4. Tackling COVID-19 Through Soaps

Prelims Syllabus: Medicine & Pharmaceuticals

Mains Syllabus: GS-II Issues relating to development and management of Social Sector or Services relating to Health, Education, Human Resources.

Why in News?

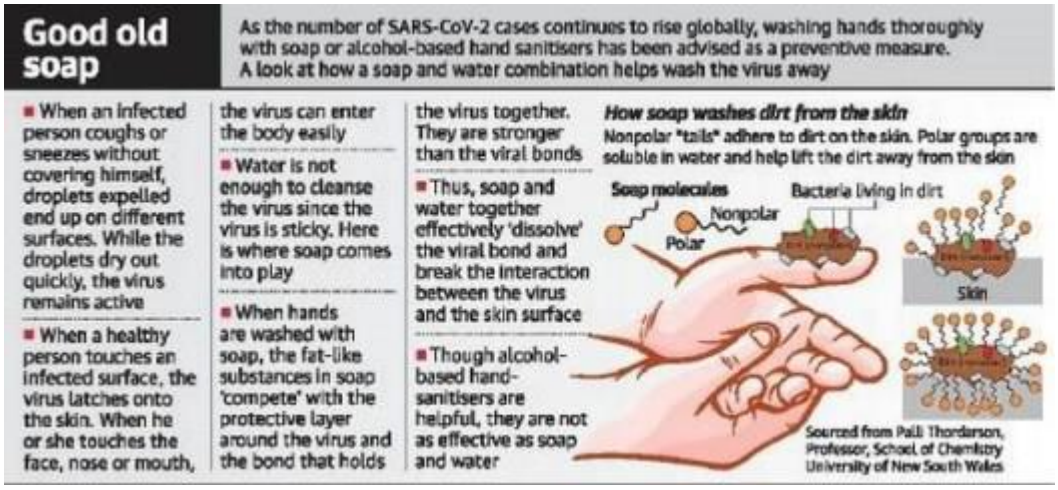
- Guidelines by the **World Health Organization**, to reduce the risk of SARS-CoV-2 infection, specify that one of the ways to reduce the risk of infection is by regularly and thoroughly cleaning one's hands with an alcohol-based hand rub or washing them with soap and water.

How does washing with soap help get rid of the Coronavirus?

- Using soap is more effective in removing microbes on our hands.
  - ✓ Viruses such as coronavirus, influenza-causing viruses, Ebola, Zika have their genetic material encased in a layer of fat called the lipid envelop.
  - ✓ Soap molecules are pin-shaped with a head that is water-loving (hydrophilic) and a tail that is oil-loving (oleophilic). Being oleophilic, the tail portion of the molecule tends to have an affinity for and 'competes' with the lipids in the virus envelope.
  - ✓ Since the chemical bonds holding the virus together are not very strong, the long oleophilic tail gets inserted into the envelope and tends to have a 'crowbar' effect that breaks the lipid envelope of the virus.
  - ✓ The tail also competes with the bond that binds the RNA and the lipid envelop thus dissolving the virus into its components which are then removed by water.

Do all viruses have the Lipid Layer?

- No, certain viruses do not have the lipid envelop and are called the non-enveloped viruses. Rotavirus which causes severe diarrhoea, poliovirus, adenovirus that cause pneumonia and even human papillomavirus (HPV) do not contain the lipid envelop.
- The oil-loving tail of the soap molecule also disrupts the bond that binds dirt and non-enveloped viruses to the hand.
- The dirt and viruses are surrounded by several tails making them remain as suspended particles. Rinsing with water washes away the suspended particles leading to clean hands.



How do alcohol-based hand sanitisers help get rid of coronavirus?

- Like soap, the alcohol present in hand sanitisers dissolve the lipid envelop, thus inactivating the virus.
- In addition, the alcohol also tends to change the shape or denature the mushroom-shaped protein structures that stick out of the lipid envelop. The mushroom-shaped protein structures help the virus to bind to special structures found on human cells and enter the cells. To be effective, the sanitisers should contain at least 60% alcohol.
- Unlike water, alcohol run does not remove the dead viruses from the hand. While a sanitiser can quickly reduce the number of microbes, it does not get rid of all types of germs, and is "not as effective when hands are visibly dirty or greasy".

Primary Precautions:

- WHO cautions that using a mask alone will be insufficient to provide an "adequate level of protection". It should be combined with hand hygiene to prevent human-to-human transmission.