London School of Hygiene & Tropical Medicine

Cover sheet for work submitted towards Assessment 2017/18

Please attach a copy of this sheet to *each* piece of work submitted.

LSHTM Candidate Number:	*******
Module Title:	STEPH
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This section to be completed by the Module Administrator:

NAME:……

MSc. ……..

Topic 14: Data Analysis Exercise

Q1. Summary of study sample.

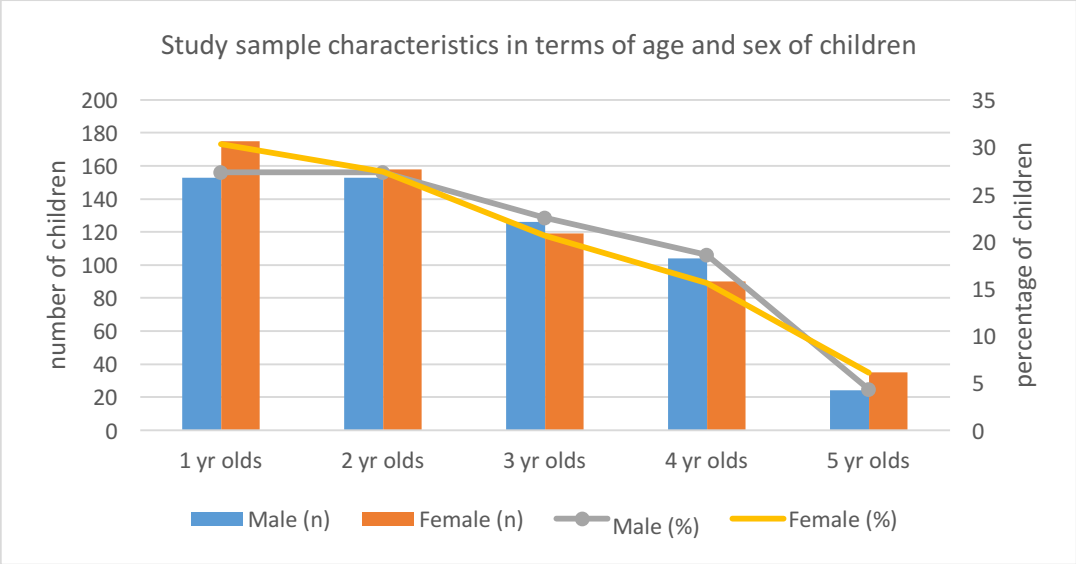

Fig 1. Age and sex distribution of the children in the study (n=1137).

Risk factors	Number	Percent
Nutritional risk factors		
haemoglobin level		
anaemia	407	35.80
weight-for-age		
underweight	427	37.55
height-for-age		
Stunted	503	44.24
weight-for-height		
Wasted	58	5.10
Currently breast fed		
yes	793	69.74
Serum retinol level		
deficient	835	73.44
Other risk factors		
BCG vaccination scar		
present	595	52.33
Ever had measles		
Yes	56	4.93
Admitted to hospital during past year		
Yes	86	7.56
Mother educated		
yes	209	18.38
Access to a bore hole with pump		
Yes	903	79.42
Not currently functioning	65	5.72
No	169	14.86

Table 1. Baseline characteristics for nutritional status and other risk factors (n = 1137).

Q2. Association of individual risk factors with Vitamin A deficiency.

Risk factors	**Vitamin A deficiency**		**Crude odds ratio (95% CI)**	**p value (chi^2)**
	no (%)	yes (%)		
age of child (in months) [1.]				
0-11 (ref grp)	103 (31.40)	225 (68.60)	1.0	
12-23	87 (27.97)	224 (72.03)	1.18 (0.84-1.66)	
24-35	63 (25.71)	182 (74.29)	1.32 (0.91-1.91)	
36-47	37 (19.07)	157 (80.93)	1.94 (1.27-2.98)	**0.001 (p**
48-59	12 (20.34)	47 (79.66)	1.79 (0.91-3.52)	**for trend)**
Sex				
female	152 (26.34)	425 (73.66)	1.03 (0.79-1.33)	0.87
haemoglobin level				
anaemia	88 (21.62)	319 (78.38)	1.50 (1.13-2.00)	**0.005**
weight-for-age				
underweight	107 (25.06)	320 (74.94)	1.13 (0.86-1.49)	0.37
height-for-age				
stunted	114 (22.66)	389 (77.34)	1.44 (1.10-1.89)	**0.008**
weight-for-height				
Wasted	16 (27.59)	42 (72.41)	0.95 (0.52-1.71)	0.86
currently breast fed				
yes	228 (28.75)	565 (71.25)	0.70 (0.50-0.92)	**0.01**
had BCG vaccination scar				
present	167 (28.07)	428 (71.93)	0.85 (0.65-1.11)	0.23
ever had measles				
yes	13 (23.21)	43 (76.79)	1.21 (0.64-2.28)	0.56
admitted to hospital in past yr				
yes	30 (34.88)	56 (65.12)	0.65 (0.41-1.04)	0.07
mother educated				
yes	68 (32.54)	141 (67.46)	0.70 (0.51-0.97)	**0.03**
access to a bore hole with pump [2.]				
No or not currently functioning (ref grp)	61 (26.07)	173 (73.93)	1.0	
yes	241 (26.69)	662 (73.31)	0.97 (0.74-1.43)	0.92

Table 2. Summary of risk factors associated with Vitamin A deficiency (n=1137).

[1.] Age of child group (0-11 months old) was used as reference age group with respect to each of the other age groups.

[2.] No access to bore hole or bore hole not currently functioning was recoded and used as a single reference group with respect to functioning bore hole.

Using the chi^2 significance test, age of child, haemoglobin level, height for age, breast feeding status and maternal education were significantly associated with the Vitamin A deficiency in the sample population (relevant p values in bold).

With increasing age of child that the odds of having a Vitamin A deficiency was 1.80 times the odds of children of less than 1 year old. Children with anaemia 50% more likely of being Vitamin A deficient. Children with stunted growth had 1.44 times the odds of being Vitamin A deficient.

Breast fed children were 30% less likely of being Vitamin A deficient and that children with educated mothers had between 0.51 and 0.97 the odds of being Vitamin A deficient.

Q3 The association between breast feeding and Vitamin A deficiency.

	Odds Ratio	[95% CI]	P (chi^2)	Test of homogeneity Pr (chi^2)
Crude OR (breast feeding)	0.68	0.50-0.92	0.011	.
Stratified analysis by risk factor categories				
age of child (in years)				
1	0.00	.	0.50	.
2	1.30	0.38-4.45	0.67	.
3	0.92	0.51-1.65	0.77	.
4	1.47	0.41-5.29	0.56	.
5	0.24	0.01-4.35	0.29	.
MH (Adjusted OR)	0.99	0.61-1.59	0.96	0.71
haemoglobin level				
anaemia	1.03	0.55-1.94	0.92	.
MH (Adjusted OR)	0.61	0.45-0.83	**0.001**	0.06
height for age				
stunted	0.82	0.52-1.31	0.41	.
MH (Adjusted OR)	0.68	0.51-0.93	**0.01**	0.30
admitted to hospital in past yr				
yes	0.84	0.32-2.19	0.71	.
MH (Adjusted OR)	0.68	0.50-0.91	**0.010**	0.65
mother educated				
Yes	0.70	0.35-1.41	0.32	.
MH (Adjusted OR)	0.69	0.51-0.93	**0.02**	0.95

Table 3. The effects of breast feeding for risk factors with significant association with Vitamin A deficiency (n=1137).

The effects of breast feeding on Vitamin A deficiency in children was evaluated using the Mantel-Haenszel (MH) method for the following risk factors; age of child, risk of anaemia, by height for age, by hospital admission and by the mothers education status.
Indication of confounding was investigated by comparing crude and MH ORs, evidence of effect modification was investigated using a homogeneity test (chi^2 p value).

It was found that breast fed children were 32% less likely of being Vitamin A deficient (Crude OR 0.68 [95% CI 0.50-0.92], p=0.01) than those children not breast fed.

Controlling for **age of the child**; there was significant difference between breast fed and non-breast fed children (adjusted MH OR 0.99 [95% CI 0.61-1.59], p=0.96) in relation to Vitamin A deficiency.

This adjusted MH OR (0.99) was not close to the crude OR (0.68) indicating evidence of confounding of the association between breast feeding and Vitamin A deficiency. This is due to breast feeding being less likely to continue as the child approaches 5 years of age.
Testing for homogeneity of ORs of p=0.71 indicates no significant effect modification by age group.

Breast feeding has a significant association with Vitamin A deficiency when controlling for anaemia, height for age, hospital admission in the past year and for maternal education.

Controlling for cases of **anaemia**; children who were breast fed were 39% less likely of having a Vitamin A deficiency (adjusted MH OR 0.61 [95% CI 0.45-0.83], p=0.001).

This adjusted MH OR (0.61) was close to the crude OR (0.68) indicating little evidence of confounding between breast feeding and Vitamin A deficiency.
Testing for homogeneity of ORs gave a p=0.063, indicating partial presence of effect modification as a result of anaemia as anaemia may have an effect on the health of the child.

Controlling for **height for age** of the children; those children who were breast fed were 32% less likely of having a Vitamin A deficiency (Adjusted MH OR 0.68 [95% CI 0.51-0.92], p=0.01).
This adjusted MH OR (0.68) was the same as the crude OR (0.68) indicating that there is little evidence of confounding by height for age of the child.
Testing for homogeneity of ORs gave a p=0.3, indicating no effect modification as a result of the effects of the child's height for age.

Controlling for those children **admitted to hospital admission in the past year**; those children who were breast fed were 32% less likely of having a Vitamin A deficiency (Adjusted MH OR 0.68 [95% CI 0.5-0.91], p=0.01).
This adjusted MH OR (0.68) was close to the crude OR (0.68) indicating that there is no evidence of confounding by hospital admission of the child in the past year.
Testing for homogeneity of ORs gave a p=0.65, indicating no significant effect modification as a result of the hospital admission of the child in the past year.

Controlling for the **mothers education** level; those children who were breast fed were 31% less likely of having Vitamin A deficiency (Adjusted MH OR 0.69 [95% CI 0.51-0.93], p=0.02).
This adjusted MH OR (0.69) was close to the crude OR (0.68) indicating that there is little evidence of confounding by hospital admission of the mothers education level.
Testing for homogeneity of ORs gave a p=0.95, indicating no significant effect modification as a result of the hospital admission of the mothers education level.

Based on these findings, breast feeding was found to be an important factor in the reduction of Vitamin A deficiency in children up to the age of 5 years, when controlling for anaemia, height for age, hospital admission in the past year and for maternal education.

It is not clear how breast feeding was measured in this study. Therefore recall bias should be considered if breast feeding was self reported.