



REACH THE UNREACHED

Dental Science

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ABSTRACT

Many people, especially those from lower socio-economic families, have limited access to dental care, transportation problems and poor appointment attendance. The dentist to population ratio has been dramatically improved in the last two decades with no significant improvement in oral health care status of the general population. Mobile dental clinics have been implemented in many communities to address these issues. Mobile dental vans remove the barriers of accessibility and improve the care of rural and underprivileged population. The vans currently in use are equipped with hi-tech gadgets thereby being able to achieve almost everything that is done in a well-equipped dental office. The recent advancement taken place over the past few years is incorporating solar panels in the dental vans. It is very useful in areas where there is no external power supply, thus, proving to be eco-friendly without causing pollution.

KEYWORDS:

mobile dental van, rural, solar

INTRODUCTION:

India being the world's second most populous country with 1.3 billion people, the oral health in the country is greatly compromised. This can be due to wide range of geographical character, culture, religion and languages. Health care is always faced by a challenge of inadequate doctor: patient ratio (1:10,000 in urban areas and 1:2,50,000 in rural areas).^[1] There is usually an extrapolation of less number of doctors when taking into account the amount of population. In India, 30% of population live in rural areas and 70% reside in urban areas; whereas 70% of the dentists practice in urban areas and we rarely find any dental clinics in rural areas except for the government aided ones.^[2]

The primary health care centres and mobile dental clinics deliver dental health care services. The current objective of health care is to provide quality health service to every part of the nation. The common challenges faced by rural population are quackery, deficient funding, low socio economic status, lack of transport, geographic barriers and homeless, elderly people. To overcome the difficulties, camps are organized by government and non-government organizations.^[3] This issue could be overcome through mobile dental clinics.

Mobile dental facility is defined as 'any self-contained facility in which dentistry will be practiced, which may be moved, towed or transported from one location to another.'^[4] Mobile dental clinics as the name itself says, it is the modern way to deliver health care at your door step and reach the people who have poor access to health care.

It also plays an important role in the elimination of quacks in rural areas where, there is lack of quality health care. Elimination of quacks is very important as it reduces further complications. The mobile dental units provide the flexibility that stationary sites do not provide. Unlike stationary dental clinics, mobile clinics provide greater physical access to dental care for medically underserved population in poor urban and remote rural communities and many existing dental clinics services at lower or no cost to the user, this being the main challenge faced currently. Continuous efforts have always been taken to overcome this particular and significant challenge. Pertaining to dentistry, similar challenges are being faced by population in rural sectors with a poor oral hygiene, due to improper dentist-patient ratio.^[5]

REQUIREMENTS OF MOBILE DENTAL CLINIC:

Thus a fully equipped dental van including all the necessary armamentarium was developed to overcome this challenge. It was designed in such a way all the day-to-day procedures could be carried

out within the van. The basic dental van consists of two compartments, one of which will be treatment area, while the other would be a passenger area for the doctors with a cabin for the driver.

The treatment area consisted of 1-2 dental chairs with seating space for 15 to 20 people with an X-ray unit attached to either one or both the chairs. The hydraulically operated dental chair would have all the basics such as a in-built scaler tip with 3 scaling tips, 3 way syringe, airtor connection, micromotor, air ventury suction, spittoon and tumbler, light cure with gun, eye protection shield, multi functional foot control, transparent water booster, basin, stainless steel instrument tray and dental operator's stool.^[2] The van contains a huge tank which holds and provides water for the treatment. There is also a monitor to which an radiovisiography or Intra-oral camera could be linked. A dental X-ray unit of 70KV, 8mA with a digital arm timer must be attached. Some vans also come with a satellite connection where opinion on special cases can be given through a tele-communication by doctors from different parts of the world. It also has all the sterilization machines such as an autoclave and Glass-bead sterilizer which is easy to handle with very low consumption of current. Instruments may be kept only for 10 to 30 seconds and will be sterilized to use. Since the time used for sterilization is minimal, more number of patients can be screened or treated. Power supply is derived from a nearby source or a generator from within the van.

The dental van is designed in a way it could cross all geographic barriers to reach areas lacking quality dental care. It should have adequate heaters and air conditioners for the climate changes where it will be used. It can be equipped with an under floor wheelchair lift and automatic levelling jacks, but this might be able to add to unnecessary costs. Gasoline vehicles are more cost-effective, efficient and user-friendly compared to diesel units because gasoline systems are much quieter when the vehicle is parked.^[6]

It also contains a portable hand-piece unit which contains a 3-way syringe, high flow volume evacuation, self-contained water supply, self-contained oil less compressor, dirt bottle system, light-cure unit, Piezo ultrasonic scaler and accepts all types of E-type handpiece and can be carried around.^[7]

Advantages:

- Moderate start up costs.^[2]
- Fully equipped mobile dental clinics provide dental healthcare to the doorstep of underprivileged in the need of hour.

- It is used predominantly to deliver dental care for school children and community sites.
 - Previously 'unreachable' communities become reachable.
 - Treatment of patients without taking them out of their comfort zone.^[7]
 - Patients receive proper consultation from medical staffs.
 - No need for patients to miss work or school due to long travel times associated with visiting the dentist.^[7]
 - Advanced equipment onboard, thereby increasing the efficiency.
 - It provides comprehensive dental services and school-based dental education to children and families residing in places where geographic barriers are an issue.
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Disadvantages:

- High operating and maintenance costs.^[2]
- Space may be limited for staff and productivity.
- Limited space for supplies and records.
- Highly challenging to access and store patient records, since the number of patients will be higher.
- May be adversely affected by weather conditions (e.g; extremely hot or cold temperatures)^[8]
- Fuel; if you run out, you're down.^[8]
- Provides very limited dental services and follow up may be difficult.
- Requires permission from counsellor of the area for further use.
- Tight driving conditions on narrow streets may have increased risk for liability (e.g; motor vehicle accident)
- Waste disposal is difficult (particularly hazardous materials)
- Generator noise.
- Range of services restricted.

RECENT ADVANCEMENT:

SOLAR DENTAL VAN:

India has around 80,000 villages without electricity out of which 25,000 have minimal chance of being connected to power supply in a conventional way. Even after making tremendous efforts to provide oral health care for underprivileged villages, the lack of suitable power source contributes to a huge pitfall. In order to overcome this challenge, the recent advancement of incorporating solar panel in the mobile dental van which can work without an external supply of power where electricity is a major problem.^[9] The addition of a solar panel to the dental van could result in a significant difference by generating power ranging from 150-300 watts, which can be charged to full in 5-6 hours of adequate sunlight, 4 to 5 solar panel with dimensions of 26*58 cms with durability of 15 to 20 years and costs around 1.5 to 2.5 lakhs approximately.^[10] There are various types of solar panels like crystalline silicon, monocrystalline, polycrystalline and thin film solar panels. Mono-crystalline solar panels are widely used for dental vans. They are made up of silicon ingots, which are cylindrical in shape. To optimize performance and lower costs of a single monocrystalline solar cell, four sides are cut out of the cylindrical ingots to make silicon wafers. They have the highest efficiency rates since they are made out of the highest grade silicon. If the solar panel is partially covered with shade, dirt or snow, the entire circuit can break down; hence proper maintenance is required.^[11] Installation of such a panel to the van can be eco-friendly by generating power from sunlight and causing no pollution. Such a dental unit could be run with no external power source and hence is best suited for rural areas, where finding a power source nearby could be a difficult task.

CONCLUSION:

Solar energy is an important source in our lives and has been since the beginning of time. It is capable of producing the raw energy required to satisfy the needs of the entire planet with the advantage of being one of the least destructive energy source. Use of solar energy in dentistry has proven to be promising.^[11]

Through solar panel dental vans, we can **CONSERVE** electricity in **URBAN** areas and **COMBAT** electricity issues in **RURAL** areas.

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