

SHORT ARTICLE

Respiratory health of the small scale dairy workers of urban Bhubaneswar, OdishaSnigdha Singh¹, Sonali Kar², Alpana Mishra³, Dipti Pattnaik⁴¹Senior Resident, Department of Community Medicine, Kalinga Institute of Medical Sciences, Bhubaneswar, Odisha, India;²Professor, Department of Community Medicine, Kalinga Institute of Medical Sciences, Bhubaneswar, Odisha, India;³Associate Professor, Department of Community Medicine, Kalinga Institute of Medical Sciences, Bhubaneswar, Odisha, India;⁴Professor, Department of Microbiology, Kalinga Institute of Medical Sciences, Bhubaneswar, Odisha, India

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Abstract

Background: Human in close inhabitation with the cattle due to unventilated or inadequately ventilated establishments or inadequate living space, is always at a risk of sustaining infection from the cattle through different modes of disease transmission. This study hints at the increased incidences in respiratory infections among dairy workers in unorganized and small scale dairy farms due to amendable unhygienic practices. **Methods:** This survey was part of a larger study, conducted after ethics approval. Number of households involved in dairy work surveyed were 60. From every house, two members actively involved in dairy work were chosen and total respondents were 120. The study tool was a semi structured, mixed questionnaire. **Results:** 67.5% dairy workers self-reported occurrence of respiratory symptoms which included the complaints like cough, breathing difficulty on exertion. None of the dairy workers were vaccinated against any milk borne disease. **Conclusion:** The housing, civic amenities accessed by them and their awareness are probably the main reasons for wide variety of self perpetuated practices and deviations of standard requirement. Use of protective gear (gloves, caps, masks) should be strictly emphasized and popularized.

Keywords

Dairy Worker; Small Scale; Occupational Hazard; Respiratory Disease; Prevention.

Introduction

Dairy worker is a person who undertakes the activities involving caring, feeding & milking of the livestock in Dairy facility(1). Dairy workers in the Indian scenario are generally less educated, less aware and belonging to lower socio economy and thus take up this ownership to maintain their living. Delineating the vulnerability of dairy workers in their occupation, they are highly prone to respiratory health problems(2,3) More importantly, human in close inhabitation with the cattle due to inadequately ventilated establishments or living space, is always at a risk of sustaining infection from the cattle through different modes of disease transmission thus validating observations of several epidemiological studies which conclude stating a strong association of these diseases with dairy farming. Sufficient exposure to smog-forming volatile organic compounds and organic

particulate matter(endotoxins) might result in dose-dependent organic dust toxic syndrome with symptoms like fever, dry cough and chest tightness. Other sources of organic particles that may contribute includes animal dander, feces, components of animal feed(4). It may also be associated to chronic bronchitis. They are frequently affected by M.tuberculosis followed by M.bovis, that causes bovine tuberculosis(5). These issues lead to disability, restricted workdays, loss of work time for the workers bringing a short in their income. To safeguard their earning, dairy workers inspite of being unhealthy, work and handle the cattle and milk which may be apprehended as a factor for irreversible illness in the workers and milk contamination, respectively.

The present study hints at the occupational hazards faced by the dairy workers in unorganized and small scale dairy

farms and provides evidence of infection among the dairy workers due to unhygienic practices.

Aims & Objectives

1. To assess their respiratory health and its relation to the unhygienic practices and living conditions of small scale dairy workers
2. To lay down preventive and health promotive recommendations for the population under study.

Material & Methods

A community based, descriptive cross-sectional study among 120 small scale dairy workers from 60 dairy households, in the urban settings of Bhubaneswar after considering the inclusion criteria(6) was conducted from September 2018 to January 2020. The results discussed are part of a thesis dissertation, a portion which reports on hygiene practices of the small scale dairy workers and their awareness on milkborne diseases, has already been published(6)

A semi structured, mixed questionnaire was administered to interview the participants during house visit, by a team led by the researcher, interns and health worker. The tool was developed using references from similar literature(6-8). The questionnaire was pilot tested in 15 households before being finalized for use in the study. The house of the worker, cattle shed, respiratory and related symptoms were observed for the requisite findings. Every household taken up was visited for 3 consecutive days- one day was allotted for interview and health check up, second day for the inspection and microbiological sample collection and on the third day, reports were handed over to the subject in addition to medicines and counselling if found infected. The visits ended with an awareness campaign for all the subjects that was conducted Zone wise.

Sputum sample (coughed up from lungs, but not saliva) of the dairy worker was collected in sterile, leak proof plastic container from field of study and was brought to the KIMS Microbiology lab within 2-3 hours of collection by maintaining the cold chain for processing and reporting. Samples were checked for Tubercular infections using ZN staining process as per the standardized RNTCP protocol(9). Slide was read under microscope.

The participants were offered treatment as per standardized guidelines if found suffering from any of the infections stated above without any cost liability. The same was explained to them at the time of informed consent.

Statistical analysis: Data was organized and coded in Microsoft excel and analyzed. SPSS-23 was used for analysis. X2 test and Fischer exact test were applied as appropriate and p-value <0.05 was considered significant.

Results

To conduct the study, statistically adequate sample size of 110 was calculated but data reporting was done for **120 subjects**. Hence, the household data is reported for **60**

dairy households, as from each household 2 active workers were taken up.

Majority of the participants were illiterate hinting that this was a profession of the less read. Small scale dairy farms in Bhubaneswar commune are unorganized and mostly family-run. The select sample reported 31.7% workers had ≤ 17 years of experience in dairy farming while 68.3% had >17 years experience. [Table 1](#) describes the household and living condition of the dairy workers which might make them prone to several respiratory infections. Although much of this section concerns behaviour outside the milking and animal care arenas, it is important to examine general hygiene issues (such as kitchen and personal hygiene) of dairy workers and to assess their potential influence on disease transmission and milk quality ([Figure 1](#)).

[Table 2](#) represents the health status and personal history of the study sample. Enquiring about current health issues which have been continuing for at least 3 months, 67.5% dairy workers self-reported occurrence of respiratory symptoms which included the complaints like cough (21.2%), breathing difficulty on exertion (18%) and rhinitis (35.6%). It was also reported that none of them were vaccinated against any milk borne disease.

Following up the study participants during COVID 19 pandemic (Till July 2021) on their vaccination status, we found only 34.2% were vaccinated against COVID 19 while the rest were either hesitant regarding vaccination or could not avail them due to lack of resources or awareness. None of them have received jab against diseases like Influenza, Tuberculosis, Hepatitis A, Japanese Encephalitis or Anthrax.

For association of various parameters to respiratory health, for analysis, household data (n=60) was doubled (n=120) since from every HH, 2 workers were recruited. The respiratory symptoms rated one of the highest among personal complaints, yet no significant association was seen for the complaints with household parameters, cattle shed conditions and personal habits ([Table 3](#)). This could be because of interplay of multiple factors like environment or their living conditions in causing respiratory symptoms and we did have a budgetary constraint of medically confirming the complaints. Discussing the association of milk consumption and respiratory symptoms, it might also depend on the regularity and quantity of milk consumed by them.

For dairy workers testing positive for M.tuberculosis (3.4%), may be explained by the fact of working in congested environment inside the sheds, the close association of cattle and workers, inadequately ventilated and over crowded houses of the dairy workers.

Discussion

Working environment of dairy workers: 99.17% farms did not have gutter/ slope facility in shed to drain waste

water. While to avoid pooling of water in cattle sheds, a study in Chandigarh shows 13.5% cattle sheds having drainage system(10). It is evident from our observation, that due to the lack of idea regarding an ideal cattle shed and about the consequences of not having one, has led to architectural deficits like absence of gutter to collect cattle dropping, having open drains and floor without slope in the cattle shed creating an unhealthy environment at work.

A study in Rajasthan shows only few sheds (12%) having gutter for drainage(11).The particular housing design reported in Rajasthan is their local architecture to provide a cooling environment inside the shed in the hot and humid climate. In contrary to the present finding that keeping cattles in separate confinement but close to human settlement is a general custom of people in Bhubaneswar, to maintain the security, studies from Belgaum(12) and Rajasthan(11) report 8.2% and 38.7% dairy farms providing separate cattle sheds respectively. Adequate ventilation was observed in only 28.3% sheds while 71.7% sheds were inadequately ventilated. While a study by Abunna et al.(13) in Ethiopia where 70 dairy farms were studied, noted 78.6% cattle sheds to be semi open. The closed type of sheds compromised on adequate ventilation and light, were congested due to poor ventilation and cattle over crowding that could cause respiratory diseases like LTBI or breathing difficulty(14) due to the accumulation of gas produced by the cattle(5), bacterial infections(5) and also be contagious from an infected cattle to the rest(10)(15).

Health status of dairy workers: Data of current study reports respiratory symptoms higher (67.5%) than the findings of Gonzalez et al. who reported that 9.6% of subjects had respiratory symptoms for more than two weeks during their survey(16).While another study from California reports persistent wheeze (1.8%),chronic cough(2.21%),eczema(9.3%)and rhinitis(17.7%) in dairy workers(14). A study done by Heller et al.(2) where significant reduced lung function was observed among the dairy workers in England and Wales, suggesting the effect of this occupation on human. Since, our study was a post graduation thesis work and was limited to fulfill the objectives only, we could not perform lung function measurement in the study participants. Prolong exposure to organic particulate matter(primary factor being the endotoxins) may result in lung function impairments, influenza like conditions (rhinitis,eye and throat irritation), dry cough and chest tightness. The sources of organic particles that may contribute to adverse respiratory effects include dander, feces, minor components of animal feed(4)(14).Cattle waste emits gases such as hydrogen sulfide, methane and ammonia, in addition to smog-forming volatile organic compounds which causes inflammation, irritation and neurotoxicity in humans(4)

Screening for milk borne diseases and infections related to their poor hygiene: Infection with *M. tuberculosis* may be attributed to practice of consuming raw milk which can lead to TB as a milk borne disease. This finding was in accordance to the study in Mexico(16) which reported prevalence of TB in dairy workers was consequence of their regular exposure to infected cattle in poor ventilated and over crowded sheds. Another study from California(17) reported *M. bovis* infection in 72% dairy workers and 27% of their family members due to their contact with diseased cattle.

Conclusion & Recommendation

The study brings out strongly this need as most of the workers had microbiological infections and even TB and some had icterus, which was beyond the scope of our study to investigate. The housing, civic amenities accessed by them and their awareness are probably the main reasons for wide variety of self perpetuated practices and deviations of standard requirement. Use of protective gear(gloves,caps,masks) should be emphasized and popularized. This can be brought in by regular monitoring, ensuring cost effective availability which would in future impact the practice and can be clubbed with enhancing awareness regarding protection against diseases and safety of their milk.

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Tables

TABLE 1 CHARACTERISTICS OF DAIRY WORKER

VARIABLES	FREQUENCY
HOUSEHOLD CHARACTERISTIC (N=60)	
Over crowding	42 (70%)
Socio Economic status (Modified B.G.Prasad Scale)	
I – Upper class	57 (95%)
II –Upper middle class	3 (5%)
Presence of closed drainage system	16 (26.7%)
Presence of insects/rodents	57 (95%)
Frequency of disposing household waste (each day)	25 (41.6%)
Availability of closed dustbin in kitchen	21 (35%)
Smoke outlet in kitchen	27 (45%)
Distance of living space from cattle shed (more than 50 metres)	16 (26.7%)
DAIRY WORKERS (N=120)	
Gender	
Female	67 (55.9%)
Age (years) [Range :21-64 years]	
20-30	24 (20%)
31-40	48 (40%)
41-50	33 (27.5%)
>51	15 (12.5%)
Education status	
Illiterate	62 (51.6%)
Primary school	49 (40.9%)
Middle school and above	9 (7.5%)

TABLE 2 HEALTH STATUS OF DAIRY WORKERS

VARIABLES	MEAN ± SD
GENERAL EXAMINATION	
Weight (kg)	60 ± 4.02
Height (cm)	1.6 ± 1.02
BMI (kg/m2)	22.8 ± 3.5
	FREQUENCY(%)
Blood Pressure [SBP (>120 mmHg), DBP (> 80 mmHg)]	
■ SBP (Range: 122-140 mmHg)	66 (55%)
■ DBP (Range: 82-96 mmHg)	72 (60%)
Any respiratory symptoms (≥ 3 months)	81 (67.5%)
Congestion/ watering/ irritation in eyes (≥ 3 months)	18 (15.0%)
Known case of HTN	
■ HTN under regular treatment	41 (34.1%)
■ HTN not under treatment/ regular treatment	14 (11.6%)
■ HTN not under treatment/ regular treatment	27 (22.5%)
Known case of Diabetes	
Diabetes being managed	16 (13.4%)
■ Diet restriction	4 (3.4%)
■ Diet restriction + OHA	5 (4.2%)
Diabetes not being managed	7 (5.8%)
Smoking tobacco (Both current and former smoker)	28 (23.2%)
Chewing tobacco (Both current and former)	95 (79.2%)

TABLE 3 ASSOCIATION OF PARAMETERS

HOUSEHOLD PARAMETER	Respiratory Symptoms			X2 (p value)
	Present (n=41)	Absent (n=79)	TOTAL	
Presence of overcrowding in dairy household	32 (78.0%)	52 (65.8%)	84 (70.0%)	1.921 (0.166)
Inadequate ventilation	28 (68.3%)	44 (55.7%)	72 (60.0%)	1.785 (0.182)
CATTLE SHED PARAMETER :				
Closed type cattle shed	35 (85.4%)	63 (79.7%)	98 (81.7%)	0.569 (0.451)
DAIRY WORKER PARAMETER :				
Not using protective gear (mask/gloves)	38 (92.7%)	72 (91.1%)	97 (100%)	*(1.000)
Tobacco Use (smoking/chewing/both)	36 (87.8%)	60 (75.9%)	96 (80.0%)	2.371 (0.124)
Practice of consumption of milk				
Not boiled	25 (32.4%)	49 (80.3%)	74 (75.5%)	2.028 (0.154)

*Fisher’s exact test, DF=1

Figures

FIGURE 1 DESCRIPTION OF WORKING ENVIRONMENT OF THE DAIRY WORKERS, N=120

