Bridging the Gaps in Health Service Delivery for Truck Drivers of India Through Mobile Medical Units

Subrata Chanda, Sonali Randhawa, Hardeep Singh Bamrah, Thomson Fernandes, Vishal Dogra, Shailendra Hegde

Background: Truck drivers in India suffer from many lifestyle-related health problems. Providing primary health care services to truck drivers is essential to improve their overall health and well-being. This paper reports the findings of a community-based mobile medical unit program providing nonemergency and basic primary care services to truck drivers along the major highways of India. Piramal Swasthya Management and Research Institute launched this community-based mobile medical unit program, in partnership with Shriram Transport Finance Corporation Limited (STFCL). Materials and Methods: The paper describes the program model, its coverage, the sociodemographic profile, and common health morbidities of the truck drivers availing the program services. 2-year routine program data (April 2017 to March 2019) were accessed and analyzed. Results: A total of 1,167,210 number of unique truck drivers availed the program services during the reference period, of which 61,331 had complete data. The majority of truck drivers were male (99.1%) and just a few women (0.88%) and transgender (0.003%). The mean age was 45.5 years ± 10.91 and nearly half (49%) were in the productive age group (31–45 years). Noncommunicable and other chronic diseases (34.74%), musculoskeletal problems (24.17%), communicable diseases (14.52%), oral cavity-related problems (1.23%), and other minor ailments (17.77%) were the major consultation categories. Conclusion: Truck drivers in India have significant health morbidities. Providing primary health care services to truck drivers through mobile medical units is a step toward achieving universal health coverage.

Keywords: Disease, India, health service, mobile medical unit, truck drivers

INTRODUCTION

The transport system is involved in everything that reaches us. Transportation by road scores over other modes of transport because of its easy accessibility, flexibility of operations, door-to-door service, and reliability. Hence, the share of roads in passenger and cargo movement has been increasing vis-à-vis other transport modes, of which trucks are an integral part of the cargo.[1] As per an estimate, 9.3 million trucks are registered in India, transporting 65% of the overall Indian cargo.[2] Despite its importance, the trucking sector has received scant attention from the Government in India.[3] Lack of infrastructure, poor organizational structure, insufficient funding focused health care programs for the truck workers, and many other such factors have made the sector deplorable.[4]

Working conditions in the truck involve both physiological and psychological demands. Long driving hours (on average 12.7 h/day driving 400–600 km/day), excessive alcohol and tobacco use, irregular eating schedule, and erratic sleep timings not only affect truck driver’s physical health but also the emotional and mental health.[5–7] All these factors also lead to chronic diseases such as heart disease, diabetes mellitus, and hypertension.[8–11] Truck drivers are twice as likely to acquire the human immunodeficiency virus (HIV) infection.[12] Recent studies have highlighted an increasing prevalence of musculoskeletal, skin diseases, and other chronic conditions.
in this vulnerable population. In a survey among Indian truckers, 81% claimed that there were no substantial medical centers on national highways available to them. Considering the severity and prevalence of common health problem, health prevention, and promotion programs for truck drivers seems scarce in India. Besides, there is very little documentation of the pattern of health care utilization and the suitability of health care availability for truck drivers in India. Most of the studies focused on their sexual health and very few studies centered on their health service access and morbidity profile.

Keeping “truck drivers and cleaners” as target beneficiaries, Piramal Swasthya Management and Research Institute, in partnership with Shriram Transport Finance Company Limited (STFCL), designed a mobile-medical-unit-based health program. The Shriram Transport Finance Company Limited (STFCL) provided the funding for the entire program. Besides target beneficiaries, other people also seek our program services. Overall the program goal was to (i) improve the accessibility and availability of primary health care services; and, (ii) detect and manage the chronic noncommunicable diseases among target beneficiaries.

Objectives
The objectives of the paper are to (i) describe the design and implementation of the program and (ii) describe the health status of truck drivers in particular, after the first 2 years of operations.

Materials and Methods

Program settings
The STFCL program was launched in three phases in 22 cities across 12 states of India. In the first phase which began in March 2017, eight locations in seven states were selected. Eight locations in the second phase in three states began in February 2018 and six locations in five states in the third phase began in September 2018. The program chose 11 truck parking hubs in each city, as program sites, to deliver the mobile medical unit (MMU) services. Figure 1 describes the program locations city and states wise.

Program design
The program was designed to use MMU to provide health care services to the truck drivers and cleaners at the “truck parking hub” in various parts of the city. In consultation with representatives of the local truck drivers’ associations, a roster was drawn up for twice-a-month service delivery (e.g. first Monday and third Monday and so on). Small-sized posters advertising the initiation of the services were stuck at the back and sides of many trucks. The beneficiaries can also call toll-free number “104” which is a government-owned health information helpline for any health-related issues when they do not have access to MMU. The overall design of the program operations for a day starts from the MMU parking place, which is depicted in the below figure [Figure 2].

Staff in the mobile medical unit
Each MMU comprises four people: (a) a driver who drives the team to the truck parking hubs and also engages with truck drivers and mobilizes them to seek health services. (b) A nurse who registers the beneficiaries, and captures the anthropometric, other vital parameters, conducts basic laboratory tests, and provides support to the doctor. (c) A doctor who leads the team, provides clinical services and prescribes the necessary treatment. And (d) a pharmacist who dispenses medicines.

Scope of services
Box 1 depicts the package of services offered at the MMU

Service flow
On clinic days, truck drivers approach the nurse in counter 1, who registers the patient’s details in an application installed on a laptop. The patient then proceeds to the doctor in counter 2, who registers the patient’s health complaints, takes a detailed history, examines the patient, advises laboratory tests makes a provisional diagnosis and prescribes medicines. The nurse conducts and records the results of basic laboratory tests such as random blood glucose and hemoglobin estimations if advised by the doctor. After the laboratory test, the patient goes back to the doctor who then completes the diagnosis and prescribes medicines. The patient then moves to the pharmacist in counter three to receive medicines. Figure 3 depicts the...
overall service flow on clinic days including the roles of each of the team members.

**Data documentation and archiving**

The nurse counter has a laptop, which also acts as a network server. The doctor and the pharmacist also have a tablet for data entry. Each laptop and tablet have a preinstalled software application to record beneficiary details which sync with each other’s system while the data are being entered. Further, the patient’s records move seamlessly between the counters, just as the patient moves between counters. Once the patient is registered, a unique ID number is generated. Using this unique ID, patient information can be accessed across all MMUs in all the 22 cities. The software application collects relevant socio-demographic information, harmful habits such as tobacco and alcohol consumption, vital parameters, basic laboratory test findings, signs, symptoms, provisional diagnosis, and the prescription received from the doctor. All clinical and non-clinical information is stored in the form of an electronic medical health record. An online real-time dashboard captures and monitors the daily program operations.

**Data analysis**

Electronic health records of truck drivers for a two-year period (April 1, 2017, to March 31, 2019) were accessed and analyzed. Descriptive statistics were used for data analysis and reporting. Figure 4 describes the steps of data cleaning.

**Ethical considerations**

Program staff obtained truck drivers’ consent to use their data for research work. Piramal Swasthya Management and Research Institute Ethics Committee approved the study (letter no. PSMRI/2019/04).

**Results**

A total of 61,331 truck driver’s health records had complete data. Of all the records, half (50% or 30,604) records belonged to the productive age group (31–45 years; mean years 45.5 ± 10.91 SD). Table 1 summarizes the sociodemographic features of truck drivers included in our study.

Among all age categories, a high proportion of truck drivers in the age group 31–45 years were found addicted to tobacco and alcohol use. The median body mass index (BMI) of the truck drivers was 24.34 kg/m² (IQR = 27.3–22). A significant number of truck drivers were obese 26,614, (44.10%) and small fractions of them were underweight 3,710 (6%). Truck

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**Box 1: Package of services offered at the Mobile Medical Unit (MMU)**

1. Treatment of common ailments and minor ailments.
   a. General problems: fever, malaise, headache etc.
   b. Communicable diseases: upper and lower respiratory tract infections, infections of alimentary tract like gastritis, moderate to severe diarrhea and vomiting, abdomen pain etc.
   c. Musculoskeletal problems: back aches, neck pain etc.

2. Noncommunicable Diseases (NCDs): Screening, diagnosis, and treatment of beneficiaries for hypertension, diabetes, and visual disturbances.

3. Health education though information, education, and communication (IEC) on
   a. Addictions to alcohol/tobacco use
   b. Personal hygiene, diet, physical activity
   c. Safe drinking water, healthy food and appropriate sanitation
   d. HIV—AIDS sensitization, including promotion of protective measures against HIV

4. Diagnostic services
   a. Blood sugar
   b. Urine examination for sugar and albumin
   c. Hemoglobin test
   d. Malaria test

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**Figure 2:** The STFC program service delivery model
drivers between 31 and 45 age group were more obese and overweight than other age groups [Refer Table 2].

A total of 7,287 (17.24%) truck drivers had a random blood sugar value over 200 mg/dL and a further 8,963 (21.21%) of them had a random blood sugar value in the prediabetic range. Similarly, a total of 2,616 (4.15%) truck drivers had blood pressure in stage 1 or stage 2 hypertension and 12,649 (20.06%) truck drivers had prehypertension [Refer Table 3].

Disease pattern

The most commonly rendered program service was the consultations for NCDs, accounting for nearly a third among all consultation categories was 19,620 (34.69%). A quarter of the drivers sought consultation for musculoskeletal diseases 13,668 (24.17%), followed by those for minor ailments 10,052 (17.77%) and communicable diseases 8,215 (14.52%). Health problems were either self-reported by the beneficiary or diagnosed based on history, symptoms and signs, by the doctor on-site at MMUs during the visit.

Disease wise consultations depicted in Table 4.

- NCDs- APD, arthralgia, asthma, cataract, COPD, diabetes, Hypertension, osteoarthritis.
- Musculoskeletal diseases- arthralgia, arthritis, myalgia, trauma.
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- Communicable diseases- acute bronchitis, acute rhinitis, amoebiasis, cheilitis, chickenpox, chikungunya fever, conjunctivitis, dengue fever, dysentery, gastroenteritis, giardiasis, influenza, lower respiratory tract infection, malaria, otitis media, pharyngotonsillitis, sinusitis, STI/RTI, urinary tract infection, typhoid fever, viral fever, URTI, viral hepatitis
- Skin diseases- abscess, allergic rash, boils, fungal infections, impetigo, pyoderma, scabies
- Diseases of teeth and oral cavity- aphthous ulcers, cheilitis, dental caries, dental fluorosis, febrile blisters, gingivitis, glossitis, gum abscess, oral candidiasis, oral ulcers, stomatitis
- Chronic diseases- filariasis, tuberculosis, HIV/AIDS, leprosy
- Others- headache, constipation, migraine, accidents such as minor road traffic accidents, minor accident injury, etc.

DISCUSSION

The present study described the setup and operations of a large-scale mobile medical unit-based health program for truck drivers. The program has allowed us to study the risk profile and pattern of different health morbidities among truck drivers on a large scale.

In our study, the truck drivers were mainly middle-aged married males (mean age 45.5 years) and a high proportion of them suffer from non-communicable diseases. The obesity rates (BMI of 25 kg/m² or more) and related morbidities seen in our analysis are higher than the general population estimates.[14,22] The continual exposure to low-grade vehicle vibrations fatigues the bones and joints. In addition, the sedentary lifestyle and prolonged and poor sitting posture further aggravated the musculoskeletal issues.

These results indicate that truck drivers had some serious health issues. These health problems, coupled with other risk factors such as sedentary lifestyle, long hours of sitting and abnormal diet, attributed to their truck driving, put these drivers at high risk of other major illnesses such as cardiovascular diseases.

A high level of tobacco and alcohol consumption is of concern. Tobacco is a stimulant and it increases the alertness and arousal levels. It helps in keeping truck drivers awake at odd hours, especially at night. While after a long and tiring journey, alcohol gives them ecstasy and relief. These findings are similar to a study done by Karthikeyan et al., who also have reported a high prevalence of tobacco chewing and alcohol addiction among truck drivers.[17] Studies have shown adverse health outcomes in the form of cardiovascular diseases, cancers among people regularly consuming tobacco and alcohol for an extended period. Truck drivers, apart from consuming tobacco and alcohol, had alarming rates of obesity, diabetes, and hypertension. Therefore the likelihood of experiencing cardiovascular morbidity and mortality among truck drivers increases compared to general population groups.[10,23,24]

Skin conditions like dermatitis and itching among truck drivers reflect poor hygiene and sanitary habits. It may be due to long-distance travel, nonavailability of water bodies along the highways, and general reluctance among truck drivers. There

![Figure 4: Steps in data cleaning](image)

![Photograph 1: Exterior and interior design of the mobile medical unit](image)

| Table 2: Risk profile of Truck drivers |
|--------------------------------------|
| Age category (in years)               | 15-30 n (%) | 31-45 n (%) | 46-60 n (%) | ≥ 61 n (%) | Total n (%) |
| Tobacco use                          | 5,567 (9.07%) | 14,521 (23.68%) | 7,263 (11.84%) | 1,017 (1.66%) | 61,331 |
| Alcohol use                          | 2,770 (4.52%) | 9,743 (15.88%) | 5,362 (8.74%) | 724 (1.18%) | 61,331 |
| BMI*[19]                             | 12,395 | 30,027 | 15,498 | 2,367 | 60,287 |
| Underweight                         | 1,220 | 1,517 | 824 | 149 | 6.2% |
| Normal                               | 1,220 | 1,517 | 824 | 149 | 6.2% |
| Overweight                           | 2,624 | 6,776 | 3,348 | 514 | 22.0% |
| Obese                                | 4,219 | 13,939 | 7,459 | 997 | 44.1% |

*BMI categories=underweight=<18.5 kg/m², normal=18.5–22.9 kg/m², overweight=23–24.9 kg/m², obese=≥25 kg/m²
are also chances that truck drivers had frequent exposure to chemicals and oils, causing skin allergy and infections.

The program also faced several challenges. First, mobilizing the community of truck drivers in the initial days was difficult since truck drivers did not want to leave their trucks even for a few minutes. We then hired locally available human resources as “community mobilizers” and slowly the number of beneficiaries increasing. Second, the nurses are overburdened due to these multiple responsibilities, which is affecting their work efficiency. Hence, the recruitment of laboratory technicians is in the process to relieve the community of truck drivers in the initial days was difficult since truck drivers did not want to leave their trucks even for a few minutes. We then hired locally available human resources as “community mobilizers” and slowly the number of beneficiaries increasing. Second, the nurses are overburdened due to these multiple responsibilities, which is affecting their work efficiency. Hence, the recruitment of laboratory technicians is in the process to relieve nurses from laboratory duties to concentrate on their work efficiently. Third, supply chain management of the drugs and consumables emerged as a huge challenge due to the distribution of the MMUs. Currently, efforts are being made to decentralize and automate supply chain management at all levels.

The truck drivers who availed our program services were bucketed in two groups (1) repeat service users (coming more than once in a 6-month period) and (2) single time or one-time users (not coming for the second time). All repeat service users, identified as diabetic and or hypertensive, were tested/examined in each visit and given government-approved drugs for a month. They were also encouraged to adopt a healthy lifestyle. Besides, repeat users (diabetic or hypertensive) were also monitored for their health conditions and advised accordingly. We do not have control over program beneficiaries who use our program services only once just because they are long-distance truck drivers or never turn up again for any other reason.

Table 3: Diabetes and hypertension pattern among drivers

| Random blood sugar* | (n=42253) |
|---------------------|-----------|
| 70-139 mg/dL (normal) | 26 003 (61.54%) |
| 140-199 mg/dL (prediabetic) | 8 963 (21.21%) |
| ≥200 mg/dL (diabetes) | 7 287 (17.24%) |
| Blood Pressure# | (n=63036) |
| < 120 and 80 mmHg (normal) | 47 771 (75.78%) |
| 120-139 or 80-89 mmHg (prehypertension) | 12 649 (20.06%) |
| 140-159 or 90-99 mmHg (stage 1) | 2 425 (3.85%) |
| ≥160 or ≥ 100 mmHg (stage 2) | 191 (0.30%) |

* as per ADA Guidelines (mg/dL)(30), # as per JNC 7 Guidelines (mmHg)(31)

Table 4: Types of consultation received by truck drivers

| Type of consultation received | (n=56558) |
|-----------------------------|-----------|
| Noncommunicable disease | 19620 (34.69 %) |
| Musculoskeletal diseases | 13668 (24.17 %) |
| Communicable diseases | 8215 (14.52 %) |
| Skin diseases | 4277 (7.56 %) |
| Diseases of teeth and oral cavity | 696 (1.23 %) |
| Chronic diseases | 30 (0.05 %) |
| Others: minor ailments or accidents | 10052 (17.77 %) |

Conclusions

Our program providing basic primary care services to truck drivers is a unique model of health care service delivery. The experience of the STFCL program suggests that the essential components of such programs could be screening, diagnosis, treatment for common illnesses, management of chronic NCDs, and timely referrals. The present program for truck drivers adopts a primary health approach, which could very well reduce the healthcare costs and may significantly improve the health outcomes among truck drivers. Further economic evaluations are recommended to derive the cost-effectiveness and benefit analysis.

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Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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