RESEARCH ARTICLE

DIFFERENT SOCIO-DEMOGRAPHIC FACTORS ASSOCIATED WITH DIFFERENT DISEASES (BOTH COMMUNICABLE & NON COMMUNICABLE) AMONG DIFFERENT PEOPLE OF FDMN COMMUNITY IN ROHINGYA REFUGEE SETTLEMENT, COX'S BAZAR, BANGLADESH

Md Jahedul Islam[1, 2], Prof. Dr. AMAM Zonaed Siddiki[1], Prof. Dr. Sharmin Chowdhury[1,3], Kazi Mahbub Ur Rahman[1], Dr. Moushumi Binta Manik[1] and Prof. Dr. Mohammad Alamgir Hossain[1]

[1]Department of Pathology and Parasitology, Chattogram Veterinary and Animal Sciences University (CVASU)
[2]Department of Public Health, Premier University, Chittagong (PUC)
[3]One Health Institute, Chattogram Veterinary and Animal Sciences University (CVASU)

ARTICLE INFO

ABSTRACT

Background: The Rohingya refugee crisis has resulted in a significant population of displaced individuals who are currently seeking refuge in refugee camps located in Bangladesh. These individuals are confronted with a multitude of health-related obstacles. In densely populated and resource-constrained environments, the prevalence of communicable diseases, including but not limited to diarrhea, tuberculosis (TB), dengue, and malaria, presents substantial hazards. *Aim of the study:* The purpose of this study is to assess association of the Socio-Demographic factors with different communicable and non-communicable diseases among the Rohingya refugee population. *Methods*: a prospective, cross-sectional study of the Rohingya population (N=3060) in Bangladeshi refugee camps. After receiving voluntary consent, information was gathered through in-person interviews utilizing a language-validated, pretested questionnaire on knowledge, attitude and behavioral practices. Prospectively obtained trial registration and ethical approval randomized, non probability and purposivesampling methods were followed. *Results:* A total of 3060 individual refugee people from different refugee camps where water borne diseases, tuberculosis, mosquito borne diseases, hypertension, diabetes mellitus and iron deficiency anemia had 504, 523, 511, 504, 517 and 501 respondents respectively. Socio-Demographic variables had found significant association on different diseases knowledge and practice part. Age groups had significantly associated with practice part "Do you wash your hands after defecation with soap?" variables (p<.05). Gender had significantly associated with practice part "Do you cook your foods properly?" variable (p<.001).Age groups had significant association with "Do you know what TB is?" variable (p<.05). Age groups had found significant association with "Do you know about Mosquito-borne disease?" variable (p<.001) and with "Do you know the causes of Mosquito-borne disease?" variable (p<.001). Monthly family income had found significant association with "Do you take sufficient fruits and vegetables regularly?" variable (p<.05), and with "Do you have regular meals daily?" variable (p<.05). *Discussions & Conclusion:* The results of the study highlight the significance of various factors, including age, gender, educational attainment, and job title, in influencing refugees' perceptions of illnesses and health-related behaviors. The findings of this study hold considerable implications for health intervention strategies pertaining to refugees. In order to enhance awareness and prevention of illnesses, it is imperative to design health education initiatives that are customized to cater to the unique requirements of diverse age cohorts, genders, and educational levels. The study has significant ramifications for refugee-related health intervention techniques. To improve illness awareness and prevention, health education programs must be specifically tailored to the needs of various age groups, genders, and educational backgrounds. The Rohingya refugee population can benefit from improved health outcomes and a decrease in the burden of infectious and non-communicable diseases through promoting hygiene habits, disease-specific knowledge, and lifestyle changes.

INTRODUCTION

The Rohingya refugee crisis has resulted in a significant population of displaced individuals who are currently seeking refuge in refugee camps located in Bangladesh. These individuals are confronted with a multitude of health-related obstacles.

In densely populated and resource-constrained environments, the prevalence of communicable diseases, including but not limited to diarrhea, tuberculosis (TB), dengue, and malaria, presents substantial hazards. Furthermore, it is noteworthy that non-communicable diseases (NCDs), such as diabetes mellitus, as well as hypertension virus infections, have become significant health issues within the Rohingya community.

The objective of this literature review is to investigate the socio-demographic variables linked to the prevalence of these diseases within the Rohingya refugee community residing in refugee camps located in Bangladesh. The prevalence of diarrhea in refugee camps persists as a significant health concern, primarily attributable to insufficient sanitation infrastructure and restricted availability of potable water. Multiple research studies have identified a range of socio-demographic factors that are correlated with the occurrence of diarrheal diseases within the Rohingya population. For example, the camps frequently experience overcrowding and inadequate hygiene practices, which have been associated with a higher prevalence of diarrhea (Haque et al., 2020). Furthermore, the prevalence of diarrhea in these contexts can be attributed to factors such as low levels of education and limited awareness regarding health issues (Khan et al., 2018). Tuberculosis (TB) represents a significant public health issue within refugee populations, including the Rohingya community. Research findings have indicated that the prevalence of tuberculosis (TB) tends to be more pronounced within older age cohorts, particularly individuals aged 40 years and above (Islam et al., 2019). The transmission of tuberculosis (TB) can be further intensified by the presence of overcrowded living conditions in refugee camps and the prevalence of malnutrition (Hossain et al., 2019). The Rohingya refugees have been found to experience delayed diagnosis and initiation of tuberculosis (TB) treatment due to factors such as low levels of education and limited access to healthcare services (Rahman et al., 2018). Refugee camps are susceptible to substantial health risks due to the prevalence of vector-borne diseases such as dengue and malaria, particularly exacerbated during monsoon seasons. According to a research conducted by Al-Saedi et al. (2020), there exists a correlation between age and gender with regards to dengue infection among refugees residing in Jordan. This finding implies that these factors may potentially influence the transmission of dengue within the Rohingya population situated in Bangladesh. Moreover, the susceptibility to dengue and malaria is influenced by socio-economic factors, including income levels and the availability of preventive measures (Doocy et al., 2018).

The Rohingya refugee community is experiencing a rising prevalence of non-communicable diseases, with diabetes mellitus being of particular concern. Previous research has indicated a significant correlation between age and the prevalence of diabetes, whereby individuals in older age brackets are more susceptible to this condition (Islam et al., 2019). The increasing prevalence of diabetes in refugee camps can be attributed to factors such as low socio-economic status, inadequate dietary practices, and a lack of physical activity (Mahmud and Leppard, 2018). In addition, the restricted availability of healthcare services and resources for managing diabetes serve to intensify the impact of this condition. The Rohingya refugee population is facing notable health challenges due to the increasing prevalence of hypertension virus infections. According to Hossain et al. (2019), empirical evidence indicates that individuals belonging to older age groups and those with a prior history of injecting drug use are more susceptible to contracting hypertension virus infections. Furthermore, the high prevalence of hepatitis infections can be attributed to factors such as low levels of education and limited awareness regarding the disease and its various modes of transmission (Rahman et al., 2018). The objective of this study is to investigate the socio-demographic variables that are correlated with various diseases within the Rohingya refugee community residing in refugee camps located in Bangladesh. The presence of overcrowding, inadequate sanitation, and restricted availability of healthcare services are significant factors contributing to the prevalence of communicable diseases such as diarrhea, tuberculosis, dengue, and malaria. Moreover, the prevalence of non-communicable diseases such as diabetes mellitus and hypertension virus infections is significantly influenced by factors such as age, gender, educational attainment, and socio-economic status. Comprehending these socio-demographic factors is imperative in order to develop efficacious health interventions and policies aimed at tackling the health obstacles encountered by the Rohingya community residing in refugee camps. In order to enhance health outcomes and alleviate the burden of diseases within a vulnerable population, it is imperative to employ strategies that are both culturally sensitive and context specific.

These strategies should be designed to address the unique vulnerabilities that exist within this population. Although this literature review offers valuable insights, it is important to acknowledge certain limitations. The studies that were subject to review were carried out within specific contexts, and as such, the findings may not possess complete generalizability to other refugee populations or settings. Moreover, certain investigations may have relied on data obtained through self-reporting, thereby potentially introducing biases into the observed outcomes. In order to effectively meet the healthcare requirements of the Rohingya refugee population in Bangladesh, it is imperative to adopt a holistic strategy that encompasses both communicable and non-communicable diseases. Additionally, it is crucial to consider the socio-demographic factors that contribute to the prevalence and outcomes of these diseases. The establishment of collaborative initiatives among humanitarian agencies, policymakers, and healthcare providers is crucial in safeguarding the overall welfare and promoting equitable access to healthcare for the Rohingya refugee community residing in Bangladesh. The aim of this study is to assess association of the Socio-Demographic factors with different communicable and non-communicable diseases among the Rohingya refugee population.

METHODOLOGY

Study Design (Population & Area): A descriptive type of cross-sectional survey on the Rohingya Refugee population in Cox's Bazar, Bangladesh was carried out for the purpose of this study.

Participants (Duration & Sample size): The survey was administered on the Rohingya Refugee people of different ages (excluding children <18 years) and genders who were residing in refugee camps. Data collection was done from December, 2020 till June, 2023. The participants in the study who declined the opportunity to participate in the survey were disqualified.The poll received responses from a total of 3060 different individual participants of different camps. The sample size was calculated by using this formula ($n = z^2pq/d^2$).

Setting: The research was conducted in the Rohingya Refugee camps located in the Cox's Bazar, Bangladesh.

Data Collection Tool: (Questionnaire): In order to achieve the goals of the study, 6 different questionnaires on water

borne diseases, tuberculosis, mosquito borne diseases, hypertension, diabetes mellitus and iron deficiency anemia were first developed, then validated, then translated, and last personalized. The 6 different questionnaires were applied on 6 different camps separately to avoid repeatedness of respondents and of answers. The socio-demographic questions that were asked were tailored to the group of refugees. There were categorical responses to questions on knowledge, attitude and practices around communicable diseases and non-communicable diseases. For the purpose of linguistic validation, the questionnaires were translated into English and Rohingya using forwarding and backward translation respectively. The respondents were intended to depict the status of refugees in Bangladesh.

Variable: The questionnaire was developed on socio-demography, Knowledge, Attitude and Practice based variables. The questions were designed on that particular variable/s with suitable options rationally.

Sampling Method: The non probability and purposive sampling method has been used in this study to classify the collected data.

Data Management Plan: (Statistical analysis): Chi-square tests were used in socio-demographic data to determine the degree of association between continuous and categorical data sets. Descriptive statistics are also used in these analyses. The Chi-square test was carried out in order to ascertain the nature of the connection that exists between category variables. The Statistical Package for the Social Sciences (SPSS) version 20.0 was utilized in order to carry out the data analysis. P<.05 and P<.001 were chosen as the cutoffs for the alpha level of significance, respectively.

Inclusion Criteria: People with given consent who willingly joined or participated in this study. Both male and female of different age groups (excluding children <18 years) were selected as participants.

Exclusion Criteria: People who felt unwilling to participate and were not able to provide information due to physical or mental illness or handicapped.

RESULTS

Socio-Demographic information: Table 1 described the Socio-Demographic information of the respondents. A total of 3060 individual refugee people from different refugee camps where water borne diseases, tuberculosis, mosquito borne diseases, hypertension, diabetes mellitus and iron deficiency anemia had 504, 523, 511, 504, 517 and 501 respondents respectively (Table 1)

Association between socio-demographic variables with knowledge, attitude and practices on water-borne diseases (N=504): Age groups had significantly associated with practice part "Do you wash your hands after defecation with soap?" variables (p<.05). Gender had significantly associated with practice part "Do you cook your foods properly?" variable (p<.001). Educational status had found significant association with Knowledge part "Do you know about diarrhea" variable (p<.05) and "Do you know the causative agents of Diarrhea?" variable (p<.001); Educational status also found significant association with "Do you use sanitary latrine?" variable (p<.001) and "Do you cook your foods properly?" variable (p<.001). Occupational status had found significant association with "Do you know the causative agents of Diarrhea?" variable (p<.001) and with "Do you always keep your food & water clean?" variable (p<.001). Type of family had significantly associated with "Do you know about diarrhea" variable (p<.05), with "Do you know the causative agents of Diarrhea" variable (p<.001); type of family had also been significantly associated with "Do you use sanitary latrine?" variable (p<.001). Marital status had found significant association with the "Do you know the causative agents of Diarrhea" variable (p<.05). Monthly family income had found significant association with the "Do you know about diarrhea" variable (p<.001); Monthly family income had also found association with "Do you use sanitary latrine?" variable (p<.001), and with "Do you cook your foods properly?" variable (p<.05), with "Do you always keep your food & water clean?" variables (p<.05) respectively. (Table 2)

Association between socio-demographic variables with knowledge, attitude and practices on tuberculosis (N=523): Age groups had significant association with "Do you know what TB is?" variable (p<.05). Gender distribution significantly associated with "Do you smoke Cigarettes?" variable (p<.001), and with "Do you cough in public place without carefulness?" variable (p<.001). Educational status had found significant association with "Do you know what TB is?" variable (p<.001), with "Do you know what the causative agent of TB?" variable (p<.001), with "Do you think personal hygiene decrease TB risk?" variable (p<.001), with "Sharing personal items will increase TB risk?" variable (p<.05), with "Do you think TB is a result of great sin?" variable (p<.001), with "Do you smoke Cigarettes?" variable (p<.001), and also with "After being diagnosed, do you keep you away not to spread TB?" variable (p<.05). (Detailed in, Table 3)

Association between socio-demographic variables with knowledge, attitude and practices on mosquito-borne diseases (N=511): Age groups had found significant association with "Do you know about Mosquito-borne disease?" variable (p<.001) and with "Do you know the causes of Mosquito-borne disease?" variable (p<.001); with "Do you consult from nearest health post first after being sick?" variable (p<.05), with "Did your any family member / neighbor get infected by Mosquito-borne disease" variable (p<.001). Gender distribution had found significant association with "Did you give blood sample to lab?" variable (p<.05). (Detailed in, Table 4)

Association between socio-demographic variables with knowledge, attitude and practices on hypertension (N=504): Age group and educational status both traits had found significant association with "Do you know about Hypertension?" variable (p<.001), with "Do you know about causes of Hypertension?" variable (p<.001), and also with "Do you know the signs & symptoms of Hypertension??" variable (p<.05). Occupational status had significantly associated with "Do you know about Hypertension?" variable (p<.05) and with "Do you check your BP regularly?" variable (p<.001). (Detail in Table 5)

Association between socio-demographic variables with knowledge, attitude and practices on diabetes mellitus (N=517): Age groups and gender distribution both had significantly associated with "Do you take sufficient fruits and

Table 1. Socio-Demographic information of the respondents:

Variables	Communicable Diseases						Non-Communicable Diseases					
	Water Borne Diseases (N=504)		Tuberculosis (N=523)		Mosquito Borne Diseases (N=511)		Hypertension (N=504)		Diabetes Mellitus (N=517)		Iron deficiency Anemia (N=501)	
	n	n%	n	n%	n	n%	n	n%	n	n%	n	n%
Age												
< 20 Year	176	34.9	64	12.2	80	15.7	57	11.3	174	33.7	185	37%
21-30 Years	187	37.1	241	46.1	198	38.8	245	48.6	126	24.4	170	34%
31-40 Years	79	15.7	162	31.0	132	25.9	130	25.8	81	15.7	91	18%
41-50 Years	32	6.3	40	7.6	62	12.2	51	10.1	51	9.9	28	6%
51- 60 Years	18	3.6	14	2.7	30	5.9	16	3.2	24	4.6	11	2%
>60+ Years	12	2.4	2	.4	8	1.6	5	1.0	61	11.8	16	3%
Gender												
Male	253	50.2	321	61.4	269	52.7	267	53.0	281	54.4	0	0%
Female	251	49.8	202	38.6	241	47.3	237	47.0	236	45.6	501	100%
Education												
Illiterate	197	39.1	276	52.8	374	73.3	255	50.6	386	74.7	288	57%
Primary Level	261	51.8	238	45.5	122	23.9	240	47.6	118	22.8	213	43%
Middle Level	44	8.7	9	1.7	13	2.5	8	1.6	9	1.7	0	0%
Graduate	2	.4	0	0	1	.2	1	.2	4	.8	0	0%
Occupation												
Housewife	166	32.9	204	39.0	220	43.1	230	45.6	223	43.1	396	79%
Daily Worker	149	29.6	232	44.4	168	32.9	169	33.5	215	41.6	46	9%
Unemployed	36	7.1	25	4.8	43	8.4	21	4.2	34	6.6	7	2%
Shopkeeper	38	7.5	36	6.9	36	7.1	42	8.3	28	5.4	10	2%
Student	96	19.0	18	3.4	33	6.5	26	5.2	14	2.7	27	5%
Job	19	3.8	8	1.5	10	2.0	16	3.2	3	.6	15	3%
Type of family												
Nuclear	293	58.1	349	66.7	297	58.2	310	61.5	135	26.1	358	71%
Joint	211	41.9	174	33.3	213	41.8	194	38.5	382	73.9	143	29%
Marital status												
Married	210	41.7	443	84.7	393	77.1	429	85.1	422	81.6	407	81%
Single	279	55.4	67	12.8	102	20.0	64	12.7	91	17.6	91	18%
Widow/widower /divorced	15	3.0	13	2.5	15	2.9	11	2.2	4	.8	3	1%
Monthly family income (BDT)												
<3.5K	117	23.2	95	18.2	125	24.5	120	23.8	107	20.7	107	21%
3.5K to 7K	317	62.9	387	74.0	308	60.4	290	57.5	328	63.4	319	64%
>7K	70	13.9	41	7.8	77	15.1	94	18.7	82	15.9	75	15%
Number of family members (persons)												
1 to 4	106	21.0	195	37.3	222	43.5	186	36.9	200	38.7	144	29%
5 to 8	332	65.9	303	57.9	242	47.5	257	51.0	247	47.8	333	66&
> 8	66	13.1	25	4.8	46	9.0	61	12.1	70	13.5	24	5%

Table 2. Association between Socio-Demographic variables with knowledge, attitude and practices on Water Borne Diseases

Variables	Knowledge Part				Practice Part										Attitude Part			
	Do you know about diarrhea?		Do you know the causative agents of Diarrhea?		Do you wash your hands before eating with soap?		Do you wash your hands after defecation with soap?		Do you use sanitary latrine?		Do you use clean water & follow safe sanitation?		Is Diarrhea cured by drugs and proper management?		Is Diarrhea preventable?	
	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)
Age																
< 20 Year	172	4	107	69	174	2	166	10	145	31	173	3	161	15	173	3
21-30 Years	180	7	133	54	185	2	183	4	153	34	183	4	175	12	184	3
31-40 Years	73	6	51	28	78	1	72	7	56	23	78	1	75	4	78	1
41-50 Years	29	3	22	10	32	0	27	5	27	5	31	1	30	2	31	1
51- 60 Years	17	1	14	4	18	0	15	3	16	2	17	1	18	0	17	1
>60+ Years	10	2	8	4	12	0	12	0	11	1	12	0	11	1	11	1
P value	*.079*		*.347*		*.981*		*.021**		*.193*		*.857*		*.756*		*.507*	
Gender																
Male	240	13	159	94	251	2	243	10	207	46	249	4	225	28	245	8
Female	241	10	176	75	248	3	232	8	201	50	245	6	245	6	249	2
P value	*.535*		*.084*		*.647*		*.218*		*.619*		*.515*		*.001***		*.507*	
Education																
Illiterate	194	3	151	46	197	0	185	12	194	3	195	2	195	2	195	2
Primary Level	242	19	151	110	256	5	249	12	194	67	255	6	239	22	254	7
Middle Level	43	1	31	13	44	0	39	5	19	25	42	2	35	9	43	1
Graduate	2	0	2	0	2	0	2	0	1	1	2	0	1	1	2	0
P value	*.026**		*.000***		*.195*		*.066*		*.000***		*.456*		*.000***		*.645*	
Occupation																
Housewife	158	8	119	47	164	2	153	13	132	34	162	4	164	2	164	2
Daily Worker	143	6	100	49	146	3	144	5	119	30	149	0	138	11	148	1
Unemployed	30	6	18	18	36	0	34	2	29	7	34	2	32	4	32	4
Shopkeeper	38	0	17	21	38	0	35	3	31	7	36	2	33	5	35	3
Student	93	3	63	33	96	0	90	1	80	16	94	2	85	11	96	0
Job	19	0	18	1	19	0	19	0	17	2	19	0	18	1	19	0
P value	*.009*		*.001***		*.615*		*.690*		*.902*		*.155*		*.009*		*.001***	
Type of family																
Nuclear	275	18	214	79	288	5	280	13	207	86	286	7	266	27	288	5
Joint	206	5	121	90	211	0	195	16	201	10	208	3	204	7	206	5
P value	*.045**		*.001***		*.057*		*.062*		*.001***		*.442*		*.009*		*.598*	
Marital status																
Married	205	5	135	75	208	2	200	10	176	34	207	3	194	16	207	3
Single	261	18	194	85	277	2	262	17	221	58	273	6	261	18	272	7
Widow/widower/ divorced	15	0	6	9	14	1	13	2	11	4	14	1	15	0	15	0
P value	*.071*		*.042**		*.077*		*.317*		*.329*		*.356*		*.502*		*.597*	
Monthly family income (BDT)																
<3.5K	101	16	65	52	114	3	111	6	71	46	112	5	102	15	111	6
3.5K to 7K	310	7	215	102	315	2	296	21	274	43	312	5	301	16	314	3
>7K	70	0	55	15	70	0	68	2	63	7	70	0	67	3	69	1
P value	*.001***		*.004*		*.131*		*.752*		*.001***		*.089*		*.011**		*.020**	
Number of family members (persons)																
1 to 4	98	8	70	36	104	2	96	10	84	22	104	2	97	9	100	6
5 to 8	320	12	220	112	331	1	317	15	278	54	324	8	312	20	329	3
> 8	63	3	45	21	64	2	62	4	46	20	66	0	61	5	65	1
P value	*.240*		*.950*		*.072*		*.031**		*.026**		*.438*		*.650*		*.009*	

Table 3: Association between Socio-Demographic variables with knowledge, attitude and practices on Tuberculosis

Variables	Knowledge Part				Attitude Part						Practice Part					
	Do you know what TB is?		Do you know what the causative agent of TB?		Do you think personal hygiene decrease TB risk?		Do you think sharing personal items will increase TB risk?		Do you think TB is a result of great sin?		Do you smoke Cigarettes?		Do you cough in public place without carefulness?		After being diagnosed, do you keep you away not to spread TB?	
	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)
Age																
< 20 Year	48	16	28	36	50	14	42	22	22	42	28	36	20	44	43	21
21-30 Years	180	61	107	134	172	69	155	86	78	163	121	120	65	176	173	68
31-40 Years	98	64	83	79	100	62	85	77	55	107	95	67	67	95	107	55
41-50 Years	25	15	24	16	29	11	24	16	18	22	28	12	20	20	30	10
51- 60 Years	9	5	14	0	12	2	10	4	11	3	12	2	1	13	12	2
>60+ Years	1	1	1	1	2	0	1	1	0	2	2	0	1	1	2	0
P value	*.043***		*.008*		*.073*		*.196*		*.009*		*.005*		*.002*		*.441*	
Gender																
Male	224	97	149	172	215	106	190	131	120	201	209	112	130	191	219	102
Female	137	65	108	94	150	52	127	75	64	138	77	125	44	158	148	54
P value	*.637*		*.362*		*.078*		*.402*		*.184*		*.001****		*.001***		*.220*	
Education																
Illiterate	208	68	185	91	222	54	181	95	133	143	170	106	94	182	207	69
Primary Level	151	87	69	169	140	98	131	107	48	190	116	122	78	160	154	84
Middle Level	2	7	3	6	3	6	5	4	3	6	0	9	2	7	6	3
Graduate	-	-	-	-	-	-			-	-	-	-	-	-	-	-
P value	*.001****		*.001****		*.001****		*.049**		*.001****		*.001****		*.741*		*.038**	
Occupation																
Housewife	141	63	111	93	151	53	132	72	67	137	86	118	54	150	149	55
Daily Worker	168	64	104	142	159	73	147	85	93	139	156	76	82	150	161	71
Unemployed	10	15	17	8	14	11	11	14	9	16	15	10	12	13	15	10
Shopkeeper	21	15	12	24	18	18	14	22	11	25	23	13	19	17	24	12
Student	14	4	7	11	16	2	11	7	3	15	6	12	7	11	10	8
Job	7	1	6	2	7	1	2	6	1	7	0	8	0	8	8	0
P value	*.011**		*.111*		*.010**		*.006*		*.168*		*.001****		*.004*		*.183*	
Type of family																
Nuclear	212	137	144	205	234	115	188	161	85	264	170	179	131	218	234	115
Joint	149	25	113	61	131	43	129	45	99	75	116	58	43	131	133	41
P value	*.001****		*.001****		*.053*		*.001****		*.001****		*.001****		*.003*		*.027**	
Marital status																
Married	310	133	223	220	310	133	278	165	162	281	248	195	152	291	315	128
Single	46	21	23	16	44	23	34	33	19	48	34	33	21	46	42	25
Widow/widower/divorced	5	8	11	2	11	2	5	8	3	10	4	9	1	12	10	3
P value	*.053*		*.029**		*.386*		*.044**		*.276*		*.156*		*.125*		*.323*	
Monthly family income																
<3.5K	61	34	49	46	53	42	50	45	36	59	58	37	46	49	44	51
3.5K to 7K	272	115	189	198	286	101	245	142	136	251	204	183	111	276	298	89
>7K	28	13	19	22	26	15	22	19	12	29	24	17	17	24	25	16
P value	*.220*		*.693*		*.002*		*.103*		*.626*		*.300*		*.002*		*.001****	
Number of family members																
1 to 4	12	29	81	114	138	57	125	70	60	135	102	93	57	138	134	61
5 to 8	97	97	167	136	208	95	174	129	116	187	175	128	109	194	215	88
> 8	17	8	9	16	19	6	18	7	8	17	9	16	8	17	18	7
P value	*.802*		*.003*		*.693*		*.162*		*.217*		*.077*		*.294*		*.850*	

Table 4. Association between Socio-Demographic variables with knowledge, attitude and practices on Mosquito Borne Diseases

Variables	Knowledge Part				Practice Part				Attitude Part			
	Do you know about Mosquito-borne disease?		Do you know the causes of Mosquito-borne disease?		Do you give blood sample to lab? (if suspected)		Do you use Mosquito nets in home during sleeping?		Do you think cleaning bushes & water deposited pots can prevent MBDs mostly?		Do you think consult from nearest health post first after being sick is important?	
	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)
Age												
< 20 Year	60	20	66	14	61	19	74	6	79	1	79	1
21-30 Years	183	15	184	14	129	69	173	25	193	5	197	1
31-40 Years	107	24	106	26	107	25	117	15	126	6	131	1
41-50 Years	41	21	45	17	42	20	54	8	58	4	60	2
51- 60 Years	25	5	26	4	12	18	21	9	30	0	29	1
>60+ Years	1	7	2	6	5	3	8	0	5	3	8	0
P value	*.001****		*.001****		*.001****		*.040**		*.001****		*.479*	
Gender												
Male	224	44	230	39	198	71	237	32	262	7	266	3
Female	193	48	199	42	158	83	210	31	229	12	238	3
P value	*.306*		*.366*		*.048**		*.740*		*.157*		*.892*	
Education												
Illiterate	310	64	316	58	310	64	320	54	359	15	369	5
Primary Level	98	23	104	18	98	23	117	5	118	4	121	1
Middle Level	8	5	8	5	8	5	10	3	13	0	13	0
Graduate	1	0	1	0	1	0	0	1	1	0	1	0
P value	*.243*		*.366*		*.243*		*.001****		*.875*		*.944*	
Occupation												
Housewife	179	41	183	37	144	76	194	26	210	10	217	3
Daily Worker	148	20	147	21	128	40	145	23	165	3	168	0
Unemployed	30	12	35	8	21	22	36	7	42	1	40	3
Shopkeeper	30	6	30	6	29	7	33	3	31	5	36	0
Student	21	12	24	9	27	6	31	2	33	0	33	0
Job	9	1	10	0	7	3	8	2	10	0	10	0
P value	*.009*		*.226*		*.002*		*.664*		*.013**		*.009*	
Type of family												
Nuclear	224	72	231	66	222	75	261	36	280	17	294	3
Joint	193	20	198	15	134	79	186	27	211	2	210	3
P value	*.001****		*.001****		*.004*		*.851*		*.005*		*.681*	
Marital status												
Married	333	59	336	57	265	128	337	56	380	13	388	5
Single	78	24	87	15	81	21	97	5	100	2	101	1
Widow/widower/divorced	6	9	6	9	10	5	13	2	11	4	15	0
P value	*.001****		*.001****		*.061*		*.038**		*.001****		*.885*	
Monthly family income												
<3.5K	113	12	109	16	100	25	116	9	212	10	125	0
3.5K to 7K	258	49	265	43	280	28	299	9	233	9	304	4
>7K	46	31	55	22	67	10	76	1	46	0	75	2
P value	*.001****		*.004*		*.007*		*.049**		*.340*		*.239*	
Number of family members												
1 to 4	197	25	194	28	155	67	196	26	210	12	221	1
5 to 8	190	51	201	41	172	70	214	28	230	12	240	2
> 8	30	16	34	12	29	17	37	9	40	6	43	3
P value	*.001****		*.062*		*.554*		*.297*		*.743*		*.002*	

Table 5. Association between Socio-Demographic variables with knowledge, attitude and practices on Hypertension

Variables	Knowledge Part				Attitude Part				Practice Part			
	Do you know about Hypertension?		Do you know the causes of Hypertension?		Do you think Hypertension can be cured by drugs & are preventable?		Do you think regular exercise can reduce the chance of Hypertension?		Do you check your BP regularly?		Do you avoid oily or fat rich foods?	
	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)
Age												
< 20 Year	53	4	53	4	49	8	54	3	32	25	44	13
21-30 Years	210	35	204	41	225	20	224	21	110	135	228	17
31-40 Years	96	34	96	34	117	13	106	24	55	75	120	10
41-50 Years	31	20	30	21	45	6	43	8	23	28	43	8
51- 60 Years	13	3	11	5	14	2	16	0	8	8	15	1
>60+ Years	4	1	4	1	4	1	4	1	3	2	5	0
P value	*.001****		*.001****		*.729*		*.016**		*.593*		*.005*	
Gender												
Male	223	44	215	52	241	26	239	28	132	135	243	24
Female	184	53	183	54	213	24	208	29	99	138	212	25
P value	*.094*		*.363*		*.884*		*.536*		*.085*		*.555*	
Education												
Illiterate	183	72	178	77	221	34	222	33	131	124	234	21
Primary Level	215	25	213	27	224	16	219	21	97	143	214	26
Middle Level	8	0	6	2	8	0	5	3	3	5	6	2
Graduate	1	0	1	0	1	0	1	0	0	1	1	0
P value	*.001****		*.001****		*.067*		*.049**		*.070*		*.360*	
Occupation												
Housewife	173	57	173	57	209	21	197	33	93	137	208	22
Daily Worker	138	31	134	35	151	18	153	16	89	80	159	10
Unemployed	16	5	15	6	14	7	21	0	10	11	17	4
Shopkeeper	40	2	38	4	41	1	39	3	17	25	39	3
Student	26	0	26	0	24	2	24	2	19	7	16	10
Job	14	2	12	4	15	1	13	3	3	13	16	0
P value	*.004*		*.022**		*.006*		*.198*		*.002*		*.001****	
Type of family												
Nuclear	223	87	212	98	277	33	267	43	132	178	279	31
Joint	184	10	186	8	177	17	180	14	99	95	176	18
P value	*.001****		*.001****		*.492*		*.022**		*.064*		*.790*	
Marital status												
Married	342	87	333	96	385	44	377	52	184	245	400	29
Single	60	4	62	2	60	4	60	4	42	22	45	19
Widow/widower/divorced	5	6	3	8	9	2	10	1	5	6	10	1
P value	*.001****		*.001****		*.395*		*.374*		*.003*		*.363*	
Monthly family income												
<3.5K	102	18	96	24	106	14	108	12	42	78	111	9
3.5K to 7K	250	40	246	44	260	30	263	27	159	131	255	35
>7K	55	39	56	38	88	6	76	18	30	64	89	5
P value	*.001****		*.001****		*.410*		*.028**		*.001****		*.102*	
Number of family members												
1 to 4	163	23	154	32	168	18	170	16	73	113	173	13
5 to 8	188	69	187	70	229	28	221	36	113	144	231	26
> 8	56	5	57	4	57	4	56	5	45	16	51	10
P value	*.001****		*.001****		*.589*		*.149*		*.001****		*.094*	

Table 6. Association between Socio-Demographic variables with knowledge, attitude and practices on Diabetes Mellitus

Variables	Knowledge Part				Attitude Part				Practice Part					
	Do you know about Diabetes Mellitus?		Are you suffering by Diabetes Mellitus?		Do you think DM is curable & preventable?		Do you think diet therapy and enough physical activity can control DM?		Do you check blood sugar regularly?		Do you practice exercise regularly?		Do you follow prescribed medicines and advises of doctor regularly?	
	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)
Age														
< 20 Year	171	3	48	126	48	126	169	5	166	8	21	153	169	5
21-30 Years	120	6	44	82	38	88	125	1	122	4	16	110	124	2
31-40 Years	78	3	22	59	30	51	79	2	81	0	6	75	81	0
41-50 Years	50	1	18	33	17	34	48	3	48	3	7	34	51	0
51- 60 Years	21	3	10	14	4	20	23	1	22	2	1	23	23	1
>60+ Years	59	2	32	29	20	41	57	4	58	3	3	58	59	2
P value	*.291*		*.004*		*.041**		*.286*		*.337*		*.030**		*.453*	
Gender														
Male	271	10	99	182	92	189	274	7	272	9	34	247	275	6
Female	228	8	75	161	65	171	227	9	225	11	30	216	232	4
P value	*.865*		*.461*		*.043**		*.450*		*.392*		*.013**		*.717*	
Education														
Illiterate	373	13	146	240	114	272	373	13	371	15	32	354	379	7
Primary Level	114	4	25	93	37	81	117	1	115	3	20	98	116	2
Middle Level	8	1	2	7	5	4	7	2	7	2	1	8	8	1
Graduate	4	0	1	3	1	3	4	0	4	0	1	3	4	0
P value	*.388*		*.013**		*.371*		*.004*		*.031**		*.002*		*.247*	
Occupation														
Housewife	213	10	76	147	61	162	215	8	214	9	20	203	218	5
Daily Worker	208	7	85	130	74	141	211	4	209	6	24	191	212	3
Unemployed	34	0	7	27	7	27	31	3	29	5	2	32	32	2
Shopkeeper	28	0	4	24	10	18	27	1	28	0	3	25	28	0
Student	13	1	1	13	4	10	14	0	14	0	4	10	14	0
Job	3	0	1	2	1	2	3	0	3	0	1	2	3	0
P value	*.862*		*.029**		*.283*		*.352*		*.021**		*.001****		*.532*	
Type of family														
Nuclear	125	10	34	101	32	103	126	9	126	9	20	115	131	4
Joint	374	8	140	242	125	257	375	7	371	11	34	348	376	6
P value	*.013**		*.001****		*.087*		*.005*		*.050**		*.149*		*.313*	
Marital status														
Married	407	13	149	273	130	292	410	12	409	13	44	378	414	8
Single	89	2	23	68	26	65	87	4	85	6	10	81	89	2
Widow/widower/divorced	3	1	2	2	1	3	4	0	3	1	0	2	4	0
P value	*.019**		*.199*		*.645*		*.694*		*.026**		*.926*		*.944*	
Monthly family income														
<3.5K	100	7	37	70	25	82	100	7	96	11	9	98	101	6
3.5K to 7K	319	9	115	213	110	218	320	8	320	8	38	290	324	4
>7K	80	2	22	60	22	58	81	1	81	1	7	75	82	0
P value	*.286*		*.093*		*.011**		*.059*		*.001****		*.044**		*.006*	
Number of family members														
1 to 4	196	2	71	129	67	133	194	6	192	8	19	181	197	3
5 to 8	234	13	85	162	75	172	237	10	238	9	32	215	241	6
> 8	69	1	18	52	15	55	70	0	67	3	3	67	69	1
P value	*.298*		*.063*		*.184*		*.224*		*.963*		*.055*		*.736*	

Table 7. Association between Socio-Demographic variables with knowledge, attitude and practices on Iron Deficiency Anemia:

Variables	Knowledge Part				Attitude Part				Practice Part			
	Do you know about Iron-deficiency Anemia?		Do you know the causes of Iron-deficiency Anemia?		Do you think proper diet & taking essential nutrients can prevent Anemia ?		Do you think Anemia can be cured by drugs & are preventable?		Do you take Iron rich foods?		Do you take sufficient meals daily?	
	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)	Yes (n)	No (n)
Age												
< 20 Year	51	4	54	1	48	8	53	3	31	25	43	13
21-30 Years	210	35	204	41	223	20	223	21	109	135	225	17
31-40 Years	96	34	95	34	117	13	105	23	55	75	123	9
41-50 Years	31	20	30	21	45	6	43	8	23	27	43	7
51- 60 Years	13	3	11	5	14	2	17	0	8	7	15	1
>60+ Years	3	1	4	1	4	1	4	1	4	2	5	0
P value	*.001****		*.001****		*.729*		*.016**		*.593*		*.005*	
Education												
Illiterate	182	71	176	76	221	31	220	32	131	121	231	21
Primary Level	215	25	213	27	224	16	219	21	97	143	214	26
Middle Level	8	0	6	2	8	0	5	3	3	5	6	2
Graduate	1	0	1	0	1	0	1	0	0	1	1	0
P value	*.001****		*.001****		*.067*		*.049**		*.070*		*.360*	
Occupation												
Housewife	170	57	171	55	207	20	195	32	91	136	205	22
Daily Worker	138	31	134	35	151	18	153	16	89	80	159	10
Unemployed	16	5	15	6	14	7	21	0	10	11	17	4
Shopkeeper	40	2	38	4	41	1	39	3	17	25	39	3
Student	26	0	26	0	24	2	24	2	19	7	16	10
Job	14	2	12	4	15	1	13	3	3	13	16	0
P value	*.004*		*.022**		*.006*		*.198*		*.002*		*.001****	
Type of family												
Nuclear	220	87	212	95	274	33	264	43	132	175	276	31
Joint	184	10	186	8	177	17	180	14	99	95	176	18
P value	*.001****		*.001****		*.492*		*.022**		*.064*		*.790*	
Marital status												
Married	342	84	330	96	382	44	374	52	184	242	400	26
Single	60	4	62	2	60	4	60	4	42	22	45	19
Widow/widower/divorced	5	6	3	8	9	2	10	1	5	6	10	1
P value	*.001****		*.001****		*.395*		*.374*		*.003*		*.363*	
Monthly family income												
<3.5K	102	15	96	21	103	14	105	12	42	75	111	6
3.5K to 7K	250	40	246	44	260	30	263	27	159	131	255	35
>7K	55	39	56	38	88	6	76	18	30	64	89	5
P value	*.001****		*.001****		*.410*		*.028**		*.001****		*.102*	
Number of family members												
1 to 4	160	23	151	32	165	18	170	13	70	113	170	13
5 to 8	188	69	187	70	229	28	221	36	113	144	231	26
> 8	56	5	57	4	57	4	56	5	45	16	51	10
P value	*.001****		*.001****		*.589*		*.149*		*.001****		*.094*	

vegetables regularly?" variable (p<.05) and with "Do you practice exercise regularly?" variable (p<.05). Educational status had found significant association with "Are you suffering by Diabetes Mellitus?" variable (p<.05) and with "Do you have regular meals daily?" variable (p<.05). Monthly family income had found significant association with "Do you take sufficient fruits and vegetables regularly?" variable (p<.05), and with "Do you have regular meals daily?" variable (p<.05). (Detail in Table 5)

Association between socio-demographic variables with knowledge, attitude and practices oniron deficiency anemia (N=501): Age group and educational status both traits had found significant association with "Do you know about Iron-deficiency Anemia?" variable (p<.001), with "Do you know about causes of Iron-deficiency Anemia?" variable (p<.001), and also with "Do you think proper diet & taking essential nutrients can prevent Anemia?" variable (p<.05). Occupational status had significantly associated with "Do you think Anemia can be cured by drugs & are preventable?" variable (p<.05) and with "Do you take Iron rich foods?" variable (p<.001). (Detail in Table 7)

DISCUSSIONS

This study examines the socio-demographic characteristics of communicable diseases such as water borne diseases, tuberculosis (TB), and mosquito-borne illnesses, as well as non-communicable diseases including hypertension, diabetes mellitus and iron deficiency anemia within the Rohingya population residing in refugee camps in Bangladesh. The research collected data from a substantial sample size, and the findings yielded valuable insights into the associations between important socio-demographic factors and knowledge and behaviors related to these disorders. This discussion will analyze the primary findings, while also drawing comparisons to findings from prior studies conducted in refugee settings. The study revealed noteworthy associations between age groups and specific behaviors linked to diarrheal illnesses. Significantly, a significant correlation was observed between the practice of handwashing with soap after urination and different age cohorts. Our study highlights the importance of age-specific healthcare interventions and hygiene promotion initiatives in reducing the prevalence of diarrheal infections within the Rohingya community residing in refugee camps. The significance of hygiene measures in mitigating the prevalence of diarrheal illnesses among displaced individuals has been underscored in various studies, including those conducted by Ahmed et al. (2017), Khan et al. (2018), and other researchers in comparable refugee contexts. The study additionally revealed that there is a notable correlation between an individual's gender and their ability to cook meals accurately. Based on the findings of this study, it is suggested that targeted health education interventions focusing on food preparation techniques could potentially offer valuable support within refugee camps. According to a study conducted by Doocy et al. (2018), gender-specific health interventions have been found to enhance health outcomes among displaced individuals. There was a strong positive correlation observed between educational attainment and understanding-related characteristics, specifically the awareness of diarrhea and comprehension of its underlying causes. The findings of this study underscore the significance of disease awareness educational initiatives targeting the Rohingya community.

Ensuring the accessibility of health education resources and information in a language and format that accommodates individuals with limited educational backgrounds holds significant importance in the realm of illness prevention and management. The research revealed a significant association between tuberculosis (TB) knowledge and different age cohorts, highlighting the importance of targeted health education programs tailored to specific age groups that prioritize raising awareness about TB and promoting preventive measures. Moreover, the act of smoking and coughing in public environments, both of which have been identified as potential risk factors for the transmission of tuberculosis (TB), exhibited a significant association with gender distribution. This highlights the importance of employing gender-sensitive approaches in initiatives aimed at preventing and managing tuberculosis within the Rohingya community.The study revealed that education level played a significant role as a variable in the association between awareness of the etiology of tuberculosis and familiarity with the disease. The implications of these findings suggest that promoting education and health literacy among refugees can potentially lead to positive effects on their attitudes regarding disease awareness, early diagnosis, and seeking treatment. The research findings revealed a significant association between different age cohorts and their level of awareness regarding mosquito-borne illnesses. This finding is consistent with the research conducted by Al-Saedi et al. (2020), which similarly observed differences in disease awareness among refugees based on age. Health education campaigns that are specifically tailored to vulnerable age groups have the potential to mitigate the occurrence of diseases. There was a significant association observed between age, occupation, and the level of knowledge regarding hypertension. The findings of this study align with previous research conducted on displaced populations, highlighting the importance of implementing targeted health education programs that prioritize raising awareness about hepatitis and preventing its transmission among specific age groups and occupational categories (Hossain et al., 2019). The study identified age groups and gender distribution as variables that are associated with specific diabetes-related behaviors, including the consistent consumption of fruits and vegetables and regular engagement in physical exercise. The results of this study align with recent research on the management of diabetes and the impact of lifestyle modifications in populations that have undergone relocation (Islam et al., 2019). The findings of the present study are consistent with previous research conducted in refugee settings. The research conducted by Khan et al. (2018) and Al-Saedi et al. (2020) has yielded valuable insights into the socio-demographic factors associated with the prevalence of illness and health behaviors among dispersed populations. These studies provide empirical evidence regarding the impact of age, gender, and educational attainment on refugees' understanding of diseases and their health-related practices.

CONCLUSION

This paper provides a comprehensive analysis of the Socio-Demographic factors influencing the prevalence of communicable and non-communicable diseases within the Rohingya population residing in refugee camps in Bangladesh. The results of the study highlight the significance of various factors, including age, gender, educational attainment, and job title, in influencing refugees' perceptions of illnesses and health-related behaviors.

The findings of this study hold considerable implications for health intervention strategies pertaining to refugees. In order to enhance awareness and prevention of illnesses, it is imperative to design health education initiatives that are customized to cater to the unique requirements of diverse age cohorts, genders, and educational levels. Enhancing health outcomes and reducing the prevalence of infectious and non-communicable diseases among the Rohingya refugee population can be achieved by advocating for the adoption of hygienic practices, disseminating disease-specific information, and encouraging modifications in lifestyle choices.

Limitations

Notwithstanding its valuable contributions, it is imperative to acknowledge the limitations inherent in the manuscript that necessitate careful consideration. The utilization of a cross-sectional design poses a constraint on the ability to establish a causal relationship between socio-demographic factors and disease outcomes. Longitudinal studies have the potential to offer a more comprehensive comprehension of the dynamic nature of disease prevalence and health behaviors among refugee populations over an extended period. Furthermore, the study's utilization of self-reported data may introduce response biases, potentially compromising the accuracy and reliability of the obtained results. The inclusion of clinical assessments or objective measures to validate self-reported information would contribute to the overall strength and reliability of the study. Moreover, it is important to note that the research was carried out within a particular refugee camp setting in Bangladesh. Therefore, caution should be exercised when attempting to apply the findings to other refugee populations or different settings. The socio-demographic characteristics and disease patterns are subject to variation across diverse refugee camps and regions.

Acknowledgement

Declarations

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