Introduction

The goal of this chapter is to introduce some of the major issues related to the use of survey data in social ecological health survey of Dhar city and adjacent villages of Dhar city. The major living sites of the area were urban, rural and slums.

In the study area water borne diseases remain a major cause of death and illness in urban and rural. A large account percentage of these diseases with high morbidity and mortality are: diarrhoeal diseases, cholera, shigellosis, fluorosis, poliomyelitis, typhoid fever, dysentery, amoebiasis, giadiasis, malaria, skin diseases and water borne viral hepatitis, amoebic dysentery, gastro-enteritis, and infective hepatitis wide spread in the communities specially living in unsuitable environmental conditions in urban slums areas.

The major diseases that are attributed to environment pollution and contaminated drinking water supply Lack of safe water creates an enormous burden in the form of waterborne illness among children and overall, was the leading cause of death in low-income groups. Rural population does not use any method of water disinfection and have no sanitary toilets. Open air defecation, a common practice among villagers, may lead to contamination of the water supply system and result in outbreaks of diarrhoeal (Sarkar et al., 2007). We have earlier studied the socio-cultural factors impacting water safety with the help of knowledge, attitudes and practices survey on water handling and usage, sanitation and defecation practices in a village in southern India using questionnaires and focus group discussions (Banda et al., 2007).

Interesting examining of survey data for a study area was questionnaire carried out to describe the water supply and sewage distribution systems in relation to human dwellings, their wastes, Locality of water source in wards and villages, condition of water source, drinking water quality and sanitary practices in the study area Dhar city and adjacent village of Dhar city.
Evidence from most developing countries at least indicates the inefficiencies of the prevailing government health systems which have disillusioned many of the targeted users; provision of free care of all kinds to all the citizens has in reality resulted in rationing of services either in terms of physical quantities or in terms of quality. Studies exist to show that people spend large amounts out-of-pocket for curative care, by preferring to visit private, rather than public health facilities (Sundar 1995, Visaria and Gumber 1994).

Materials and methods

Socio-ecological and health survey

To find out the causative factors on the human health a questionnaire have been prepared based on N.C.A.E.R. New Delhi. The data collected have been subjected to statistical analysis.

- Contour of the locality and its type.
- Locality of water sources.
- Localization and relationship of water sources and sewage tank.
- Condition of water sources (hand pump) and their neighbourhoods.
- Common diseases of the areas.
- Water borne diseases in the areas.
- Medical facility available in the areas.
- Study of public latrine facility.
- Study of population density.
- Types of house
- Income groups
- Literacy

The data and information have been collected from the field survey by using questionnaires. Observation checklist was used to record the environment and sanitation conditions of the water sources, and settlement localities.
In the present, the sampling were randomly selected in Dhar city and adjacent villages of Dhar city namely Delmi-Delmi, Badpipli, Sitapat, Padliya, Matalabpura, Gyanpura Khilchipura, Tornod, Jetpura and Utawad.

Results and discussion

Contour of the Locality and its type

In the study area of Dhar city maximum wards were located on Plain (49.33%) followed by on unequal surface (24.89%), on hill and plain (14.22%) and on the hill/Rock (11.55%). The localities of wards for situating on Plain maximum in ward no.07 (86.67%) followed by ward no.20 (80%), ward no.17 and ward no.28 (76.67% each) and ward no.19 and ward no.21 (70% each). Least locality of wards for situating on Plaines was reported in ward no.09 (13.33%) followed by ward no.04, ward no.13 and ward no.30 (26.67% each) and ward no.10 and ward no.11 (33.33% each). The locality of wards for situating on the hill/rock were maximum in ward no.09 (53.33%) followed by ward no.04 (43.33%) and ward no.05 (40%). Lowest locality of wards for situating on the hill/rock was recorded in ward no.02, ward no.12 and ward no.25 (6.67%) followed by ward no.16 and ward no.24 (10% each) and ward no 30 (23.33%). The locality of wards for situating on the unequal surface was maximum in ward no.13 and ward no.26 (40% each) followed by ward no.12, ward no.15, ward no.16 (36.67%), ward no.06, ward no.14, ward no.18 ward no.19 and ward no.29 (30% each) and ward no.24 (33.33%). Minimum locality of wards for situating on unequal surface was recorded in ward no.04 (6.67%) followed by ward no.21 (10%), ward no.05 and ward no.07. (13.33% each) and ward no.11 (16.67 %). The locality of wards for situating on hill and plains maximum in ward no.08, ward no.13 and ward no.14 (33.33% each). Followed by ward no.22 (26.67%) and ward no.04 and ward no.29 (23.33% each). Least locality of wards for situating on hill and plain was reported in ward no.03 ward no. and ward no.09 (6.67% each) followed by ward no.05(10% each) and ward no.10, ward no.12 and ward no.16 (13.33% each)
In the adjacent villages of Dhar city maximum villages were located on plain (44.5%) followed by on unequal surface (27.5%), on hill and plain (15.5%) and on the hill/rock (12.5%). The locality of wards for situating on Plains were maximum in village Utawad (85.%) followed by Delmi and Gyanpura (60.% each) and Badpipli and (55% each). Least locality of villages for situating on plains was reported in Sitapat (10%) followed by Padliya and Tornod (35% each) and Matalabpura and Khilchipura (40% each). The locality of villages for situating on the hill/Rock were maximum Sitapat 45%) followed by Tornod (30%) and Badpipli (20%). Lowest locality of wards for situating on the hill/rock was recorded in Padliya and ward Jetpura (15% each). Followed by Badpipli(10% each). The locality of wards for situating on the unequal surface was maximum in villages Khilchipura (50%) followed Matalabpura (45%) and Delmi and Padliya (30% each). Minimum locality of wards for situating on unequal surface was recorded in Tornod And Utawad (15%) followed by Gyanpura and Sitapat (20%) and Delmi and Padliya (30% each). The locality of villages for situating on hill and plain were maximum in Sitapat and Jetpura (25% each). Followed by Padliya, Gyanpura Tornod (20% each). Least locality of villages for situating on hill and plain was reported in Delmi, Badpipli and Khilchipura (10%each) followed by Matalabpura (15%).

Overall Reports of contour of the locality of wards and its type of Dhar city
Overall Reports of contour of the locality and its type
of adjacent villages of Dhar city

Locality of drinking water sources
In the study area of Dhar city maximum water sources were located at Plain (50.33%) followed by near of sewer line (14.44%), in Hilly areas (14%), Near of Garbage (13.67%) and near of refuge dumps (7.55%).

The water sources located at Plain maximum in wards were ward no.17 (83.33%) followed by ward no.22 and ward no.28 (73.33% each), ward no.18 and ward no.20 (70% each). Least water sources located at Plaines was found in ward no.09 and ward no.13 (26.67% each) followed by ward no.01 and ward no. 06 (13.33% each).

The water sources located in hilly areas maximum were in ward no.09 (40%) followed by ward no.30 (33.33%), ward no.04, ward no.05, ward no.11 and ward no. 29 (26.67% each). Least water sources located in hilly areas were recorded in ward no.8 and ward no.13 (3.33%) followed by ward no.07, ward no.26 and ward no. 28 (6.67% each), ward no.18 and ward no. 27(10% each).

Maximum water sources located near of garbage were recorded in ward no.13(33.33%) and minimum recorded in wards were ward no.18 and ward no.22 (3.33% each) followed by ward no.03, ward no.4, ward no.12and ward no.20 (6.67% each).

In the present study maximum water sources located at near sewer line recorded in ward no.12, ward no.15, and ward no.21 (26.67% each) followed by ward no.22 and ward no.27 (23.33% each). Least water sources located at sewer line noted in ward no.04 and ward no. 29(3.33% each) followed by ward no. 17 and ward no. 26 (6.67% each). Other wards in which more than 10% water sources located near sewer line recorded in ward no.03, ward no.06, ward no.09, ward no.11, ward no.14, ward no.24, ward no.25 and ward no. 28. However, in ward no.30 in which none of water sources were located near sewer line.

In the study areas the maximum 20 percent of water sources were located near refuge dumps recorded in ward no.01, ward no.08 and ward no.13. Followed by ward no. 26 (16.67%), ward no.06 and 29(13.33% each). Least water sources located at near refuge dumps were recorded in ward no.03, ward no.04, ward no.05, ward no.16, ward no.18, ward no.20, ward no.28and ward no.30 (3.33%each) followed by ward no.02, ward no.10, ward no.11, ward no.14, ward
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no.23, ward no.24, and ward no.25 (6.67 each) and ward no.09, ward no.12, ward no.17, ward no.21 and ward no.27 (10% each). However, in ward no.07, ward no.15, ward no.19 and ward no. 22 in which none of water sources were located near refuge dumps.

In the adjacent villages of Dhar city maximum water sources were located at Plaines (44.5%) followed by in Hilly areas (17%), Near of Garbage (16%), near of refuge dumps (13.5%) and near of sewer line (9%),

The water sources located at Plain maximum in village were Gyanpura (83.33%), followed by Delmi (65%), and Badpipli (55%). Least water sources located at Plaines was found in village Sitapat (25%) followed by Jetpura (30) and Matalabpura, Tornod and Utawad (35% each).

The water sources located in hilly areas were maximum in village Sitapat (45%) followed by Badpipli (30%), Padliya and Tornod (20% each). Least water sources located in hilly areas were recorded in Matalabpura (5%) followed by Delmi and Jetpura (10% each), Gyanpura and Khilchipura (15% each).

Maximum water sources located near of garbage were recorded in Matalabpura (25%) and minimum recorded in Delmi and Gyanpura were (10% each), followed by Badpipli, Sitapat, Padliya, Khilchipura and Tornod (15% each).

In the present study maximum water sources located at near sewer line recorded in Utawad (30%) followed by Jetpura (25%). Least water sources located at sewer line noted in Padliya and Tornod (10% each) followed by Matalabpura (15% each). However in villages Delmi, Badpipli, Sitapat, Gyanpura and Khilchipura in which none of water sources were located near sewer line.

In the study areas the maximum 20 per cent of water sources were located near refuge dumps recorded in village Khilchipura. Followed by Matalabpura and Tornod (20% each). Least water sources located at near refuge dumps were recorded in Padliya (10% each) followed by Delmi, Sitapat, Jetpura and Utawad (15% each). However in Badpipli and Gyanpura in which none of water sources were located near refuge dumps.

Overall Reports of locality of drinking water sources of Dhar city
Overall Reports of locality of drinking water sources of adjacent villages of Dhar city

Localisation and Relationship of water sources with Sewage tank
In the study area of Dhar city maximum available of water sources of tap water supply (51.11%), followed by tube well (30.55%), Hand pump (17%) and well (1.33%). The tap water supply were maximum in ward no.06 (80%) followed by ward no.04, ward no.12 and ward no.14 (63.33% each) and ward no.05, ward no.09, ward no.16, ward no.21 and ward no.29 (60% each). Least of tap water supply was recorded in ward no.27 (26.67%) followed by ward no.34 and ward no.26 (33.33%) and ward no.25 and ward no.23 (40% each). The tube well water source was reported maximum in ward no.17, ward no.19 and ward no.2 (46.67%) followed ward no.07 and ward no.18 (43.33% each) and ward no.15, ward no.16, ward no.21 and ward no.41 (40% each). Least of the tube well water source was reported in ward no.09 (13.33%) followed by ward no.12, ward no.29 and ward no.30 (16.67% each) and ward no.13, ward no.20 and ward no.23 (20% each). and well water supply was seen in the survey report. Hand pump source of drinking water was reported maximum in ward no.30 (43.33%) followed by ward no.23 and ward no.24 (40% each), and ward no.25 (36.33% each). Least of the Hand Pump water source was reported in ward no.04 (6.67%) followed by ward no.02 and ward no.05 (10% each) and ward no.03 (13.33% each).

In the present study the tube well water source which located on no fifth around source were recorded maximum in ward no.18 (20%) followed by ward no.17 and ward no.19 (16.67%) and ward no.04, ward no.15, ward no.24, ward no.21, ward no.26 and ward no.27 (13.33% each). Least the tube well water source which located on no fifth around source were reported in ward no.01 and ward no.13 (3.33%) followed by ward no.06, ward no.08, ward no.09, ward no.12, ward no.23, ward no.25 and ward no.28 (6.67% each).

In the study areas the tube well water source which located on fifth present around source were recorded maximum in ward no.03 (13.33%) followed by ward no.02 and ward no.10 (10% each). Least the tube well water source which located on fifth present around source” were reported in ward no.04, ward no.08, ward no.11, ward no.15, ward no.19, ward no.22, ward no.25, ward no.27, ward no.28, and ward no.29 (3.33% each). Followed by ward no.01, ward n ward no.05, ward
In the present study the tube well water source which located on near drain were recorded maximum in ward no.27 (13.33%) followed by ward no.01 and ward no.08 (10% each). Lowest the tube well water source which located on near drain were reported in ward no.02, ward no.03, ward no.04, ward no.09, ward no.13, ward no.21 and ward no.28 (3.33% each).

In the study areas the tube well water source which located on clean place were recorded maximum in ward no.19 and ward no.26 (16.67%) followed by ward no.16, ward no.17 and ward no.21 (13.33% each) and ward no.12, ward no.15 and ward no.18 (33.33%). Least the tube well water source which located on clean place were reported in ward no.05, ward no.06, ward no.08, ward no.09, ward no.23, ward no.29 and ward no.30 (3.33%) followed by ward no.01, ward no.02, ward no.03, ward no.07, ward no.14, ward no.22, ward no.24, ward no.25, ward no.27, ward no.28 and ward no.30 (6.67% each).

In the present study the tube well water source which located on near septic tank were recorded maximum in ward no.07 (13.33%) followed by ward no.04 and ward no.27 (10% each). Least of the tube well water source which located on near septic tank were recorded in ward no.01, ward no.03, ward no.05, ward no.06, ward no.10, ward no.11, ward no.16, ward no.17, ward no.19, ward no.20, ward no.21, ward no.22, ward no.23, ward no.26 and ward no.28 (3.33% each).

Well In the present study the well water supply only found in ward no.30 which located on no fifth around the source (10%), Clean (13.33%), Wall Present (16.67%), there is no found Near Septic tank, Fifth Present and Near Drain.

In the present study the tap water supply which located on the dry areas were recorded maximum in ward no.29 (40%) followed by ward no.06 (33.33%) ward no.05 (30%), ward no.04, ward no.12 and ward no.28 (26.67% each). Least the tap water supply which located on “The dry areas” was reported in ward no.13 and ward no.27 (6.67%) followed by ward no.10, ward no.15 and ward no.24.
(10%) and ward no.01, ward no.08, ward no.20, ward no.22 and ward no.25 (13.33% each).

In the study areas the tap water supply which located on crossing the sewage line was recorded maximum in ward no.14 (30% each). Followed by ward no.13 (26.67%) and ward no. 08 and ward no.11 (23.33%) Least the tap water supply which located on crossing the sewage line were reported in ward no.24, ward no.26 and ward no.29 (6.67%) followed by ward no.01, ward no.05, ward no.10, ward no.22, ward no.25 and ward no.27 (10% each).

In the present study the tap water supply which situated on submerge in sewage were recorded maximum in ward no.01 and ward no.10 (13.33%). Lowest the tap water supply which situated on submerge in sewage were reported in ward no.08, ward no.19 and ward no.24 (3.33% each).

In the study areas tap water supply which located on passing through fifth were recorded maximum in ward no.06 and ward no.12 (23.33%) followed by ward no.09, ward no.10 and ward no.22 (20% each) and ward no.04 and ward no.21 (16.67% each). Least the tap water supply which located on passing through fifth were reported in ward no.02, ward no.011, ward no.14, ward no.15 and ward no.25 (6.67% each) followed by ward no.01, ward no.03, ward no.08, ward no.13, ward no.19, ward no.23, ward no.26, and ward no.27 (10% each).

In the present study the Hand pump as water source which located on no fifth around source were recorded maximum in ward no.20 and ward no.30 (13.33% each) followed by ward no.23 and ward no.24 (10% each). Least the Hand pump as water source which located on no fifth around source was reported in ward no.12, ward no.13, ward no.15 and ward no.28 (3.33%) followed by ward no.09, ward no.22, ward no.25 and ward no.29 (6.67% each).

In the study areas the Hand pump as water source which located on fifth present around source were recorded maximum in ward no.23 (13.33%). Least the Hand pump as water source which located on fifth present around source was reported in ward no.02, ward no.15 and ward no.22 (3.33% each).
In the present study the hand pump water source which located on near drain were recorded maximum in ward no.27 (13.33%). Lowest the tube well water source which located on near drain were reported in ward no.03, ward no.04, ward no.05, ward no.09, ward no.15, ward no.22, ward no.23, ward no.26 and ward no.29 (3.33% each).

In the present study the hand pump water source which located on near septic tank were recorded maximum in ward no.04 (13.33%) followed by ward no.20 (10%) Least of the tube well water source which located on near septic tank were recorded in ward no.01, ward no.10, ward no.11, ward no.25 and ward no.28 (3.33%) followed by ward no.08, ward no.12, ward no.13 and ward no.27 (6.67% each).

In the study areas the tube well water source which located on clean place were recorded maximum in ward no.30 (23.33%) followed by ward no.24 (16.67%) and ward no.23 and ward no.26 (33.33% each). Least the tube well water source which located on clean place were reported in ward no.13, ward no.04, ward no.08 and ward no.11 (3.33%) followed by ward no.02, ward no.15, ward no.22, ward no.28 and ward no.29 (6.67% each).

In the adjacent villages of Dhar city maximum available of water sources of Hand pump (42.5%) followed by tube well (27.5%), tap water supply (15.5%) and well water (14.5%).

Hand pump and its supply was available in all the villages. Maximum population served with Hand pump water was in villages Delmi (70%) followed by Sitapat (65%) and Badpipli and Utawad (50% each), Khilchipura and Tornod (40% each).

Tube well water source was the next drinking water source after hand pump used by the most of the surveyed population in the study area. 27.5 per cent of the surveyed population were using tub well water source for drinking in all villages. In the present study maximum tub well water source were recorded in Jetpura (50%) followed by Utawad (40%), Delmi Padliya and Tornod (30% each).
and Matalabpura and Gyanpura (25% each). Least of tub well water source in Khilchipura (10%) followed by Sitapat (15%) and Badpipli (20%).

In the study area tap water supply was a limited facility and it’s available in Tornod, Khilchipura Matalabpura Padliya and Jetpura only. Except the village Delmi Badpipli Gyanpura Sitapat and Utawad it is interesting that per cent of tap water maximum even than number of well water maximum in villages. The tap water supply were maximum in Khilchipura (50%) followed by Tornod (40%) and Matalabpura (30%). Least of tap water supply was recorded in Jetpura (6.67%). Followed by Padliya (25%). Except the villages Delmi, Badpipli, Sitapat, Gyanpura and Utawad.

Well water was the next Drinking water source after tap water, more than 14.5 surveyed populations were using well water as a source of drinking water. The well water sources were maximum in Gyanpura (40%). Followed by Badpipli (30%) and Sitapat and Padliya (20%). Least of the well water source was Matalabpura (15% followed by Tornod and Utawad (10%). Except villages in Delmi, Khilchipura and Jetpura.

In the present study the tube well water source which located on no fifth around source were recorded maximum in ward Delmi, Jetpura and Utawad (20% each) followed by Padliya, Matalabpura, Gyanpura and Tornod(10% each). Least of tube well water source which located on no fifth around source were recorded Badpipli and Sitapat (5% each).

In the study areas the tube well water source which located on Fifth present around source were recorded maximum in Jetpura and Utawad (10% each). The tube well water source which located on fifth present around source were recorded minimum Delmi, Badpipli, Sitapat, Padliya, Matalabpura Gyanpura and Tornod (5% each).

In the present study the tube well water source which located on near drain were recorded maximum in Jetpura only (10%). Lowest the tube well water source which located on near drain were reported in Utawad only (5% each).
In the study areas the tube well water source which located on clean place were recorded maximum Padliya, Jetpura and Tornod (15%) followed by Delmi, Badpipli, Matalabpura, Gyanpura, Khilchipura, and Utawad (10%). Lowest the tube well water source which located on clean place were recorded Sitapat (5%).

In the present study in all the villages none of the tube well water source which located on near septic tank was recorded.

In the present study the well water source which located on no fifth around source were recorded in Badpipli and Sitapat only (5%). Except Padliya, Matalabpura, Gyanpura, Tornod and Utawad.

In the study areas the well water source which located on fifth present around source were recorded in Padliya only. Except Badpipli, Sitapat, Matalabpura, Gyanpura, Tornod and Utawad.

In the present study of the well water source which located on near drain none of the villages were recorded.

In the study areas the well water source which located on clean place were recorded maximum Gyanpura (30%). Followed by Badpipli, Sitapat, Matalabpura and Padliya (10% each). Lowest of well water source which located on clean place were recorded Tornod and Utawad (5% each).

In the present study in all the villages none of the well water source which located on near septic tank was recorded.

In the present study well water source maximum wall present on the well Badpipli (15%). Followed by Gyanpura (10%). Least of the well water source wall present on the well Sitapat, Padliya, Matalabpura, Tornod and Utawad (5% each).

In the present study the tap water supply which located on the dry areas were recorded maximum in Khilchipura (40%) followed by Tornod (20%). Least the tap water supply which located on the dry areas was reported in Matalabpura and Jetpura (5% each). Except Padliya.

In the study areas the tap water supply which located on crossing the sewage line were recorded maximum in Matalabpura and Tornod (10% each).
Lowest tap water supply which located on crossing the sewage line were recorded in Jetpura (5%). Except Khilchipura and Padliya.

In the present study the tap water supply which situated on Submerge in sewage were recorded only in Matalabpura (5%). except Tornod, Khilchipura, Padliya and Jetpura.

In the study areas tap water supply which located on passing through fifth were recorded in Padliya, Matalabpura, Khilchipura and Tornod (10%). Except the village Jetpura.

In the present study the Hand pump as water source which located on no fifth around source were recorded maximum in Delmi (20% each). Least the Hand pump as water source which located on no fifth around source was reported in Tornod and Utawad18 (3.33% each).

In the study areas the Hand pump as water source which located on fifth present around source were recorded maximum in Utawad (20 %) followed by Delmi and Jetpura (15 % each). Least the Hand pump as water source which located on “fifth present around source” were reported in Padliya, Matalabpura and Khilchipura (5%each) followed by Badpipli, Sitapat and Gyanpura (10%).

In the present study the hand pump water source which located on near drain were recorded maximum in Matalabpura and Utawad (15 % each). Lowest the tube well water source which located on near drain were reported in Padliya and Tornod (5% each).

In the present study the tube well water source which located on near septic tank were found only Matalabpura, Jetpura and Utawad (5% each).

In the study areas the hand pump water source which located on clean place were recorded maximum in Sitapat (40%) followed by Delmi (35%) and Badpipli (30 %). Least the hand pump water source which located on clean place were reported in Matalabpura (5%) followed by Tornod, Jetpura and Utawad (10% each). Padliya and Gyanpura (15%).
**Condition of drinking water source (hand pump) and their neighbourhood**

In the present study area of Dhar city maximum cemented platform were reported from 75 to 100 percent in ward no. 27(75%), ward no. 30(76.92) and ward no.20 (100%) and lowest 16. to 25 percent in ward no.11(16.67%), ward no.01 and ward no.29(28.57% each) and ward no.13(25%).

Casing leak proof damages were maximum found in ward no. 13(75%) followed by Ward no. 10(60%) and ward no. 29(57.14%).Least of the Casing leak proof Damages were found in ward no30(7.69%) followed by ward no.23 and ward no.24(8.33%) and ward no.26 and ward no.27(12.5%). Parapet lining were found maximum in ward no.05 (66.67%) and Lowest Parapet lining were found in ward 01(28.57%).

In the adjacent villages of Dhar city maximum cemented platform were reported in village Delmi and Gyanpura (85.71) followed by Sitapat (84.61) and Tornod (75%). Lowest cemented platform were reported in Utawad (40%) followed by Matalabpura (50%) and Padliya (60%).

Casing leak proof Damages were maximum found from 37 to 50 percent Jetpura (37.5%), Utawad (40%), Matalabpura (50%) and other village Badpipli (30%).

In the present study Parapet lining were found maximum in Khilchipura (37.5%) followed by Tornod (25%) and Utawad (20%).Lowest Parapet lining were found in Sitapat(15.34%%) and Delmi and Gyanpura (14.28% each).

**Common and Water borne diseases in the areas**

Lack of safe water creates an enormous burden in the form of waterborne illnesses such as diarrheal disease, cholera, typhoid, and Guinea worm disease. Diarrheal disease itself is a leading cause of mortality and morbidity among children under the age of five and, overall, was the third leading cause of death in low-income countries in 2004 (World Health Organization, 2009).

Waterborne diseases are cause by pathogenic microorganisms that most commonly are transmitted in polluted fresh water. Infection commonly results
during drinking, washing bathing, preparation of food and consumption of food thus infected. Malaria as water borne disease just because Mosquitoes have aquatic phases in their life cycles,

Every effort should be made to achieve a drinking-water quality as safe as practicable. (WHO, 2004) Diarrhoeal diseases kill an estimated 1.8 million people each year. (WHO, 2005) Among children under five years in developing countries, diarrhoea accounts for 17% of all deaths. (United nation, 2006)

In the present study epidemiological survey of the urban and Rural population was found infected with various water born and other related diseases. Various diseases like typhoid, dysentery, diarrhoea, cholera, amoebiasis, giadiasis, hepatitis, fluorosis, poliomyelitis, malaria, skin diseases, and joint / waist pain were reported in the study area.

In the present study Dhar city maximum cases of cold cough (18.63%) and amoebiasis (15.63%) were reported followed by pain in joint (13.52%), typhoid (9.84%), diarrhoea (9.52%), jaundice (8.64%), indigestion (8.13%), skin disease (5.71%), malaria (4.98%), dysenteric (3.19%) and T.B. (1.40%). Lowest incidence of the cholera (0.23%) and fluorosis (0.41%). The case of poliomyelitis was not reported in the study area.

Singh and Devi (2006) reported that the water-borne diseases such as diarrhoea (34.84%), worm infestation (27.27%), typhoid fever (21.21%) and jaundice (16.66%) in studying of water borne morbidities of Thanga village. Among the wards maximum per cent of the cold cough as a disease was found in ward no.16 (30.67%) followed by ward no. 17 (25.74%) and ward no.27 (25.40%). Lowest cases of the cold cough as a disease was reported in ward no.07 (9.49%) followed by ward no.25 (10.08%), ward no.22 (14.20%) and ward no.29 (12.56%).

In the present study maximum incidence of amoebiasis were recorded in ward no.29 (21.46%) followed by ward no.28 (20.99%) and ward no.25 (20.96%). Least case of amoebiasis were reported in ward no.03 (6.73%) followed by ward no.20 (10.19%) and ward no.05 (10.22%).
Maximum case of pain in joint as a disease was recorded in ward no.18 (20%) followed by ward no.14 (17.82%) and ward no.15 (17.43%). Minimum case of pain in joint was recorded in ward no.21 (8.57%) followed by ward no.27 (9.01%) and ward no.11 (10.60%).

The incidence of typhoid disease was maximum in ward no.03 (14.90%) followed by ward no.19 (14.62%) and ward no.29 (13.61%). Least case of typhoid was recorded in ward no.27 (5.32%) followed by ward no.24 (6.42%), ward no.25 (7.25%) and ward no.36 (0.99%).

The incidence of diarrhoea disease was recorded maximum in ward no.03 (17.30%) followed by ward no.06 (15.47%) and ward no.07 (14.52%), ward no.36 (13.36). Least case of diarrhoea diseases were recorded in ward no.29 (4.18%) followed by ward no.04 (5.79%) and ward no.16 (5.77%).

In the study areas maximum incidence of jaundice were recorded in ward no.01 (13.42%) followed by ward no.07 (12.29%) and ward no.20 (11.46). Least case of jaundice were reported in ward no.19 (4.25%) followed by ward no.17 (5.44%) and ward no.21 (5.71%).

Maximum case of indigestion as a disease was recorded in ward no.02 (12.37%) followed by ward no.04 (10.14%), ward no.27 (9.83%) and ward no.29 (9.42%). Minimum case of indigestion was recorded in ward no.12 (5.91%) followed by ward no.13 (6.06) and ward no.10 (6.12%).

The skin diseases were maximum in ward no.38 (25.75%) followed by ward no.23 (22.22%) and ward no.24 (21.71%). Least of the skin diseases were recorded in ward no.44 (6.83%) followed by ward no. 41(9.45%) and ward no.29 (9.88%).

Maximum case of malaria as a disease was recorded in ward no.21 (9.52%) followed by ward no.27 (8.19 %), ward no.25 (7.66%). Minimum case of malaria was recorded in ward no.02 (1.54%) followed by ward no.04 (1.93%), ward no.18 (2.17%) and ward no.15 (2.56%).

In the present study maximum incidence of dysenteric were recorded in ward no.27 (9.83%) followed by ward no.10 (4.95%) and ward no.25 (4.43%).
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Lowest case of dysenteric was reported in ward no.04 (0.96%) followed by ward no.18 (1.73%) and ward no.09 (1.36).

In the present study maximum incidence of T.B. were recorded in ward no.05 (3.51%) followed by ward no.01 (2.61%) and ward no.6 (2.38%). Lowest case of T.B. was reported in ward no.18 (0.43%) followed by ward no.12 (0.49), ward no.27 (0.81%), ward no.08 (0.88%) and ward no.09 (0.91%).

The incidence of fluorosis was not more than 1.5% reported in the ward no.01, ward no.03, ward no.05, ward no.06, ward no.08, ward no.10, ward no.11, ward no.12, ward no.13, ward no.16, ward no.17, ward no.21, ward no.22, ward no.23, ward no.24, ward no.26, ward no.28, ward no.29.

In the study areas incidence of cholera were reported in ward no.01, ward no.04, ward no.05, ward no.07, ward no.10, ward no.11, ward no.13, ward no.23, ward no.25 and ward no 27 in which not more than 1.1 percent.

In the adjacent villages of Dhar city present study of villages maximum cases of cold cough (20.40%) and amoebiasis (18.46 %) were reported followed by indigestion (10.51%), diarrhoea (10.07%), and jaundice (9.54%), skin disease (9.27 %), pain in joint (7.68 %), typhoid (5.65%), dysenteric (2.82%), malaria (2.56%), and T.B. (2.20%). Lowest incidence of the cholera (0.35%) and fluorosis (0.44%). The case of poliomyelitis was not reported in the study area.

Among the wards maximum per cent of the cold cough as a disease was found in village Utawad (27.46%) followed by Khilchipura (24.61%) and Gyanpura (23.59%). Lowest cases of the cold cough as a disease was reported in Padiya (7.99%) followed by Sitapat (13.09%) and Delmi (13.48%).

In the present study maximum incidence of amoebiasis were recorded in Tornod (24.82%) followed by Khilchipura (19.81%) and Jetpura (19.51%). Least case of amoebiasis were reported in Matalabpura (14.28%) followed by Badpipli (14.66%) and Padiya (15.78%).

Maximum case of indigestion as a disease was recorded in Matalabpura (14.28%) followed by Padiya (14.03%) and Delmi (12.35%). Minimum case of
Indigestion was recorded in Gyanpura (6.74%) followed by Utawad (7.74) and Tornod (8.51%).

The incidence of diarrhoea disease was recorded maximum in Padliya (21.92%) followed by Sitapat (13.09%) and Delmi (12%). Least case of diarrhoea diseases were recorded in Tornod (3.51%) followed by Jetpura (6.70%) and Khilchipura (7.5%).

In the study areas maximum incidence of jaundice were recorded in Sitapat (16.66%) followed by Gyanpura (12.35%) and Badpipli (12%). Least case of jaundice were reported in Jetpura (6.70%) followed by Padliya (7.01%) and Delmi (5.71%).

The skin diseases were maximum in Matalabpura (13.03%) followed by Delmi (11.23%) and Padliya (9.64%). Least of the skin diseases were recorded in Gyanpura (6.74%) followed by Tornod (7.80%) and Badpipli (8%).

Maximum case of pain in joint as a disease was recorded in Delmi (8.98%) followed by Tornod (8.51%) and Khilchipura (8.49%). Minimum case of pain in joint was recorded in Utawad (4.92%) followed by Badpipli (6.66%) and Sitapat (7.14%).

The incidence of typhoid disease was maximum in Jetpura (7.31%) followed by Tornod (6.38%) and Padliya (6.14%). Least case of typhoid was recorded in Khilchipura (3.77%) followed by Matalabpura (4.51%) and Utawad (4.92%).

In the present study maximum incidence of dysenteric were recorded in Sitapat (4.76%) followed by Matalabpura (4.51%) and Tornod (4.25%). Lowest case of dysenteric was reported in Utawad (1.40%) followed by Padliya (1.75%) and Jetpura (1.82%).

Maximum case of malaria as a disease was recorded in Sitapat (3.57%) followed by Padliya (3.50%) and Delmi (3.37%). Minimum case of malaria was recorded in Khilchipura (1.88%) followed by Utawad (2.11%) and Tornod (2.12%).
In the present study maximum incidence of T.B. were recorded in Utawad (4.22%) followed by Tornod (3.54%) and Khilchipura (2.83%). Lowest case of T.B. was reported in Gyanpura (1.12%) followed by Sitapat (1.19) and Delmi (2.24%).

The incidence of fluorosis was not more than 2.5% reported in the village Delmi, Padliya, Gyanpura and Utawad. Except the village Badpipli, Sitapat, Matalabpura, Khilchipura, Tornod and Jetpura.

In the study areas incidence of cholera were reported in Jetpura, Padliya and Matalabpura in which not more than 1.5 percent.

Thus in the present study was found that lower income group was more various water born and related and diseases. Unhygienic habits, in illiteracy, lack of proper drainage system, unprotected sources of drinking water and lake of toilet facility were mainly responsible for spread of water- borne and water hygiene diseases.

Overall reports of common and water borne diseases of Dhar city
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FLUOROSIS    DIARRHEA    DYSENTERIC    COLD COUGH    AMOEBIASIS
TYPHOID     JOANDECE    PAIN IN JOINT    SKIN DISEASE    T.B.
INDIGESTION    CHOLERA    MALARIA    POLIOS
Overall reports of common and water borne diseases of adjacent villages of Dhar city

- DIARRHEA: 20.40%
- DYSENTERIC: 18.46%
- COLD COUGH: 9.54%
- AMOEBIASIS: 9.27%
- TYPHOID: 10.15%
- JOANDECE: 2.20%
- SKIN DISEASE: 9.27%
- T.B.: 2.56%
- INDIGESTION: 0.35%
- CHOLERA: 0.00%
- MALARIA: 0.00%
- POLIOS: 0.00%
Medical facility available in the areas

In the study area of Dhar city maximum available medical facility of Private (44.56%) followed by Homeopathy (23.11%), Ayurvedic (22.78%), Government (7.89%) and Unani (0.67%). The Private medical facility maximums in wards were ward no.22 (70%) followed by ward no.19 (63.33%), ward no.04 (60%) and ward no.15, ward no.16 and ward no.26 (53.33% each). Least of Private medical facility was available in ward no.09 and ward no.17 (30%) followed by ward no.11and ward no. 13 (33.33% each). The Ayurvedic medical facilities were maximum in ward no.10 (33.33%) followed by ward no.20, ward no.28 and ward no.30 (30%). Least of Ayurvedic medical facilities were recorded in ward no.04 (13.33%) followed by ward no.05, ward no.09, ward no.19 and ward no.25 (16.67% each). Maximum medical facility of Homeopathy was recorded in ward no.17 (43.33%) followed by ward no.27 and ward no.30 (33.33% each). Minimum available of homeopathy recorded in ward no.08, ward no.09 and ward no.24 (10% each) followed by ward no.10 and ward no.12 (13.33% each).

In the present study maximum Medical facility of Government recorded in ward no.09 (43.33%) followed by ward no.08 and ward no.10 (23% each).Least Medical facility of Government reported in ward no.02 and ward no.03 (6.67% each) followed by ward no.01, ward no.05, ward no.13 and ward no.25 (10% each).

In the study areas the maximum 0.52 per cent of Unani medical facility was recorded only in ward no.11 and ward no. 14 (6.67%). Least of Unani medical facility was recorded only in ward no.13 and ward no.25 (3.33%). In all other wards was none of medical facility of Unani.

In the adjacent villages of Dhar city maximum available medical facility of Government (60%) followed by Private (16.5%) Homeopathy (12.5%), Ayurvedic (11%), and Unani (0.%). The Government medical facility maximum in village Badpipli were (85%) followed by Sitapat and Utawad (70%), Gyanpura and Khilchipura (65% each). Least of Private medical facility was available in Matalabpura (25%) followed by Delmi and Jetpura (55% each).
The Ayurvedic medical facility was maximum in Delmi, Padliya, Tornod and Jetpura (15%) followed by Sitapat, Gyanpura, Khilchipura and Utawad (10%). Least of Ayurvedic medical facilities were Badpipli and Matalabpura (5%).

In the present study maximum Medical facility of Privet recorded in Matalabpura (40%) followed by Delmi (25%) and Jetpura (20%). Least Medical facility of Privet reported in Badpipli (5%) followed by Sitapat, Gyanpura and Utawad (10% each) and Padliya, Khilchipura and Tornod (15% each). In the study areas in all other villages was none of medical facility available of Unani.

**Study of public latrine facility**

In the study area open field defecation was no common practice as more than 8.78% of population showed this old trend of defecation. open field defecation was maximum in ward no.30 (36.67%) followed by ward no.9 (30%) and ward no.05 (26.67%). Least open field defecation was ward no.12 (3.33%), ward no.10, ward no.11 and ward no.16 (6.67%) and ward no.03 and ward no.24 (10%). In their wards are no facility there for ultimately open field defecation was the only place where people eased out. Other wards more than 13% of the surveyed population showed this trend were ward no.02, ward no.08 and ward no.26 (13.33% each), ward no.01, ward no.06, ward no.23 and ward no.29 (16.67% each), and ward no.25 (20% each). Total 91.22% of the surveyed population was provided with either community or home toilet facility. Community toilet were maximum in ward no.13 and ward no.23 (10% each) followed by ward no.01, ward no.03, ward no.05, ward no.09, ward no.11, ward no.14, ward no.17, ward no.24, ward no.25 and ward no.27 (6.67% each). Minimum community toilet facility in wards were ward no.02, wards no.08, ward no.10, ward no.21 and ward no.26 (3.33% each). In other wards were not found to have any community toilet facility. Personal toilet were maximum in ward no.04 ward no.01, ward no.07, ward no.15, ward no.18, ward no.19, ward no.20, ward no.22 and ward no.28 (100% each) followed by ward no.12, ward no.14, ward no.16, ward no.17 and ward no.27 more than 90% of the served population possessed personal toilet. In other wards more than 63 percent of the served
population was provided with this facility. Sewer line for disposal of wastes and excrement was available in most of wards of Dhar city. In the other wards toilet were attached to septic tank. Most of toilets attached to septic tank toilet were maximum found in ward no.08 followed by ward no.07, ward no.28 and ward no.04 more than 75% of surveyed population possessed this facility.

In the adjacent villages of Dhar city. Open field defecation was no common practice as more than 35.5% of population showed this old trend of defecation. In village Badpipli, Sitapat and Gyanpura was no maximum facility there so ultimately open field defecation was the only place where people where eased out. Other villages more than 25% of the surveyed population showed this trend were Delmi, Matalabpura, and Khilchipura (30% each) and Padliya (35%). Total 65.5% of the surveyed population was provided with either community or home toilet facility.

Community toilet were maximum in village Utawad (20% each) followed by Delmi, Badpipli, Padliya, Gyanpura and Jetpura (15% each). Minimum community toilet facilities in village were Sitapat, Matalabpura, Khilchipura and Tornod (10% each). Personal toilets were maximum Tornod followed by Jetpura, Matalabpura, Khilchipura Utawad and Delmi where more than 50 per cent of the surveyed population possessed personal toilet. Sewer line for disposal of wastes and excrement was available in Matalabpura and Jetpura. In the other villages’ toilet were attached to septic tank. Most of toilets attached to septic tank were found Jetpura followed by Tornod Matalabpura Utawad and Delmi more than 72% of surveyed population possessed this facility.

**Population density**

In the study area of Dhar city maximum population density of male were 51.17 percent and female density were 48.82 Total of 5807 respondent. Maximum population density of male was recorded in ward 29. (54.77%) followed by ward no.02 (53.66%) and ward no. 26(53.5%). Least of population density of male were recorded in ward no. 12 (47.26%) followed by ward no.06 (48.88%) and ward no.27(48.57%). In the study area maximum population density of female were
recorded in wards no. 12 (52.73) followed by ward no. 27 (51.42 %) and ward no.06 (51.11%). Least of population density of female were recorded in ward no. 29 (45.22 %) followed by ward no. 10(46.76 %) and ward no.02 (46.33%).

In the adjacent villages of Dhar city maximum male reported were 55.05 percent and female density were 44.94 percent total of 1475 respondent. Maximum population density of male were recorded in village Delmi (59.85%) followed by Tornod (57.86%) and Matalabpura (57.25%).Least of population density of male were recorded in Utawad (49.66%) followed by Jetpura (53.04%) and Gyanpura (53.38%). In the study area maximum population density of female were recorded in Utawad (50.33%) followed by Jetpura (46.95%) and Gyanpura (46.61%). Least of population density of female were recorded in Delmi (40.14%) followed by Tornod (42.13%) and Matalabpura (42.74%).

Type of house

In the present study area of Dhar city maximum houses were Pakka 92.89% per cent and Katcha houses were 7.11 percent. Pakka houses were maximum recorded in ward no.13, ward no.14, ward no.15, ward no.16, ward no.17, ward no.19, ward no.21, ward no.28, ward no.29(100% each) followed by ward no.20 and ward no.27(96.67), ward no.11, ward no.18, ward no.22 and ward no.23 (93.33%each). Least of Pakka houses were recorded in ward no.09 (80%), followed by ward no.26 (83.33%) and ward no.12, ward no.24, ward no.25 and ward no.30 (86.67% each).

In the present study area maximum Katcha houses recorded in ward no.09 (20%) followed by ward no.05 and ward no.26(16.67% each) and ward no.01, ward no.12, ward no.24, ward no.25 and ward no.30(13.33).Least of the Katcha houses recorded in ward no.20 and ward no.27(3.33% each) followed by ward no.03, ward no.06, ward no.08, ward no.11, ward no.22 and ward no.23(6.67 each) and ward no.02, ward no.07, ward no.10 and ward no.29(10% each).

In the adjacent villages of Dhar city maximum houses were Pakka 75.5 percent and houses were Katcha 24.5 percent in the present study maximum Pakka houses were recorded in village Matalabpura, Khilchipura and Tornod (90% each).
followed by Jetpura (85%) and Delmi and Padliya (80% each). Least of the Pakka houses were recorded in village Badpipli (45%), Sitapat (55%) and Gyanpura (65%).

In the present study maximum Katcha houses were recorded in village Badpipli (55%), followed by Sitapat (45%) and Gyanpura (35%). Least of the Katcha houses were recorded in village Matalabpura, Khilchipura and Tornod (10% each). followed by Jetpura (15%) and Delmi and Padliya (20% each).

**Income group**

In the present study of Dhar city in the study area Maximum available income group of Business 49.22 percent, service 29.78 percent, Farmer 7.55 percent and Labour 13.44 percent. In the present study maximum income group of businessmen were recorded in ward no.28 (73.33%) followed by ward no.13 and ward no.20 (66.67%) and ward no.17 (63.33%). Least income group of Businessmen were reported in ward no. 06 (26.67%) followed by ward no.05 and ward no.21 (33.33% each) and ward no.09 (36.67%). Maximum income group of servicemen recorded in ward no.06 (56.67%) followed by ward no.04 (53.33%) and ward no.21 (46.66%). Least income group of servicemen reported in ward no. 10 and ward no.29 (16.67%) followed by ward no.13, ward no. 16, ward no.16, ward no. 25 and ward no.30 (20% each) and ward no.01 and ward no.20 (23.33%).

Maximum income group of farming were recorded in ward no.30 (23.33% each), followed by ward no.10 and ward no.29 (20%) and ward no.07 (16.67%). Least of the income group of farming were recorded in ward no.13 and ward no.17 (3.33) followed by ward no.05, ward no.14 and ward no.23 (6.67%) and ward no.02, ward no.03, ward no.08, ward no.11, ward no.12, ward no.15, ward no.15, ward no.25 and ward no.26 (10% each). Maximum income group of Labour were recorded in ward no.09 and ward no.24 (23.33% each) followed by ward no.05, ward no.10, ward no.16, ward no.21 and ward no.25 (20% each) and ward no.01 ward no.06, ward no.11, ward no.18, ward no.23, ward no.26 and ward no.27 (16.67% each). Least of the income group of Labour were recorded in ward
no.02, ward no.07, ward no.12, ward no.17 and ward no.19 (6.67% each). followed by ward no.13, ward no.14, ward no.20 and ward no.30 (10% each).

In the adjacent villages of Dhar city the study area Maximum available income group of Farming 75.5 percent, Labour 12.5 percent, Business 7.5 percent and service 4.5 percent. In the study area maximum income group of Farming were Between 75 to 80 percent farming was found in Tornod, Matalabpura Badpipi, Sitapat, and Gyanpura (80% each) and Khilchipura and Padliya (75% each). Other village between 65 to 70 percent were Jetpura (65%), Utawad and Delmi (70% each).

In the study area Business were found in Delmi, Tornod, Padliya, Jetpura and Utawad (10% each) and Matalabpura, Badpipi, Sitapat, Gyanpura and Khilchipura (5% each).

Maximum services were recorded in Delmi, Jetpura and Utawad (10% each) and Lowest service were recorded in Matalabpura, Khilchipura Padliya and Tornod (5% each).

Maximum Labour were recorded in Badpipi, Sitapat, Gyanpura, Khilchipura, Jetpura and Utawad (15% each) and Lowest Labour were recorded in Tornod(5%), Delmi, Padliya and Matalabpura (10% each).
Overall reports of income group of Dhar city

Overall reports of income group of adjacent villages of Dhar city