New code on cholera analysis\_20250405

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# loading data

## Reading layer `MWI\_adm1' from data source   
## `C:\Users\Lenovo\OneDrive\Desktop\Git R project\R\_Projects\Cholera\_study\_project\_2024\data\MWI\_adm1.shp'   
## using driver `ESRI Shapefile'  
## Simple feature collection with 28 features and 9 fields  
## Geometry type: MULTIPOLYGON  
## Dimension: XY  
## Bounding box: xmin: 32.67152 ymin: -17.12721 xmax: 35.91505 ymax: -9.363796  
## Geodetic CRS: WGS 84

# Social and behavioral factors that influence current water treatment practices

### Awareness of the Health Risk Associated with drinking untreated Water by Sex, Age-Group, Level of Education, and District

| **Characteristic** | **no** N = 79*1* | **yes** N = 716*1* |
| --- | --- | --- |
| sex |  |  |
| female | 56 (9.2%) | 551 (90.8%) |
| male | 23 (12.2%) | 165 (87.8%) |
| age\_group |  |  |
| >50 | 12 (6.9%) | 162 (93.1%) |
| 18-30 | 39 (13.5%) | 250 (86.5%) |
| 31-50 | 28 (8.4%) | 304 (91.6%) |
| level\_education |  |  |
| none | 16 (14.8%) | 92 (85.2%) |
| primary | 57 (11.4%) | 442 (88.6%) |
| secondary | 6 (3.5%) | 164 (96.5%) |
| tertiary | 0 (0.0%) | 18 (100.0%) |
| district |  |  |
| Balaka | 3 (8.8%) | 31 (91.2%) |
| Blantyre | 12 (9.2%) | 118 (90.8%) |
| Dedza | 8 (7.6%) | 97 (92.4%) |
| Lilongwe | 35 (11.7%) | 265 (88.3%) |
| Mangochi | 16 (12.4%) | 113 (87.6%) |
| Nkhatabay | 3 (8.3%) | 33 (91.7%) |
| Salima | 2 (3.3%) | 59 (96.7%) |
| residence |  |  |
| In land | 55 (10.3%) | 480 (89.7%) |
| lake shore | 24 (9.2%) | 236 (90.8%) |
| *1*n (%) | | |

### 2.3. 0 Main sources of drinking water during the dry season by District/ Township

| district | borehole | community standpipe | piped into dwelling | piped into yard plot | protected well | unprotected well | other drinking source | river stream | spring | dam | bottled water | tanker truck bower | lake |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| character | character | character | character | character | character | character | character | character | character | character | character | character | character |
| Balaka | 34 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Blantyre | 97 (74.6%) | 6 (4.6%) | 14 (10.8%) | 9 (6.9%) | 1 (0.8%) | 3 (2.3%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Dedza | 85 (81%) | 2 (1.9%) | 1 (0.9%) | 2 (1.9%) | 5 (4.8%) | 7 (6.7%) | 1 (0.9%) | 1 (0.9%) | 1 (0.9%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Lilongwe | 247 (82.3%) | 2 (0.7%) | 2 (0.7%) | 8 (2.7%) | 22 (7.3%) | 7 (2.3%) | 0 (0%) | 7 (2.3%) | 0 (0%) | 5 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Mangochi | 112 (86.8%) | 3 (2.3%) | 2 (1.6%) | 7 (5.4%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 2 (1.6%) | 3 (2.3%) | 0 (0%) |
| Nkhatabay | 14 (38.9%) | 2 (5.6%) | 3 (8.3%) | 11 (30.6%) | 1 (2.8%) | 0 (0%) | 1 (2.8%) | 2 (5.6%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 2 (5.6%) |
| Salima | 54 (88.5%) | 1 (1.6%) | 0 (0%) | 5 (8.2%) | 1 (1.6%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| n: 7 | | | | | | | | | | | | | |

| residence | borehole | community standpipe | dam | other drinking source | piped into dwelling | piped into yard plot | protected well | river stream | spring | unprotected well | bottled water | lake | tanker truck bower |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| character | character | character | character | character | character | character | character | character | character | character | character | character | character |
| In land | 429 (80.2%) | 10 (1.9%) | 5 (0%) | 1 (0.2%) | 17 (3.2%) | 19 (3.5%) | 28 (5.2%) | 8 (1.5%) | 1 (0.2%) | 17 (3.2%) | 0 (0%) | 0 (0%) | 0 (0%) |
| lake shore | 214 (82.3%) | 6 (2.3%) | 0 (0%) | 1 (0.4%) | 5 (1.9%) | 23 (8.8%) | 2 (0.8%) | 2 (0.8%) | 0 (0%) | 0 (0%) | 2 (0.8%) | 2 (0.8%) | 3 (1.1%) |
| n: 2 | | | | | | | | | | | | | |

## 2.4. 0 Main sources of drinking water during the wet season by District

| district | borehole | community standpipe | dam | lake | piped into dwelling | piped into yard plot | protected well | rainwater | unprotected well | other drinking source | spring | river stream | tanker truck bower | bottled water |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| character | character | character | character | character | character | character | character | integer | character | character | character | character | character | character |
| Balaka | 34 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Blantyre | 94 (72.3%) | 5 (3.9%) | 1 (0%) | 1 (0.8%) | 13 (10%) | 6 (4.6%) | 1 (0.8%) | 5 | 4 (3.1%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Dedza | 84 (80%) | 3 (2.9%) | 0 (0%) | 0 (0%) | 1 (0.9%) | 1 (0.9%) | 2 (1.9%) | 7 | 5 (4.8%) | 1 (0.9%) | 1 (0.9%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Lilongwe | 235 (78.3%) | 2 (0.7%) | 6 (0%) | 0 (0%) | 1 (0.3%) | 7 (2.3%) | 26 (8.7%) | 7 | 10 (3.3%) | 0 (0%) | 0 (0%) | 5 (1.7%) | 1 (0.3%) | 0 (0%) |
| Mangochi | 109 (84.5%) | 4 (3.1%) | 0 (0%) | 0 (0%) | 2 (1.6%) | 6 (4.7%) | 0 (0%) | 1 | 0 (0%) | 0 (0%) | 1 (0.8%) | 1 (0.8%) | 3 (2.3%) | 2 (1.6%) |
| Nkhatabay | 15 (41.7%) | 2 (5.6%) | 0 (0%) | 0 (0%) | 3 (8.3%) | 11 (30.6%) | 0 (0%) | 3 | 0 (0%) | 0 (0%) | 0 (0%) | 2 (5.6%) | 0 (0%) | 0 (0%) |
| Salima | 52 (85.2%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 7 (11.5%) | 1 (1.6%) | 1 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| n: 7 | | | | | | | | | | | | | | |

| residence | borehole | community standpipe | dam | lake | other drinking source | piped into dwelling | piped into yard plot | protected well | rainwater | river stream | spring | tanker truck bower | unprotected well | bottled water |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| character | character | character | character | character | character | character | character | character | integer | character | character | character | character | character |
| In land | 413 (77.2%) | 10 (1.9%) | 7 (0%) | 1 (0.2%) | 1 (0.2%) | 15 (2.8%) | 14 (2.6%) | 29 (5.4%) | 19 | 5 (0.9%) | 1 (0.2%) | 1 (0.2%) | 19 (3.5%) | 0 (0%) |
| lake shore | 210 (80.8%) | 6 (2.3%) | 0 (0%) | 0 (0%) | 0 (0%) | 5 (1.9%) | 24 (9.2%) | 1 (0.4%) | 5 | 3 (1.1%) | 1 (0.4%) | 3 (1.1%) | 0 (0%) | 2 (0.8%) |
| n: 2 | | | | | | | | | | | | | | |

### 2.5.1 Water Treatment at Household by Sex, Level of Education, Religion

| **Characteristic** | **no** N = 299*1* | **yes** N = 496*1* |
| --- | --- | --- |
| sex |  |  |
| female | 209 (34.43%) | 398 (65.57%) |
| male | 90 (47.87%) | 98 (52.13%) |
| age\_group |  |  |
| >50 | 59 (33.91%) | 115 (66.09%) |
| 18-30 | 118 (40.83%) | 171 (59.17%) |
| 31-50 | 122 (36.75%) | 210 (63.25%) |
| level\_education |  |  |
| none | 52 (48.15%) | 56 (51.85%) |
| primary | 187 (37.47%) | 312 (62.53%) |
| secondary | 53 (31.18%) | 117 (68.82%) |
| tertiary | 7 (38.89%) | 11 (61.11%) |
| religion |  |  |
| Christianity | 231 (39.02%) | 361 (60.98%) |
| muslim | 54 (30.17%) | 125 (69.83%) |
| others\_regligion | 14 (58.33%) | 10 (41.67%) |
| *1*n (%) | | |

### 2.5.2 Water Treatment at Household by District

| **Characteristic** | **no** N = 299*1* | **yes** N = 496*1* |
| --- | --- | --- |
| district |  |  |
| Balaka | 11 (32.35%) | 23 (67.65%) |
| Blantyre | 37 (28.46%) | 93 (71.54%) |
| Dedza | 58 (55.24%) | 47 (44.76%) |
| Lilongwe | 133 (44.33%) | 167 (55.67%) |
| Mangochi | 29 (22.48%) | 100 (77.52%) |
| Nkhatabay | 15 (41.67%) | 21 (58.33%) |
| Salima | 16 (26.23%) | 45 (73.77%) |
| residence |  |  |
| In land | 228 (42.62%) | 307 (57.38%) |
| lake shore | 71 (27.31%) | 189 (72.69%) |
| *1*n (%) | | |

### yes, Methods of water treatment by District

## `summarise()` has grouped output by 'age\_group'. You can override using the  
## `.groups` argument.  
## `summarise()` has grouped output by 'sex'. You can override using the `.groups`  
## argument.  
## `summarise()` has grouped output by 'level\_education'. You can override using  
## the `.groups` argument.  
## `summarise()` has grouped output by 'religion'. You can override using the  
## `.groups` argument.

| variable | boiling | ceramic filter | filter with cloth | others methods | solar disinfection | stand settle | use chlorine | use water from tap |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| character | character | character | character | character | character | character | character | character |
| female | 76 (16.2%) | 2 (0.4%) | 23 (4.9%) | 39 (8.3%) | 1 (0.2%) | 8 (1.7%) | 308 (65.8%) | 11 (2.4%) |
| male | 31 (26%) | 0 (0%) | 6 (5%) | 4 (3.4%) | 1 (0.8%) | 7 (5.9%) | 68 (57.1%) | 2 (1.7%) |
| 18-30 | 36 (17.2%) | 2 (1%) | 13 (6.2%) | 21 (10.1%) | 0 (0%) | 7 (3.4%) | 124 (59.3%) | 6 (2.9%) |
| 31-50 | 45 (19%) | 0 (0%) | 10 (4.2%) | 12 (5.1%) | 1 (0.4%) | 4 (1.7%) | 162 (68.3%) | 3 (1.3%) |
| >50 | 26 (18.4%) | 0 (0%) | 6 (4.3%) | 10 (7.1%) | 1 (0.7%) | 4 (2.8%) | 90 (63.8%) | 4 (2.8%) |
| none | 6 (9.8%) | 0 (0%) | 4 (6.6%) | 0 (0%) | 0 (0%) | 0 (0%) | 49 (80.3%) | 2 (3.3%) |
| primary | 71 (18.9%) | 0 (0%) | 17 (4.5%) | 28 (7.5%) | 1 (0.3%) | 10 (2.7%) | 242 (64.5%) | 6 (1.6%) |
| secondary | 27 (19.7%) | 2 (1.5%) | 8 (5.8%) | 13 (9.5%) | 1 (0.7%) | 4 (2.9%) | 77 (56.2%) | 5 (3.6%) |
| tertiary | 3 (21.4%) | 0 (0%) | 0 (0%) | 2 (14.3%) | 0 (0%) | 1 (7.1%) | 8 (57.1%) | 0 (0%) |
| Christianity | 92 (21.1%) | 1 (0.2%) | 21 (4.8%) | 37 (8.5%) | 2 (0.5%) | 12 (2.8%) | 260 (59.6%) | 11 (2.5%) |
| n: 12 | | | | | | | | |

##2.5.4 Properly chlorination process by district.

properly\_chro\_district <- cholera\_data %>%   
 select(district,   
 chlorination\_process\_done\_correctly)  
  
  
table12<- properly\_chro\_district %>%   
 tbl\_summary(chlorination\_process\_done\_correctly,   
 percent = "row",   
 digits = list(  
 district~c(0,2)  
 ))

## 419 missing rows in the "chlorination\_process\_done\_correctly" column have been  
## removed.

table12<- table12 %>%   
 as\_flex\_table()  
  
  
save\_as\_docx(table12, path = here("output/table12.docx"))  
  
  
  
  
## by Sex, Age and Education   
  
  
properly\_chro\_demo<- cholera\_data %>%   
 select(sex,  
 age\_group,   
 level\_education,   
 religion,  
 chlorination\_process\_done\_correctly)  
  
  
table13<- properly\_chro\_demo %>%   
 tbl\_summary(chlorination\_process\_done\_correctly,   
 percent = "row",   
 digits = list(  
 sex~c(0,2),   
 age\_group~c(0,2),   
 level\_education~c(0,2),   
 religion~c(0,2)  
 ))

## 419 missing rows in the "chlorination\_process\_done\_correctly" column have been  
## removed.

table13<- table13 %>%   
 as\_flex\_table()  
  
  
save\_as\_docx(table13, path = here("output/table13.docx"))

## 2.5. 5 Frequency of water treatment by Sex, Level of Education, Religion

## 2. 5.6 Access to water treatment by district

## 2. 6.0 Knowledge of cholera calendar year. By Sex, Level of Education, Religion

## 2. 7. 0 Knowledge of the potential Cause of Cholera.

## 2.8. 0 Knowledge of the Prevention Measures of cholera by Sex, Level of Education and Religious Belief.

## 2.8. 0 Knowledge of the Prevention Measures of cholera by District

## 2. 9.0 Current local measures or campaigns in place to prevent cholera outbreaks by Districts

# Social and cultural behavior determinants of vaccine uptake

## 3.1. 0 Aware of Cholera Vaccine by Age- Group, Sex Level of Education, and 3.1. 1 Aware of Cholera Vaccine by District and Zone

## 3.2.0 Believe Cholera Vaccine Prevent Cholera by Sex, Level of Education

## 3.2.1 Believe Cholera Vaccine Prevent District and Zone

##3.3. 0 Information about Cholera Vaccine by Sex, Age Group, Education, Religion

## 3.3. 1 Information about Cholera Vaccine by District and Zone

## 3. 4. 0 Safe of Cholera Vaccine by Sex Age Group Education and Religion

##3. 4. 1 Safe of Cholera Vaccine by District and Zone

## 3. 5. 0 Community Influence decision about vaccination by District and Zone

## 3. 6. 0 Difficult in access cholera vaccination by Sex, Education and Religion

## 3. 6. 1 Difficult in access cholera vaccination by District

##3. 7. 0 OCV status by Sex, Age Group, Education and Religious

## 3. 7. 0 OCV status by District and Zone

## 3. 8. 0 Family Members vaccinated by District and Zone

## 3. 9. 0 Willingness to get vaccinated in the Future OCV by Sex, Age Group and Education

## 3. 9. 1 Willingness to get vaccinated in the Future OCV by District and Zone

## 3. 10. 0 Recommend a Family member to get vaccinated by District and Zone

## 3. 13. 0 Prefer ways to Receive Information about Vaccine by Sex, Age Group and Education and Religious

## 3. 13. 1 Prefer ways to Receive Information about Vaccine by District and Zone