invisible to the naked eye and can cause serious diseases as mentioned below.



Diarrhea: Virus, Bacteria, Parasites in the water are the main reason for Diarrhea.

Cholera: Cholera is an infectious disease that causes severe watery diarrhea, which can lead to dehydration and even death if untreated.

Typhoid: Typhoid is a bacterial infection that can lead to a high fever, diarrhea, and vomiting. It can be fatal.

Dysentery: Dysentery is inflammation and infection of the intestines, which results in diarrhea containing blood or mucus.

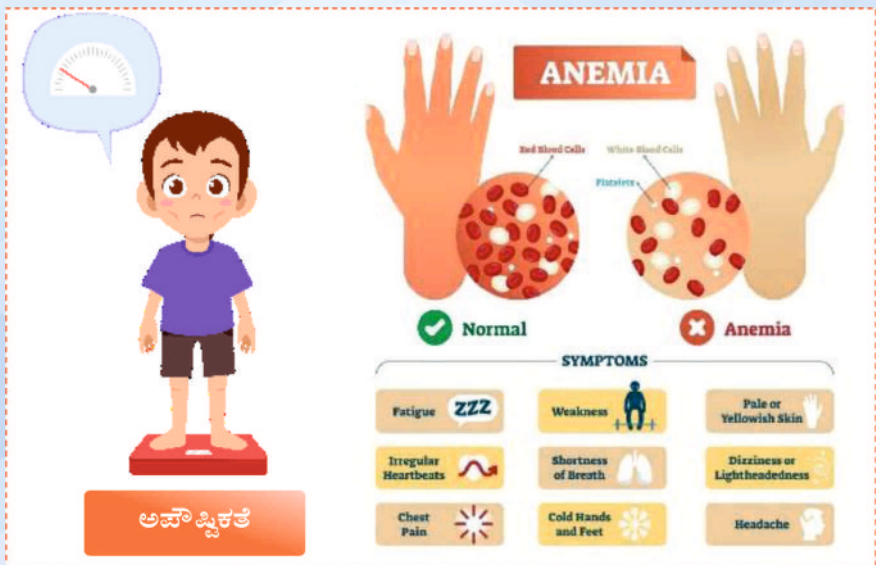
Hepatitis: Hepatitis is inflammation of the liver. Inflammation is swelling that happens when tissues of the body are injured or infected. It can damage your liver.

Intestinal Worms: Protozoal and Helminthic disease. Intestinal worms, or parasitic worms, are simple organisms that feed off the human body. These can present with various symptoms, malnutrition, and some serious complications.

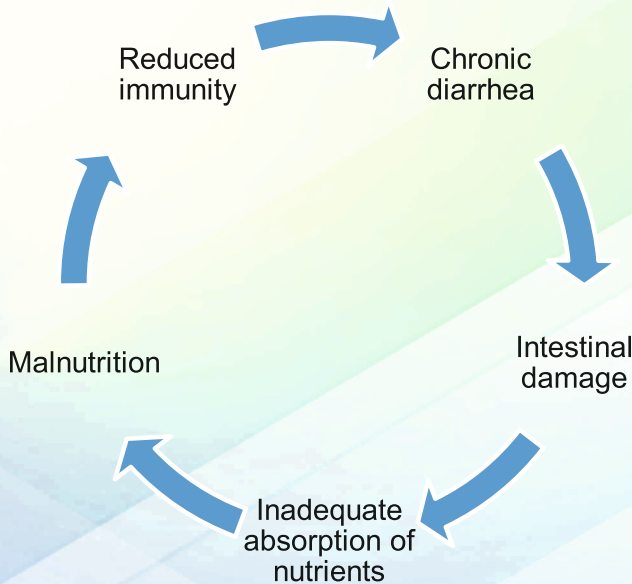
Indirect effects on health - Malnutrition

Infectious diseases can cause protein-energy malnutrition, especially in children, which will decrease the children's resistance to infections, including water-related diarrheal diseases. Infectious diseases are one of the most common causes of stunted growth among children.

Anemia can occur due to intestinal worm infestation. Anemia is a condition where hemoglobin content in the blood is reduced and causes fatigue, weakness, chest pain and various other symptoms. Due to these, productivity, and quality of life of the person deteriorates and may lead to other serious conditions. Its effect on pregnant, lactating women and children is even more serious and affects growth & development negatively.

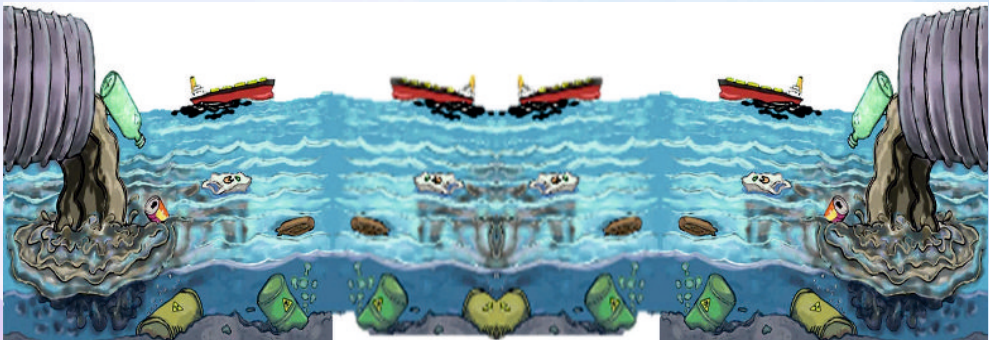


Diarrhea & Malnutrition: A Relentless Loop



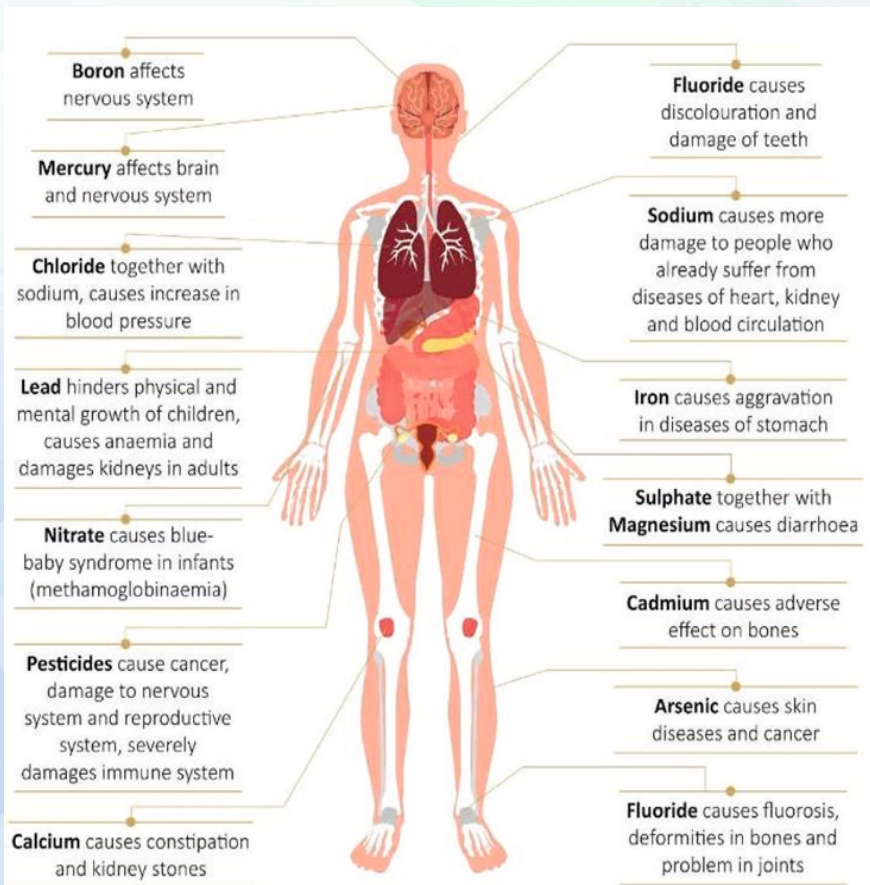
Chemical contamination

Usually, chemical contamination leads to diseases after consumption for a long period of time e.g., Fluorosis. Other common chemical contaminants are Arsenic, Selenium, Uranium, Iron, Manganese, Agricultural chemicals, waste discharges from industries containing heavy metals, solvents, oils, etc. All these can cause adverse effects on health if the recommended limits are exceeded.



Nitrate in drinking water can cause cyanosis, a reduction of the oxygen-carrying capacity of the blood. This is particularly dangerous to infants under six months of age. Lead can enter the water supply as it leaches from copper pipelines. As the water streams through the pipes, small amounts of lead will dissolve in the water, contaminating it. Lead is a toxic substance that is rapidly absorbed into the body, particularly those of small children. It causes lead poisoning

Impact of prolonged consumption of contaminated drinking water on human body



6. WHAT GENERAL PRECAUTIONS TO BE TAKEN BEFORE USING DRINKING WATER?



Know your source of drinking water.
It is important to decide what kind of purification is required.

Do not drink water from public taps directly unless it is declared safe for drinking.



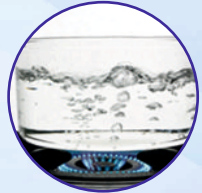
Do not drink water directly from open wells, lakes, ponds, streams, swimming pools, water meant for garden use, STP treated water.

Avoid swallowing water in swimming pools, water parks, hot tubs, spas, and fountains.



Only drink water from trusted sources.

If there is no access to safe drinking water, follow one of the methods mentioned in the next chapter.



Avoid drinking water from roadside eateries or hotels where hygiene is not guaranteed.

Carry your drinking water while going out.



Hygiene Measures



If hands are soiled, wash with soap and water before drinking water.

Do not touch drinking water with your fingers or hands. This will contaminate the water.



Use a clean tumbler to fetch water for drinking. Do not touch the tip of the tumbler.

Store drinking water in clean containers and away from washrooms.



Only drink water from trusted sources

Store water always covered with a lid.



7. WHAT ARE THE METHODS TO MAKE WATER POTABLE?

If there is no access to safe drinking water, there are methods to make water potable. Depending on the availability of resources and water sources, we can choose one or more methods mentioned in this chapter.

1 – Boiling

Pre-treatment

If water is cloudy/ muddy or contains visible impurities: Filter the water through a clean cloth (fold it in half three times to form eight layers) OR allow the solid particles to settle. Then collect the clear water for boiling.



Boiling

Bringing water to a rolling boil is the most effective way to kill all disease-causing pathogens.

- Continue boiling for a minute after the water bubbles start to come down from the bottom of the pot (Rolling boil).
- Then leave to cool. Do not mix cold water or ice to cool the water.
- Boiled water should be left in the same container. Should not be transferred to another vessel.



- Wash your hands with soap before collecting water from the container for drinking. Pour water into the glass without touching the container.
- Do not drink very hot water. Allow it to cool before drinking.

2 – Chlorination

If it is not possible to boil water, chlorination is another effective method to disinfect water.

Pre-treatment

If water is cloudy/muddy or contains visible impurities, then filter the water through a clean cloth (fold it in half three times to form eight layers) OR allow the solid particles to settle. Then collect the clear water for chlorination.

Chlorination

Chemical disinfection of clear, non-turbid water is effective for killing bacteria and viruses and some protozoa (but not, all for example, *Cryptosporidium*). Chlorine and iodine are the chemicals most used for disinfection. Chlorine tablets are available in the market and can be purchased directly.



3 – Filtration

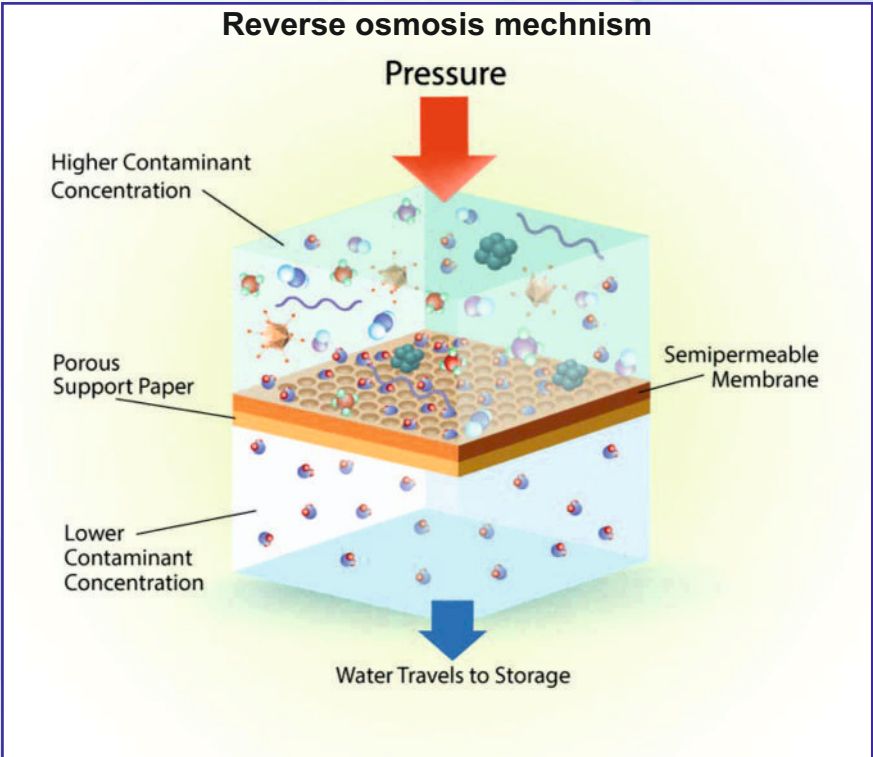
The disadvantages with boiling and chlorination methods are that they do not remove chemical impurities present in the water. It can be addressed by using various commercially available water filters which have one or more combinations of various types of filtering mechanisms. Through filtration, undesirable chemical compounds, organic or inorganic and biological contaminants are removed from the water. It may be important to consider the re-mineralization process is inbuilt when using a reverse osmosis filter to get drinking water.

Which type of water purification is good?

Depending on the source of water you can decide which type of water purification method is required. For example, if your water source TDS level is within the acceptable limit and coming from a known clean source that is not contaminated with harmful chemicals, then simply boiling or ultrafiltration or ultraviolet radiation-based purifier is enough. If your water has very high levels of TDS or comes from an unknown source, then it is better to take a reverse osmosis purifier. If you consider going for a reverse osmosis type of filter, it may be very important to choose the purifier with a re-mineralization option or the one which has the technology to selectively retain essential minerals.



Type of purification		Can filter or destroy germs?			Can it filter harmful chemicals?	Capability to decrease TDS?
		Protozoa	Bacteria	Virus		
Reverse Osmosis		Excellent	Excellent	Excellent	Excellent	Excellent
Filtration	Micro	Excellent	Moderate effectiveness	Not effective	Not effective	Not effective
	Ultra	Excellent	Excellent	Moderate effectiveness	Low effectiveness	Low effectiveness
	Nano	Excellent	Excellent	Excellent	Moderate effectiveness	Moderate effectiveness
Ultraviolet radiation		Excellent	Excellent	High effectiveness	Not effective	Not effective
Boiling		Excellent	Excellent	Excellent	Not effective	Not effective
Chlorination		Excellent	Excellent	Excellent	Not effective	Not effective



8. HOW MUCH WATER IS TO BE CONSUMED PER DAY?

The quantity of water to be consumed per day depends on many factors (both internal and external) which ultimately affect how much water you need.

It is commonly recommended to have **30ml / Kg body weight per day**. For an average healthy adult, it comes to around eight glasses of water per day which is equal to 2 liters. It is very easy to remember. However, you might need to drink more water based on several factors.



When we need to drink more water?

Exercise	Environment	Overall Health	Pregnancy & Breastfeeding
If you engage in any activities that make you sweat, you need to drink extra water to cover for the fluid loss. It is important to drink water before, during, and after a workout	Hot or humid weather can make you sweat and requires additional fluid. Dehydration also can occur at high altitudes.	Your body loses fluids when you have a fever, vomiting, or diarrhea. Drink more water or follow a doctor's recommendation to drink oral rehydration solutions. Other conditions that might require increased fluid intake include bladder infections and urinary tract stones	If you are pregnant or breastfeeding, you may need additional fluids to stay hydrated.

How do I know if I am drinking enough water?

Your fluid intake is probably adequate if:

- You rarely feel thirsty
- Your urine is colorless or light yellow

To prevent dehydration, make sure your body has the fluids it needs, make water your beverage of choice. It is a good idea to drink a glass of water:

- After each meal and between two meals
- Before, during, and after exercise
- If you feel thirsty

Should I worry about drinking too much water?

Drinking too much water is rarely a problem for healthy, well-nourished adults. However, it can cause health effects in certain individuals with kidney or heart problems. It is advisable to follow your doctor's advice if you have any health ailments.



9. WHAT WILL HAPPEN IF WE DRINK LESS WATER?

Not drinking enough water leads to immediate health effects as well as long term health effects. Few of these are described below.

THE SHORT-TERM HEALTH EFFECTS

Dehydration

Not drinking enough water causes dehydration which affects various organs in the body. Dehydration is the absence of a sufficient amount of water in your body. Dehydration occurs when you use or lose more fluid than you take in, and your body doesn't have enough water and other fluids to carry out its normal functions. If you don't replace lost fluids, you will get dehydrated.

Signs & symptoms of dehydration

Even minor dehydration can cause a lot of fatigue and affect your body's ability to perform essential functions. Dehydration can occur easier than you think. Drinking water is essential.

Mild dehydration

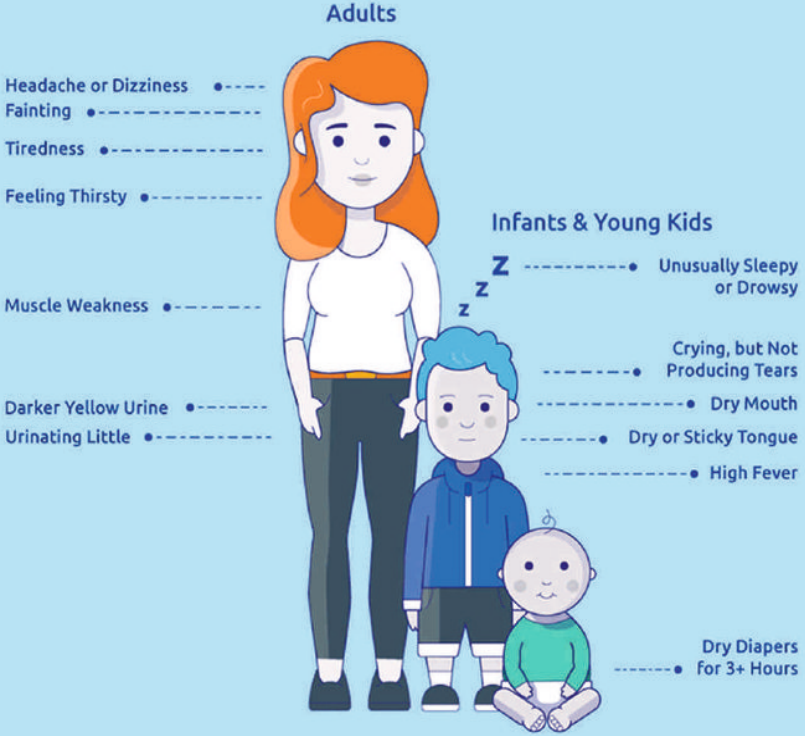
- ♦ Tiredness, fatigue, weakness
- ♦ Thirsty
- ♦ Headache
- ♦ light-headedness
- ♦ Dry mouth and/or a dry cough, dry lips
- ♦ Urinating less often
- ♦ Dark-colored urine
- ♦ Muscle cramps
- ♦ Inability to focus on tasks, lethargy
- ♦ Anger

Severe dehydration

- ♦ Apart from symptoms of mild dehydration:
- ♦ A temperature 103° or higher
- ♦ Muscle twitching.
- ♦ Red, hot, dry skin.
- ♦ Nausea.
- Rapid pulse.
- Seizures.
- Lack of sweating.
- Confusion, altered mental state, slurred speech.
- Dizziness.
- Fainting, loss of consciousness.
- Hallucinations.



What to Look For



How is dehydration treated?

Drink water. You could also try increasing your hydration with oral rehydration salt (ORS) – powders you mix in with your water.

When should I seek medical help about dehydration? At what point is dehydration dangerous?

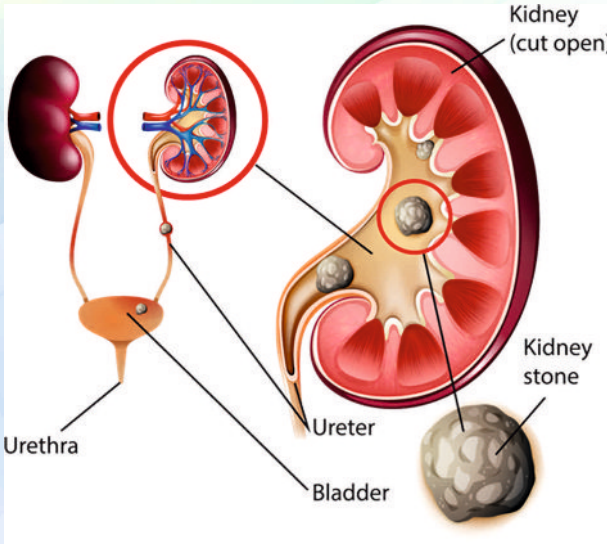
Always drink water immediately if you feel thirsty. Remember – if you feel thirsty, you are already dehydrated. You may see the symptoms of dehydration improve in as little as five to ten minutes.

If you think your symptoms of dehydration are severe, do not hesitate to seek help! Dehydration can contribute to kidney stones, kidney failure, and heatstroke. These are all life-threatening illnesses. Call 108 or go to the hospital right away.

LONG TERM HEALTH EFFECTS

Kidney Stones

Kidney stone (renal calculi) are hard deposits made of minerals and salts that form inside the kidneys. Kidney stones can affect any part of your urinary tract — from kidneys to bladder.



How these are formed

Kidney stones often have no definite single cause, although several factors may increase risk. Kidney stones form when urine contains more crystal-forming substances - such as calcium, oxalate, and uric acid - than the fluid in your urine can dilute. At the same time, your urine may lack substances that prevent crystals from sticking together, creating an ideal environment for kidney stones to form. Often, stones form when the urine becomes concentrated, allowing minerals to crystallize and stick together.

Risk factors

Not drinking enough water

Not drinking enough water each day. People who live in warm, dry climates and those who sweat a lot are at higher risk than others.



Certain diets

Eating a diet that is high in animal protein, sodium (salt), and sugar may increase your risk of some types of kidney stones.



Overweight

Family History

Certain supplements:

Vitamin C, calcium-based antacids, dietary supplements, etc,



Symptoms

Pain

Typically noticed at the flank (upper abdomen, back or sides), radiates to the lower abdomen, penis, testicles or labia, and comes in waves.

Nausea or Vomiting

Changes in urination

- Urgency
- Frequency
- Burning sensation during urination
- Urinating small amounts

Changes in urine

- Bloody
- Cloudy
- Foul-smelling

Fever and Chills

Preventive measures

- Drink enough water: Drinking enough water helps in avoiding the formation of stones
- Limit intake of salt, animal protein & sugar
- Cut down the intake of non-vegetarian food, fries, chips, sweets
- Reduce weight
- Eat citrus fruits: Like orange, lemon etc. helps in preventing the formation of stones.



Urinary infections

Drinking water helps dilute your urine and ensures that you will urinate more frequently-allowing bacteria to be flushed from your urinary tract before an infection can begin.

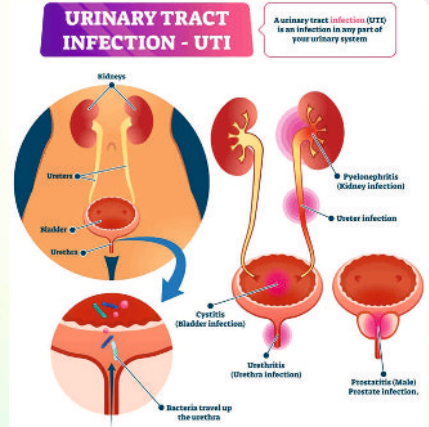
Fatigue and lack of energy

Even mild cases of dehydration can cause feelings of tiredness and negatively impact your body's ability to perform essential functions and it is easier than you may think to become dehydrated.

Constipation and other diseases of the digestive system

Drinking plenty of fluids helps in digestion, intestinal motility, keeps stools smooth and overall helps in easy passing of stool and prevention of constipation.

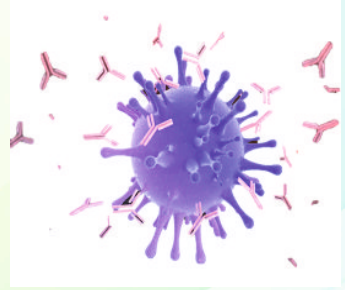
Skin diseases and premature aging



Water plays an essential role in maintaining the integrity of the skin. Not drinking enough water over a period can result in skin losing its firmness and appearing aged and less protective, and in some individuals can even lead to allergies.

Reduced immunity

Mucosal membranes i.e., inner layers of nose, mouth, eyelids, and other body parts need to be well hydrated & moist to function optimally to ward off pathogens, allergens, and toxic substances. Not drinking enough water over a period can lead to a decrease in immunity and lead to diseases.



Symptoms of Dehydration

Infant or young child:

- Dry mouth & tongue
- No tears when crying
- No wet diapers for 3hrs
- Sunken eyes, cheeks
- Sunken soft spot on top of the skull
- Listless or irritable

Adult:

- Extreme thirst
- Urination less frequent
- Urine dark-coloured
- Fatigue
- Dizziness
- Confusion
- Headache



10. FREQUENTLY ASKED QUESTIONS REGARDING DRINKING WATER

Should we drink hot water, regular water, or cold water?

Water which is too hot or cold is not advisable. You can choose to drink lukewarm, regular, or slightly cold as per your liking. It does not matter much from a health perspective unless your doctor specifically advises you on certain health conditions you might be having. What matters the most is whether the water is safe to drink and whether you are drinking enough water.

Some claim drinking hot water helps in digestion, stimulating the intestine, and relieving cold symptoms. But there is little scientific research to support the health benefits of drinking hot water as opposed to room temperature or cold water. Drinking water that is too hot can damage the tissue in your esophagus, burn your taste buds, and scald your tongue. If you enjoy hot water, it is advisable to be careful or drink lukewarm water.

Does water need to be boiled before drinking?

Boiling the water kills all the disease-causing microorganisms in it and renders the water safe from disease-causing pathogens. However, boiling is not required if the micro-organisms have already been removed by other means like filtration. Also, boiling does not filter out harmful chemicals or minerals. If you suspect the water is contaminated with chemicals, it is better to choose other methods which filter harmful chemicals.

Does boiling water change its components like minerals?

Boiling kills microorganisms and renders water safe for drinking. It does not alter mineral composition much.

Can I drink cold water during summer?

Water which is too cold or hot is not advisable. You can choose to drink slightly cold, lukewarm, or regular as per your liking. It does not matter much from a health perspective. What matters the most is whether the water is safe to drink and whether you are drinking enough water.

Can I add Salt, Sugar, or Soda during summer?

Only if you are sweating a lot because of physically intensive activities or because of hot and humid conditions. It is not required in other conditions.

Can I drink water from plastic bottles/cups?

Certain plastics contain a harmful chemical called Bisphenol A (BPA) which can get into water and cause health problems. Even when BPA-free, certain chemicals can leach into the water and cause health effects especially at higher temperatures. It is advisable to avoid refilling single-use plastic bottles. Instead use alternative material bottles like glass, stainless steel, copper, etc. for storing water.

Can I take medicine with hot water?

It is not advisable to take medicines with hot water. You can take medicines with water maintained at room temperature or lukewarm water if not comfortable with room temperature water.

Why do I feel thirstier when I am working outdoors compared to indoors?

While working outdoors, due to higher temperatures, we lose more water through excessive sweating, evaporation from the skin, and respiration. The body requires more water due to these factors and this makes us feel thirsty.

11. WHAT PRECAUTIONS TO BE TAKEN DURING SUMMER TO PREVENT DEHYDRATION

Hot and humid temperatures, especially where temperature crosses over 40 degrees Celsius, can lead to heat stress. Here are a few measures for preventing dehydration in such situations:



Stay hydrated. Drink water regularly in between work. Eat fruits or vegetables rich in water like cucumber, watermelon, oranges, etc.



Reschedule outdoor activities to cooler hours and indoor works to afternoon hours. If work cannot be rescheduled, take breaks in between



**Wear comfortable clothes:
Avoid synthetic and tight-fitting clothes.**

Ensure all windows are open to allow cross ventilation & put on fans to aid in ventilation



Watch out for signs of dehydration and urine color

Only if you are sweating excessively, consider adding sugar and salt to your drinking water.



12. REQUIREMENTS OF FACTORIES ACT 1948 AND RULES ON DRINKING WATER

1. Provide adequate drinking water to all workers in appropriate places
2. "Drinking water" should be marked in the language understandable by the workers.
3. Drinking water areas shall not be within six meters of washrooms, toilets, open sewers, spittoons, effluent, or any other source of contamination.

The quantity of drinking water:

Drinking water availability in the factory must be at least five times the daily requirement and readily available at all times.

Water storage

1. Drinking water containers or tanks should be placed in the shade on high stands or platforms and covered with dust proof covers.
2. Sufficient drainage systems should be made to carry the spilled water.
3. Keep containers and tanks clean.
4. Water should be renewed at least once daily.
5. All practical measures should be taken to ensure that the water is free from pollution.

Water cooling

In a factory with more than two hundred and fifty workers:

1. Drinking water supplied to workers shall be cooled by ice or any other effective method during March 1st to June 30th of each year.
2. Cooled drinking water should be supplied in every canteen, dining room, restrooms, and easily accessible places throughout the factory.
3. Water stations should be protected from the weather and adequately drained.
4. Each water station should be maintained in a clean and sanitary condition.

13. DRINKING WATER STANDARDS IN INDIA

IS ST10500 : 2012 Indian Standard DRINKING WATER - SPECIFICATION prescribes the requirements and the methods of sampling and test for drinking water.

Standard	Download link
IS 10500 : 2012	http://cgwb.gov.in/Documents/WQ-standards.pdf

TESTING THE QUALITY OF DRINKING WATER

Importance

Unsafe water can lead to many ailments and can be fatal. Moreover, it can cause mass casualty situations which cause pain and suffering. With this in mind, it is important to periodically conduct water hygiene inspections and laboratory tests to ensure the safety of drinking water.

When to check?

According to the central government's Drinking Water Quality Monitoring & Surveillance Framework, once a month sanitary inspection, six monthly bacteriological tests and yearly full-scale testing needs to be done. In addition, if there is a high incidence of waterborne infections or suspicion of chemical contamination, tests should be carried out in between.

Standard	Download link
Drinking Water Quality Monitoring & Surveillance Framework	https://jalshakti-ddws.gov.in/sites/default/files/WQMS-Framework.pdf

What tests to be done? Basic tests

#	Characteristics	Unit	Requirements Acceptable limits	Permissible limits in absence of alternative source
1	pH	-	6.5- 8.5	No Relaxation
2	TDS	Milligram/ litre	500	2000
3	Turbidity	NTU	1	5
4	Chloride (As Cl)	Milligram/ litre	250	1000
5	Total Alkalinity as Calcium Carbonate	Milligram/ litre	200	600
6	Total Hardness (as CaCO ₃)	Milligram/ litre	200	600
7	Sulphate (as SO ₄)	Milligram/ litre	200	400
8	Iron (as Fe) *	Milligram/ litre	1.0	No Relaxation
9	Total Arsenic (as As)*	Milligram/ litre	0.01	No Relaxation
10	Fluoride (as F) *	Milligram/ litre	1.0	1.5
11	Nitrate (as NO ₃)	Milligram/ litre	45	No Relaxation
12	Total coliform bacteria	Shall not be detectable in any 100 ml of sample		
13	E. Coli/ Thermotolerant coliform bacteria	Shall not be detectable in any 100 ml of sample		
14	Free residual Chlorine	Milligram/ litre	0.2	1
15	Colour	Hazen units	5	15
16	Odour		Agreeable	Agreeable

Advanced tests

In addition to the above tests, the next step is to conduct tests to detect the presence of heavy metals, pesticides, drugs, and radioactive elements in the body at least once a year.

14. SUMMARY

- Water is very important for life. A person may not survive without water for more than 3 days.
- Drinking water needs to be rendered safe before use. Boiling, Chlorination, and Filtration are different methods used for this purpose.
- Drinking unsafe water leads to many water-borne diseases like Cholera, Typhoid, Diarrhea, Hepatitis, Dysentery, etc.
- For the body to function optimally, one must drink enough water. An average healthy individual requires about 30ml/kg body weight of water per day. For an average healthy adult, it comes to around 2-liters of water (8 glasses) every day.
- However, one must drink more water when the water loss from the body is more when the weather is hot & humid, when engaged in physically intense activity, when there is during fluid loss due to excessive sweating, diarrhea, vomiting or when medically advised for other conditions.
- Drinking an adequate amount of safe water helps in preventing diseases, increasing productivity, reducing the economic burden due to illnesses, and improving the quality of life.
- Not drinking an adequate amount of water leads to dehydration which can be fatal when severe.
- Not drinking enough water over a period of time increases the occurrence of Kidney stones, Urinary tract infections, Constipation, Premature skin aging, Allergies, Reduced immunity which leads to various other infections and diseases.

- Urine color can be used as an indicator of hydration. Colorless to pale yellow color urine is an indicator of good hydration. Dark-colored urine is a sign of dehydration.
- Ensuring quality control of drinking water is of the highest importance to providing safe drinking water. For this purpose, a sanitary inspection of water source & delivery points to be conducted monthly once, basic laboratory tests to be conducted once in six months and full-scale water testing to be conducted once a year.



ರಾಷ್ಟ್ರೀಯ ಸುರಕ್ಷಾ ಪರಿಷತ್

ಕರ್ನಾಟಕ ಶಾಖೆ

ರಾಷ್ಟ್ರೀಯ ಸುರಕ್ಷಾ ಪರಿಷತ್ ಭಾರತ ಸರ್ಕಾರದ ಕಾರ್ಮಿಕ ಸಚಿವಾಲಯದ ಒಂದು ಸ್ವಾಯತ್ತ ಸಂಸ್ಥೆಯಾಗಿದೆ. ಈ ಸಂಸ್ಥೆಯ ಕರ್ನಾಟಕದ ಶಾಖೆ ಬೆಂಗಳೂರಿನಲ್ಲಿದೆ.

ಕೈಗಾರಿಕೆಗಳಲ್ಲಿ ಕೆಲಸ ಮಾಡುವ ಉದ್ಯೋಗಿಗಳ ಸುರಕ್ಷತೆ, ಆರೋಗ್ಯ ಹಾಗೂ ಕಾರ್ಯನಿರ್ವಹಿಸಲು ಉತ್ತಮ ಪರಿಸರ ವ್ಯವಸ್ಥೆ ಕಾಪಾಡಿಕೊಳ್ಳುವುದು, ಅಪಘಾತ ಮತ್ತು ಅವಘಡಗಳನ್ನು ತಪ್ಪಿಸುವ ನಿಟ್ಟಿನಲ್ಲಿ ಅರಿವು ಮೂಡಿಸುವುದು ಈ ಸಂಸ್ಥೆಯ ಮುಖ್ಯ ಉದ್ದೇಶವಾಗಿರುತ್ತದೆ.

ಈ ನಿಟ್ಟಿನಲ್ಲಿ ಕರ್ನಾಟಕ ಶಾಖೆ ಕೆಳಕಂಡಂತೆ ಕಾರ್ಯಕ್ರಮಗಳನ್ನು ಹಮ್ಮಿಕೊಂಡಿದೆ.

1. ಸುರಕ್ಷಾ ತರಬೇತಿ ಕಾರ್ಯಕ್ರಮ
2. ಸೇಫ್ಟಿ ಆಡಿಟ್ (Safety Audit)
3. ಹಜಾಪ್ ಸ್ಟಡಿ (Hazop Study)
4. ರಿಸ್ಕ್ ಅಸೆಸ್‌ಮೆಂಟ್ (Risk Assessment)
5. ಸುರಕ್ಷಾ ಕೈಪಿಡಿ ಮತ್ತು ಎಮರ್ಜೆನ್ಸಿ ಪ್ಲಾನ್ ತಯಾರಿಕೆ
6. ಸುರಕ್ಷಾ ಸಪ್ತಾಹ, ಅಗ್ನಿ ಸುರಕ್ಷಾ ಸಪ್ತಾಹ, ವಿಶ್ವ ಪರಿಸರ ದಿನ, ವಿದ್ಯುತ್ ಸುರಕ್ಷಾ ಸಪ್ತಾಹ, ರಾಸಾಯನಿಕ ದುರಂತ ನಿವಾರಣಾ ದಿನ, ರಸ್ತೆ ಸುರಕ್ಷಾ ಮಾಸ ಇತ್ಯಾದಿ. ಸುರಕ್ಷಾ ಕಾರ್ಯಕ್ರಮಗಳಿಗೆ ಪೂರಕ ಸಾಮಗ್ರಿಗಳನ್ನು ಕಾರ್ಖಾನೆಗಳಿಗೆ ಹಾಗೂ ಸಾರ್ವಜನಿಕರಿಗೆ ಒದಗಿಸಲಾಗುವುದು.
7. ವಿವಿಧ ವಿಷಯಗಳ ಮೇಲೆ ಕನ್ನಡ, ಇಂಗ್ಲೀಷಿನಲ್ಲಿ
ಸುರಕ್ಷಾ ಪೋಸ್ಟರ್‌ಗಳು
ಸುರಕ್ಷಾ ಕಾರ್ಡ್‌ಗಳು
ಸಿಡಿ ಫಿಲಿಂಗ್‌ಗಳು
ಸುರಕ್ಷಾ ಕ್ಯಾಲೆಂಡರ್‌ಗಳು
ಸುರಕ್ಷಾ ಡೈರಿಗಳು ಮತ್ತು ಸಾಮಗ್ರಿಗಳನ್ನು ಸರಬರಾಜು ಮಾಡಲಾಗುತ್ತದೆ.

ಹೆಚ್ಚಿನ ವಿವರಗಳಿಗೆ ಸಂಪರ್ಕಿಸಿ ಕಾರ್ಯದರ್ಶಿಗಳು

ರಾಷ್ಟ್ರೀಯ ಸುರಕ್ಷಾ ಪರಿಷತ್, ಕರ್ನಾಟಕ ಶಾಖೆ (ರಿ)

ರಾಯಲ್ ಪಾರ್ಕ್ ಅಪಾರ್ಟ್‌ಮೆಂಟ್, 34, ಪಾರ್ಕ್ ರಸ್ತೆ, ಶಿವಾಜಿನಗರ, ಬೆಂಗಳೂರು - 560051
ದೂರವಾಣಿ ಸಂಖ್ಯೆ : 080 22867996

