Socio-demographic correlate of knowledge and practice toward novel coronavirus among people living in Mosul-Iraq: A cross-sectional study

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26   **ABSTRACT**

27   **Background:** Since the World Health Organization (WHO) announced that the 2019 novel

28   coronavirus (2019-nCoV) is a worldwide pandemic, as the Iraqi authorities have started

29   responding and taking action to control the spread of the pandemic. The knowledge and practices

30   of the public play an important role in curbing the spreading of the virus by following the health

31   guidelines. This study aimed to assess the socio-demographic correlate of knowledge and

32   practices of Iraqi living in Mosul-Iraq towards novel coronavirus during its rapid rise.

33   **Methods:** A cross-sectional online survey of 909 participants was conducted among Mosul-Iraq

34   between 20th June to 1st July 2020. The survey included three parts: 1) socio-demographic

35   characteristics, 2) participants' knowledge, 3) participants' practices. T-test, ANOVA, chi-square,

36   and binary logistic regression were used. A p-value less than 0.05 ($p < 0.05$) was considered

37   statistically significant.

38   **Results:** The results showed knowledge and practice mean score of (12.91±1.67) and (21.56±

39   2.92) with cumulative knowledge and practice of 86% and 76% respectively towards 2019-

40   nCoV. Socio-demographic characteristics such as age, marital status, gender, level of education

41   and employment were statistically related with a higher mean score of knowledge and practice

42   towards the virus as *P<0.05*.

43   **Conclusions:** We concluded that the majority of the respondents demonstrate a high level of

44   knowledge and practices towards 2019-nCoV except respondents with socio-demographic

45   characteristics such as those who were younger, male respondents, those with lower education

46   and those unemployed as such campaigns that will increase the knowledge and encourage

47   adequate preventive practice towards 2019-nCoV should be targeted towards this group.

48   **KEYWORDS:** Knowledge, Practice, Novel coronavirus, Mosul, Iraq

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50   **1.   INTRODUCTION**

51   On 31st December 2019, the novel coronavirus detected in Wuhan, China, on 11-March 2020,

52   has been considered as a global pandemic by the (WHO), at the end of April, the virus has spread

53   worldwide with fear-evoking death reports (1, 2).

54   The 2019 novel coronavirus (2019-nCoV) is highly contagious; it causes a respiratory illness that

55   ranges from the common cold-like symptoms to more severe diseases (2). Most of the infected

56   patients complaining from fever, shortness in breath, cough, loss of smell, and/or taste sensation

57   and might be infected asymptomatically. In severe cases, patients might suffer from pneumonia,

58   multiple organ dysfunction, and death. (3, 4).

59   The 2019-nCoV is a novel strain that is not specified in humans earlier, and it is a zoonotic

60   illness that is transmitted between animals and people and may infect humans and animals. (5).

61   In Iraq, the first case of novel coronavirus was confirmed on 24th -February-2020 in Al-Najaf

62   city by people who have visited Iran. Therefore, at the end of March 13-2020, the Ministry of

63   Health and Environment of Iraq declared that the total of confirmed cases of coronavirus is

64   101(6). The ministry of health (MOH) in Iraq started to respond and take action to control the

65   infection, as well as the technical observation of (WHO), three governmental biological

66   laboratories in Baghdad, Basrah, and Erbil, were opened for COVID-19 outbreak testing. (7).

67   Initially, the measures that were taken by the Iraqi authorities nationwide have succeeded in

68   managing to slow the spread of the virus, but the cases have risen sharply in the past two months.

69   In the first week of August, Mosul city recorded thirty times increased in novel coronavirus cases

70   reported compared to the previous months, while the reported national cases rose from 10,000 to

71   120,000 across the country (8).

72   Due to the escalating number of cases in Mosul city, many challenges were observed while

73   trying to stop the virus from spreading, the limited number of tests that can be carried out per

74   day, lack of quarantine facilities, medical instrument, hygienic preparation insufficiency, low

75   hospital capacities, and no approved medicine or vaccine to prevent the 2019 n-CoV. Therefore,

76   the preventive measures taken by the people are important to protect themselves and others from

77   the virus infection and control the spread of the disease (9). Thus, managing this crisis hangs

78   primarily on people's knowledge and practices toward this virus and following all the

79   precautions to prevent cross-infection and follow guidelines of the World Health Organization

80   (WHO) and the Center for Disease Control and Prevention (CDC) (10, 11).

81   World Health Organization (WHO) declared precautional strategies to curb the spreading of

82   infections. The none medical precautions are maintaining social distancing, avoid public

83   gathering, avoid direct contact with infected people and use of personal protective equipment

84   (PPE) like face masks. Also, personal hygiene recommendations such as hand-washing often

85   with soap and water for at least 20 seconds, especially after touching surfaces, don't touch the

86   nose, eyes, and mouth with unwashed hands, and self-isolate when 2019-nCoV symptoms started

87   (10).

88   The knowledge and practices of the public toward 2019 novel coronavirus play an important role

89   in determining the willingness of Iraqi citizens to change their behavior and identify the kind of

90   intervention that is needed to correct the misconceptions regarding the virus, highlight the poor

91   knowledge toward the virus and disease, development of new preventive measures, develop

92   COVID-19 awareness campaign, and take precautionary. Therefore, the current study aimed to

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93   assess the socio-demographic correlate of knowledge and practices of Iraqi in Mosul towards

94   2019 novel coronavirus during its rapid rise.

95   The results of this study are expected to provide baseline information about the level of

96   knowledge and practices of Iraqi living in Mosul and highlight misperceptions related to

97   preventive measures. The outcomes of the study will further hence better planning for effective

98   awareness campaigns, required interventions and taking the appropriate action from local

99   authorities.

100   **1.   MATERIAL AND METHODS**

101   **Study design**

102   A cross-sectional survey was adopted for the study using an online google form platform. The

103   invitation of the respondents (Mosul-Iraqi) to participate in the survey was made on social media

104   using the most popular media in Iraq, the social media messenger applications such as;

105   WhatsApp and Facebook messengers were used in distributing the online google based

106   questionnaire and participation was limited to Mosul-Iraqi 18 years and above.

107   **Study Settings**

108   Mosul is located in Nineveh Governorate - Iraq, has a population of 3.5 million. Residents of

109   Mosul city suffer from a fragile health system that barely meets their basic needs, as many health

110   facilities were destroyed in 2017 (8).

111   **Survey and data collection**

112   A total of 909 Mosul–Iraqi participated in our study between 20th June to 1st July 2020. The

113   specified Sample size was by determining the lowest acceptable size of a demographic subgroup

114   with a ±5% margin of error and a confidence level of 95% (12, 13). Giving to this, out of the

115   total respondents of 1121 who filled the online google based questionnaire, only 909 were

116   included. An incomplete survey of participants of 212 was excluded from the study, leaving us

117   with a completion rate of 81%.

118   The survey was an adapted version of questionnaires published previously (14, 15,16). The

119   survey was reviewed, and pilot tested by 21 Iraqi people and 3 faculty experts at the University

120   of Mosul using WhatsApp and telephone interviews to correct any question then sent it to the

121   target population. The survey consisted of an interface page and three main themes, with a total

122   of 37 questions. The interface page included the title, objective of the study, information on

123   participants' privacy, and instructions to fill the survey. The three main themes included: 1)

124   demographic information of participants such as gender, age, education level, marital status,

125   employment status, coronavirus test, coronavirus result and Chronic diseases; 2) Knowledge

126   related the 2019 novel coronavirus consisted of 15 questions divided to clinical presentations of

127   virus (K1-K5), the spread of the virus (K6-K9) prevention (K10-K12) and the risk factors (K13-

128   K15); 3) practices of participants toward novel coronavirus outbreak, which included 13

129   questions. The google based questionnaire was designed in Arabic to encourage adequate

130   participation of the respondents since Arabic is the common language in Mosul city.

131   **Ethical approval**

132   The Research Ethics Committee (RIC) at the University of Sharjah, UAE approved this study by

133   the reference number is REC- 20-05-31-01, as of 14/06/2020.

134   **Data and statistical analysis**

135   Data analysis conducted using Statistical Package for Social Software (SPSS) version 22. Scale

136   reliability was performed to ensure data consistency (Cronbach's alpha coefficient = 0.729),

137   indicating good consistency. The frequencies of demographic characteristics, knowledge, and

138 practice answers along with descriptive statistics, were presented in mean ± SD, while qualitative

139 data were presented in frequency (number\percent). Participants' knowledge and practice scores

140 were compared with demographics factors using independent- samples t-test, one-way analysis

141 of variance (ANOVA).

142 To measure the knowledge, participants were given "yes," "no," and "not sure" answer options

143 to each survey question. A true answer to each question was marked with 1 score, while false

144 answers and not sure were marked with 0 scores. Scores of total knowledge ranged from 0-15; a

145 higher score signals a better level of knowledge. To practice measures, participants were given

146 "always", "sometimes", and " never" answer options to each item; the always option was marked

147 for 2 scores, while sometimes was for 1 score, and rarely was for 0 scores. The total practice

148 scores ranged from 0-26. The lowest and highest score of participants' knowledge was 7 and 15,

149 respectively, while the lowest and highest score of practice was 14 and 26, respectively.

150 Pearson's chi-square was used to determine the association between the explanatory and

151 outcome variables. We examined the factors associated with good knowledge & practice and

152 poor knowledge & practices by using binary logistic regression analyses. A p-value of less than

153 0.05 (p < 0.05) was considered statistically significant.

154 To identify the factors that were significantly associated with good or poor knowledge and

155 practices, a mean knowledge score of more than 12 indicated as good knowledge, while less than

156 12 assigned as poor. Similarly, a mean practice score above 21 indicated as good practice and a

157 mean practice score below 21 as poor practice. Factors were selected with a backward stepwise

158 method, and the reference category was selected based on the higher total mean. Unstandardized

159 regression coefficients (β) and odds ratios (ORs) and their 95% confidence intervals (CIs) were

160 used to quantify the associations between cofactors with knowledge and practice.

2. RESULTS

Socio-demographic characteristics

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163   The results showed that the majority of 61.4% were females, and 38.6% were males. More

164   than half of the participants, 54.5%, aged 30-49 years. Around 60.5% of respondents were

165   married, while 31.7% and 7.9% were single, and others (divorced and widows), respectively.

166   About 62.4% were holding a bachelor's degree, while 25.7, 11.9% were holding postgraduates

167   and diploma or below, respectively. Moreover, almost 64.5% were employed, while a smaller

168   number of participants, 21.8%, 13.9%, were unemployed and students, respectively. Some of the

169   participants, 7.9%, have been tested for COVID-19, while 92.1% didn't do the COVID-19 est.

170   However, 1.5% of tested respondents were positive, and 98.5% of the participants have been

171   negative tests. Figure 1 summarized the frequency of respondents according to demographic

172   characteristics.

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174   **Prevalence of chronic diseases reported by Iraqi participants**
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176   In our study, 82.4% of the participants were healthy, while 17.6% had chronic diseases. The

177   most common chronic diseases were diabetes 6%, followed by asthma at 3.30%. Moreover,

178   2.75%, 2.40%, 1.54%, 1.54%, 1.20% had chronic kidney disease, severe obesity, heart

179   conditions, chronic liver disease, and chronic lung diseases, respectively, as shown in Figure 2.

180   **Knowledge towards novel coronavirus**

181   The mean knowledge score (±SD) of 15 questions was (12.91±1.67). The correct percentage rate

182   was 86.08%. Most of the participants, 92.1%, answered correctly that novel coronavirus caused

183   by a virus; the majority, 94.1%, knew that the incubation period range of this virus is between 2-

184   14 days. Almost all participants had a high knowledge of 96% about the symptoms of a

185   novel coronavirus; about 72.3% of respondents knew that no vaccine toward this virus.

186   Moreover, 63.4% knew that no treatment was approved toward novel coronavirus until now.

187   When we asked if this virus is spread via respiratory droplets of infected people, 93.1%

188   answered correctly.

189   Similarly, A high proportion of 93.1% of the participants agreed that the virus could be

190   transmitted via touching contaminated surfaces. Also, 82.2% indicated that this virus was

191   transmitted through the eyes, nose, and mouth. Just over half, 59.4%, reported that the infected

192   person having no fever could infect healthy people and the majority of participants, 94.1%

193   recorded that children and young adults have to take measures toward novel coronavirus.

194   About 76.2% of respondents reported the individuals should stay at home and go out only when

195   necessary, while all of the participants 100% agreed that they should avoid going to crowded

196   places, and the infected person with this virus should be immediately isolated in a proper place.

197   Most of the respondents, 96%, answered that the virus is more dangerous for those with chronic

198   disease patients and the elderly, while 79.2% believed that smokers are more vulnerable to this

199   virus. The knowledge of participants toward novel coronavirus is displayed in **Table 1.**

200   **Practice towards novel coronavirus**

201   The mean practice score (±SD) of 13 questions was (21.56± 2.92). The correct percentage rate

202   was 75.8%. We found that 92.1% of the participants started washing their hands frequently

203   during a novel coronavirus period. Similarly, 92.1% indicated they were used sanitizer if the

204   soap is not available, while usual handwashing with soap for 20 seconds was recorded by 77.2%

205   of respondents. Almost 83.2% of participants wearied a mask when they go outside the home.

206   Three-quarters, 72.3% of respondents maintain space between them and others when going

207   outside, and only 36.6% maintain the 2-meter distance between them and others to prevent

208   transmission of the virus.

209   About 88% of the Iraqi respondents stopped going to crowded places recently. However, two-

210   thirds of the respondents, 69.3% and 65.3%, reported that they stopped visiting and kissing their

211   relatives or friends when meeting them, while 77.2% stopped the handshake during the greeting

212   with others. Besides, 81.2% were aware of the essential of sanitizing their hands after using cash,

213   and 75.2% of participants were aware of the importance of avoiding sharing their food with

214   others. The participant's practices toward novel coronavirus prevention presented in Table 2.

215   **Sources of information on COVID-19**

216   Participants indicated that the Ministry of Health and Environment in Iraq (MOH) and social

217   media such as Twitter, Facebook, YouTube, WhatsApp, Instagram, and Snapchat were the main

218   sources of information about novel coronavirus pandemic with 60.3% and 57.5% respectively,

219   followed by World Health Organization (WHO) press release 41.6%, while 28.7%, 15.8%, and

220   1.4% reported that they received their information from the news outlet, family and friends, and

221   other sources, respectively as presented in Figure 3**.**

222   **Level of knowledge (K) and practice (P) as per socio-demographic characteristics of**
223   **participants**

224   The knowledge level score (out of 15) showed a significant association across socio-

225   demographic characteristics such as gender, age, education levels, marital status, and

226   employment status ($p<0.005$). The practice level score (out of 26) also showed a significant

227   association between gender and age-groups ($p<0.005$) while there was no significant

228   association between marital status ((p=0.061), educational (p=0. 385) and employment (p=0.084)

229   with the practice of the participants.

230   The results indicated that females had a higher mean score of knowledge (13.19±1.70) and

231   practice (21.85±2.61) than males, aged group of participants above 50-years-old having the

232   highest score of knowledge (14.11±0.87) and practice (22.50±2.32) compared with other age

233   groups. Moreover, widows and divorced women's knowledge (13.37±1.32) were higher than

234   singles and married participants; however, there were no significant differences in practice. The

235   mean score of knowledge (13.26±1.51) and practice (21.75 ±2.77) of participants with high

236   education degrees were better than participants with lower educational degrees. Employed

237   respondents showed a higher-level score of knowledge (13.12±1.61) than non-employed and

238   students' participants. While there were no significant differences in employment status in

239   practice, neither education levels nor employment status had any significant differences in

240   practice, as depicted in table 3.

241   **Binary logistic regression analysis**

242   Table 4 shows the binary logistic regression analysis on variables significantly correlated with

243   knowledge and practice (good and poor) about 2019 novel coronavirus.

244   The Odds ratios (ORs) and their 95% confidence intervals (CIs) in a bid to quantify the

245   relationship between socio-demographic characteristics and the knowledge score (>12 and <12),

246   and between socio-demographic characteristics and the practices score (>21 and < 21). Overall,

247   the analysis presents a significant relationship between knowledge with age, marital status, and

248   employment status. The same table shows that the age of ≥50 vs other ages reported better

249   knowledge, divorced & widows vs. married and single participants were significantly related

250   with a higher mean score, employed people were significantly related with the better knowledge

251   vs unemployed and retired respondents (β:-1.790, OR: 0.167, CI: 0.103-.270). Moreover, gender,

252   age, education and employment status were significantly associated with good practices. Female

253   gender vs male (β: -0.458 OR: 0.633, CI 0.464-0.863), age group of ≥50 had higher practice

254   score than the youngest group of 18-29 and 30-49 (β: -0.790, OR: 0.454, CI: 0.261-0.788), (β: -

255   0.890 OR: 0.411, CI: 0.266-0.635), respectively. However, participants with a college-level

256   degree and below showed a better practice (β 1.450 OR: 4.263, 95% CI: 2.206-8.236) than

257   participants with a postgraduate degree, while, employment statues of employed reported a better

258   score than unemployed participants to (β: -1.215, OR: 0.297, CI: (0.158-0.558), as indicated in

259   Table 4.

260   **3. DISCUSSION**

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262   The knowledge and practices of the public play an important role in prevention by following the

263   health guidelines to control the spread of 2019-nCoV. The knowledge and practices of the

264   general population about novel coronavirus have changed during the pandemic as a defense line

265   against the disease.

266   The provided baseline data regarding the level of individuals' knowledge on clinical

267   presentations, transmission, prevention, and risk factors of novel coronavirus virus will help

268   highlight malpractices related to preventive measures hence making it critical for local

269   authorities to plan suitable strategies to prepare and manage the spread of the virus.

270   The current study resulted that the participants' knowledge was high (86%) and had good

271   measures of practice toward 2019 novel coronavirus (76%). Similar to our findings, several

272   studies done in many countries have reported high levels of knowledge about novel coronavirus,

273   among the general population in Malaysia 80.5%, Chinese residents 90%, Saudi Arabia

274   population 81.5%, and among healthcare workers in Pakistan 93.2%. (14, 4, 15, 16).

275   The high level of knowledge among the public may be due to most of the participants having a

276   college degree or higher, or due to the high level of media coverage, including all media outlets

277   and the impact of the pandemic on social life mandating that people follow.

278   The current results showed that most of the participants depend more on the ministry of health

279   and social media to get their information about the 2019 novel coronavirus, In contrast to other

280   studies among Jordanian, Egyptian and Pakistani populations that were using mostly social

281   media as the main source of information (17, 18, 19).

282   The study found that the majority of respondents had a good level in prevention and control

283   measures toward novel coronavirus, indicating that the practices of some respondents were very

284   good toward novel coronavirus. That the results reported on practice toward 2019-nCoV among

285   the respondents were similar to those reported in the Malaysian population (14) while being less

286   than the level of practices among Chinese residents (4).

287   This level of practice among the respondents attributed that the Iraqi government didn't take

288   drastic measures in reducing the spread of the disease, in addition to the low number of cases in

289   Mosul at the beginning of the pandemic (20).

290   Our results using t-tests, ANOVA and logistic regression analysis showed that there was better

291   knowledge and accurate practices associated significantly with female gender, respondents above

292   50 years old, employed respondents, higher education, and married respondents.

293   Females and mothers are expected to show better knowledge and practices towards the 2019

294   novel coronavirus precautions and preventions. Similar studies in Malaysian and Saudi Arabia

295   indicated that females had more knowledge regarding novel coronavirus than males (14, 15).

296   The high level of knowledge and practice among the participants that are above the age of 50 in

297   our study is possibly due to understanding the higher risk of contraction and complications of the

298   disease on the elderly and people with chronic diseases (21). In our study, the respondents that

299   hold a higher degree level had a greater level of knowledge than the others. Similar findings

300   were reported within Malaysian and Pakistani university populations (14,19). A great majority of

301   respondents confirmed that the novel coronavirus disease is more dangerous in patients with

302   chronic diseases and the elderly. This has been confirmed from many studies published regarding

303   the 2019 novel coronavirus disease in China (22, 23).

304   Our results reported that 17.5 % of the respondents had chronic diseases such as diabetes,

305   asthma, and severe obesity were the common diseases among our participants. A similar study

306   among Iraqi adults indicated that the common non-communicable diseases were hypertension

307   (13.3%) and overweight or obese (54.6%). Another study showed that diabetes and hypertension

308   were the most prevalent diseases among Iraqi people (24, 25).

309   Our results were compatible with many studies that showed similar significance in terms of

310   better knowledge and practice among the educated and employed people. (4, 14, 15,26, 27).

311   Finally, the results indicated that more informative novel coronavirus efforts and more intense

312   health education should be directed toward respondents with the following socio0demographic

313   characteristics; male respondents, respondents with lower educational levels, younger

314   respondents, and unmarried respondents.

315   **Limitations**

316   Since the study is a cross-sectional study, it was conducted within a short time during the

317   pandemic. Moreover, this study was an online survey that expected that the people with a higher

318   level of education would respond to the survey; as such, it doesn't give privilege to the

319   uneducated population and those with limited access to the internet.

320   **4. CONCLUSIONS**

321   In general, the current study provided a comprehensive screening of the knowledge and

322   practices of the population in Mosul city toward the 2019 novel coronavirus. The participants

323   had a high level of knowledge about the virus, and good practice towards using protective

324   measures, which is significant towards controlling the spread of the virus. The study

325   recommends developing informative novel coronavirus related campaigns targeted specifically

326   towards younger males, lower educated, and unemployed people were living in Mosul city.

327   Furthermore, interventions that encourage the provision and use of free personal protective

328   equipment (PPE) such as face mask should be developed as this will help curb the spreading of

329   the virus. In the same vein, the Iraqi government should take more effort to control the spread of

330   the disease.

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337   **CONFLICTS OF INTEREST**

338   The authors declare no conflict of interest.

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342   **AUTHOR CONTRIBUTIONS**

343   B.Q.S. Conceptualization, design of the study, data collection, resources, and wrote the paper,

344   R.A contributed to the statistical analysis, and O.A.B Revise and edit the text, All authors have

345   read and agreed to the published version of the manuscript.

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452   **TABLES AND FIGURES:**
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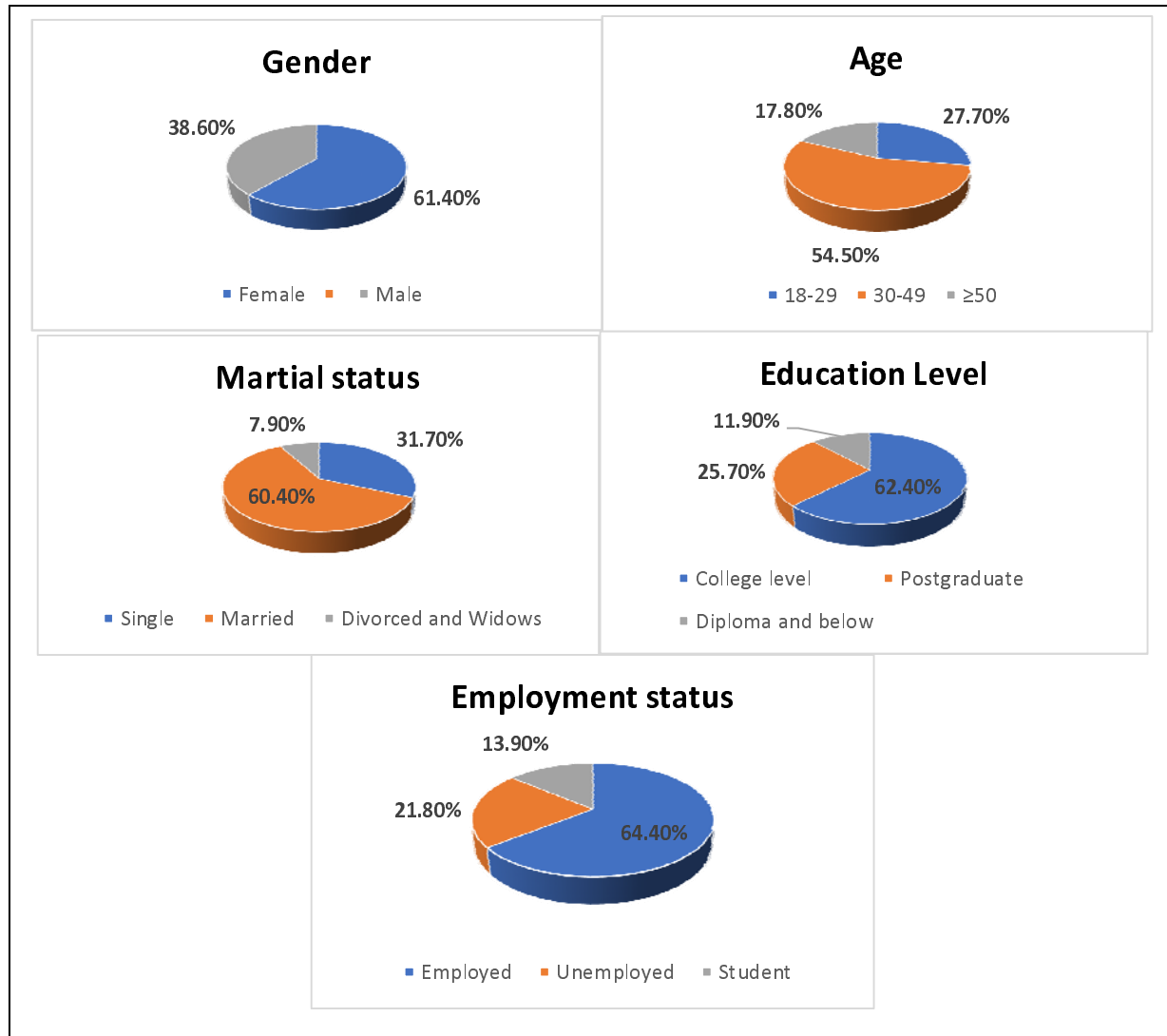
454   **Fig. 1.** Socio-demographic characteristics of the participants Mosul, Iraq (n = 909).
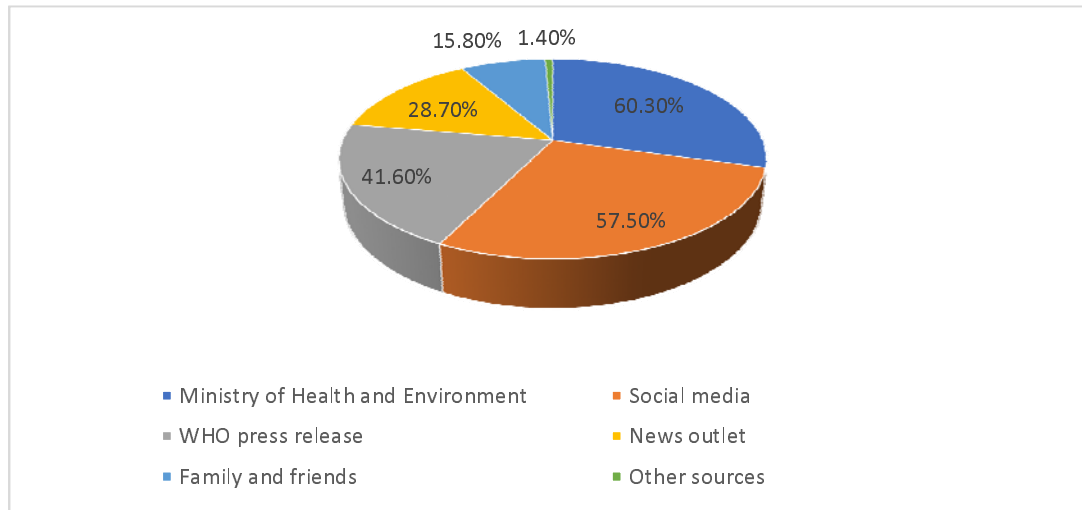
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464 **Figure. 2.:** Prevalence of chronic diseases reported by people in the Mosul, Iraq (n = 909)

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468 **Table 1.** General knowledge of participants about novel coronavirus in Mosul, Iraq (n= 909)

Knowledge questions		Frequency (%)	MEAN±SD
K:1 Novel coronavirus is caused by virus	**Yes**	**837 (92.1)**	
	No	27 (3.0)	1.13 ±0.460
	Not sure	45 (5.0)	
K:2 Incubation period range of novel coronavirus is 2-14 day	**Yes**	**855 (94.1)**	
	No	45 (5.0)	1.07 ±0.291
	Not sure	9 (1.0)	
K3: The main clinical symptoms of Novel coronavirus are fever, dry cough, tiredness, and breathing difficulties	**Yes**	**873 (96.0)**	
	No	0(0)	1.08 ± 0.390
	Not sure	36 (4.0)	
K4: No vaccine against novel coronavirus	**Yes**	**657 (72.3)**	
	No	81 (8.9)	2.10 ±0.517
	Not sure	171 (18.8)	
K5: No active treatment for novel coronavirus	**Yes**	**576 (63.4)**	
	No	63 (6.9)	2.23 ±0.561
	Not sure	270 (29.7)	
K6: Novel coronavirus spreads via respiratory droplets of infected people	**Yes**	**846 (93.1)**	
	No	9 (1)	1.13 ±0.481
	Not sure	54 (5.9)	

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		Frequency (%)	MEAN±SD
K7: Novel coronavirus is spread through touching contaminated surfaces	**Yes**	**846 (93.1)**	1.13 ±0.481
	No	9 (1)	
	Not sure	54 (5.9)	
K8: Novel coronavirus can be transmitted through eyes, in addition to nose and mouth	**Yes**	**747 (82.2)**	1.24 ±0.548
	No	108 (11.9)	
	Not sure	54 (5.9)	
K9: A person with novel coronavirus having no fever cannot infect others	**Yes**	**162 (17.8)**	2.05 ±0.636
	No	540 (59.4)	
	Not sure	207 (22.8)	
K10: Children and young adults don't need to take measures to prevent the infection by the novel coronavirus	**Yes**	**18 (2)**	2.02 ±0.243
	No	855 (94.1)	
	Not sure	36 (4)	
K11: We should stay at home and go out only when it is necessary	**Yes**	**693 (76.2)**	1.48 ±0.852
	No	216 (23.8)	
	Not sure	0 (0)	
K12: To prevent the spread of novel coronavirus, individuals should avoid going to crowded places if it's not necessary	**Yes**	**909 (100)**	1.00 ±0.00
	No	0(0)	
	Not sure	0(0)	
K13: The novel coronavirus may be more dangerous in patients with chronic diseases and elderly	**Yes**	**873 (96)**	1.07 ±0.352
	No	9 (1)	
	Not sure	27 (3)	
K14: People who have contact with someone infected with the novel coronavirus should be immediately isolated in a proper place	**Yes**	**909 (100)**	1.00 ±0.00
	No	0(0)	
	Not sure	0(0)	
K15: Smokers are likely to be more vulnerable to novel coronavirus	**Yes**	**720 (79.2)**	1.31 ±0.641
	No	99 (10.9)	
	Not sure	90 (9.9)	
Total knowledge level		**86.08%**	

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470   **Table 2.** Practices of participants toward novel coronavirus in Mosul, Iraq (n= 909)

Practice questions	**Frequency (%)**	**MEAN±SD**

P1: Have you started to wash or sanitize your hands regularly?	Always	837 (92.1)	
	Sometime	72 (7.9)	1.16 ±0.540
	Never	0 (0)	
P2: Have you washing your hands for 20 Sec or more?	Always	702 (77.2)	
	Sometime	0 (0.0)	1.38 ±0.807
	Never	207 (22.8)	
P3: Do you use sanitizer if the soap is not available	Always	837 (92.1)	
	Sometime	0 (0.0)	1.13 ±0.501
	Never	72 (8)	
P4: Do you wear a mask when you go outside?	Always	756 (83.2)	
	Sometime	135 (14.9)	1.32 ±0.717
	Never	18 (2.0)	
P:5 Do you keep distance between you and others when you go outside?	Always	657 (72.3)	
	Sometime	0 (0)	1.55 ±0.896
	Never	252 (27.7)	
P6: Do you keep 2 meters distance between you and others?	Always	333 (36.6)	
	Sometime	45 (5.0)	1.82 ±0.814
	Never	531(58.4)	
P7: Did you stop going to crowded places recently?	Always	801 (88.1)	
	Sometime	90 (9.9)	1.22 ±0.607
	Never	18 (2.0)	
P8: Did you stop visiting your relatives and friends during the outbreak?	Always	630 (69.3)	
	Sometime	189 (20.8)	1.51 ±0.816
	Never	90 (9.9)	
P9: Did you stop kissing your relatives and friends when you meet them?	Always	594 (65.3)	
	Sometime	252 (27.7)	1.62 ±0.889
	Never	63 (6.9)	
P10: Did you stop handshaking with others?	Always	702 (77.2)	
	Sometime	198 (21.8)	1.45 ±0.827
	Never	9 (1.0)	
P11: Do you wash or sterilize your hands after dealing with cash?	Always	738 (81.2)	
	Sometime	108 (11.9)	1.31 ±0.671
	Never	63 (6.9)	
P12: Did you stop sharing your eating utensils and food with others?	Always	684 (75.2)	
	Sometime	144 (15.8)	1.41 ±0.747
	Never	81 (8.9)	
P13: Do you follow regular updates on Novel coronavirus?	Always	693 (76.2)	
	Sometime	189 (20.8)	1.45 ±0.815
	Never	27 (3.0)	
Total practices level		**75.84%**	

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Table 3. Association between socio-demographic characteristics with knowledge (K) and practices (P) of participants.

Knowledge of participants					
Variables		**Frequency (%)**	**MEAN±SD**	**t/F**	**P-value**
Gender	Female	558 (61.4%)	13.19±1.70	6.57	0.000
	Male	351 (38.6%)	12.46±1.51		
Age	18-29	252 (27.7%)	12.35±1.63	64.54	0.000
	30-49	495 (54.5%)	12.80±1.70		
	≥ 50	162 (17.8%)	14.11±0.87		
Marital status	Single	288 (31.7%)	12.40±1.47	20.83	0.000
	Married	549 (60.4%)	13.11±1.74		
	Others	72 (7.9%)	13.37±1.32		
Education level	College degree	567 (62.4%)	12.84±1.62	9.28	0.000
	Postgraduate degree	234 (25.7%)	13.26±1.51		
	Others	108(11.9%)	12.50±2.07		
Employment status	Employed	585 (64.4%)	13.12±1.61	17.44	0.000
	Unemployed	198 (21.8%)	12.72±1.93		
	Student	126 (13.9%)	12.21±1.21		

Practices of participants					
Variables		**Frequency (%)**	**MEAN±SD**	**t/F**	**P-value**
Gender	Female	558 (61.4%)	21.85±2.61	3.8	0.000
	Male	351 (38.6%)	21.1±3.31		
Age	18-29	252 (27.7%)	21.64 ±2.89	12.14	0.000
	30-49	495 (54.5%)	21.21±3.04		
	≥ 50	162 (17.8%)	22.50±2.32		
Marital status	Single	288 (31.7%)	21.87 ±2.87	2.80	0.061
	Married	549 (60.4%)	21.45 ±2.99		
	Others	72 (7.9%)	21.12 ±2.48		

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Education level	College degree	567 (62.4%)	21.4 ± 3.07		
	Postgraduate degree	234 (25.7%)	21.75 ±2.77	0.955	0.385
	Others	108(11.9%)	21.73 ±2.36		
Employment status	Employed	585 (64.4%)	21.63±2.96		
	Unemployed	198 (21.8%)	21.18±2.92	2.48	0.084
	Student	126 (13.9%)	21.85±2.67		

Table 4: Binary logistic regression analysis on factors significantly associated with mean knowledge and practices about novel coronavirus of the participants, Mosul-Iraq

Knowledge (> 12 and < 12)			
Variable	**β**	**OR (CI 95%)**	**P-value**
Age (≥ 50 vs. 18-29) Age (≥ 50 vs. 30-49)	-	-	0.001*
Marital status (others vs. married and single)	-	-	0.036*
Employment status (employed vs. unemployed and students)	-	-	0.000*
Employment status (unemployed vs. employed)	-1.79	0.167(0.103-0.270)	0.000*
Practice (> 21 and < 21)			
Variable	**β**	**OR (CI 95%)**	**P-value**
Gender (male vs. female)	-0.458	0.633 (0.464-0.863)	0.004*
Age (18-29 vs. ≥50)	-0.790	0.454 (0.261-0.788)	0.005*
Age (30-49 vs. ≥50)	-0.890	0.411 (0.266-0.635)	0.000*
Education level (others level vs. postgraduate	1.450	4.263 (2.206-8.236)	0.000*
Employment status (unemployed vs. employed)	-1.215	0.297 (0.158-0.558)	0.006*

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