Implication of Gender on Covid-19 Prevention Practice Among Adults in Ethiopia: A Systemic Review and Meta-Analysis

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Abstract

Background: COVID-19 infection is a newly recognized illness that is spreading rapidly around the world and causes many morbidity and mortality. Previous epidemiological investigations of the relationship between Gender and prevention practice of COVID-19 yielded inconsistent findings. Thus, in this paper, we aim to summarize the evidence whether gender is related to the prevention practice of COVID-19 among adults in Ethiopia through a systematic review and meta-analysis approach.

Methods: Searches were performed on PubMed, Scopus, and Web of Science for relevant studies that were published from December 2020 utile October 2020 reporting Gender and prevention practice of COVID-19. Data extraction and assessment were guided by PRISMA checklist. Observational studies and studies with Newcastle-Ottawa Scale score of 5 or greater were included in the review. The pooled adjusted Odds ratios (OR)) and 95% confidence intervals were obtained using fixed effect models.

Results: A total of 6 observational studies involving 8173 participants, 4087 of which had prevention practice of COVID-19 were eligible for inclusion in this meta-analysis. The summary OR for prevention practice of COVID-19 comparing male versus female was 0.80 (95%CI 0.73 to 0.87), P < 0.00001, I2= 0%). There was no significant heterogeneity for all studies (Q = 4.44; P = 0.49; $I2$ =0%. No publication bias was observed (Egger's test: P = 0.119, Begg's test: P = 0.348).

Limitations: Prevention practice of COVID-19 definition was not identical. Therefore, the studies varied in specific way. Despite the fact that, Egger's test and Begg's funnel plots detected no evidence of publication bias in the meta-analysis, but that estimation may not be sufficiently accurate because the number of included studies was relatively small.

Conclusions: The meta-analysis indicates that difference was found in prevention practice of COVID-19 between male and female.

Keywords: Attitude Of COVID-19; COVID-19, Meta-Analysis; Practice Of COVID-19; Systematic Reviews

Abbreviations: CI: Confidence intervals; COVID-19: Corona Virus Disease 2019; MH: Mantel-Haenszel; NOS: Newcastle-Ottawa Scale; OR: Odd Ratio; PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Background

COVID-19 are a large family group of viruses that cause infections that range from the common cold to more severe diseases found in animals and humans [1]. On 31st December 2019, cases of pneumonia of unknown cause in Wuhan, China were reported to the World Health Organization [2]. As of 27 July 2020, 847,628 confirmed cases and 17,759 deaths were reported from Africa [3]. According to the Ministry of Health and the Ethiopian Public Health Institute's COVID-19 pandemic preparedness and response daily situation report (4 August 2020), since the first COVID-19

case was reported on 13 March, 2020, a total of 19, 877 COVID-19 confirmed positive cases have been recorded; out of these, 41.45% (8249) have recovered and 1.72%(343) have died [4]. The practice of precautionary measures for coronavirus among Health care practitioners was 89.7% in a study conducted in China [5], 87.9% in the Kingdom of Saudi Arabia [6]. The key components in prevention and control measures for COVID-19 includes procedures (hand hygiene, staffing, Personal Protective Equipment) [7]. Public health measures, isolation, social distancing, avoidance of handshake and community containment, are some of effective methods to prevent a disease when vaccine is not available [8].

So far, no effective anti-viral treatment or vaccine has been reported. Therefore, applying the preventive measure to control COVID-19 infection is the ultimate critical intervention [9]. Ethiopia has taken diverse prevention and control measures to stop the spread of COVID-19. These include school closure, stay at home,

keep social and physical distances, putting hand washing basins in places where people use in common (banks, churches/mosques, markets), and establishment of state emergency at the national level [10-12]. Previous epidemiological investigations of the relationship between Gender and prevention practice of COVID-19 yielded inconsistent findings. Some studies identified practices towards COVID-19 pandemic were found to be significantly associated with the gender [13-15], but other studies failed to show any significant association [16–20]. However, no study was specifically designed to study gender as a risk factor for prevention practice of COVID-19. Therefore, a meta-analysis of observational studies was conducted to investigate whether Gender is related to the prevention practice of COVID-19 in adults in Ethiopia.

Methods

Study design

This is a systematic review which includes a meta-analysis.

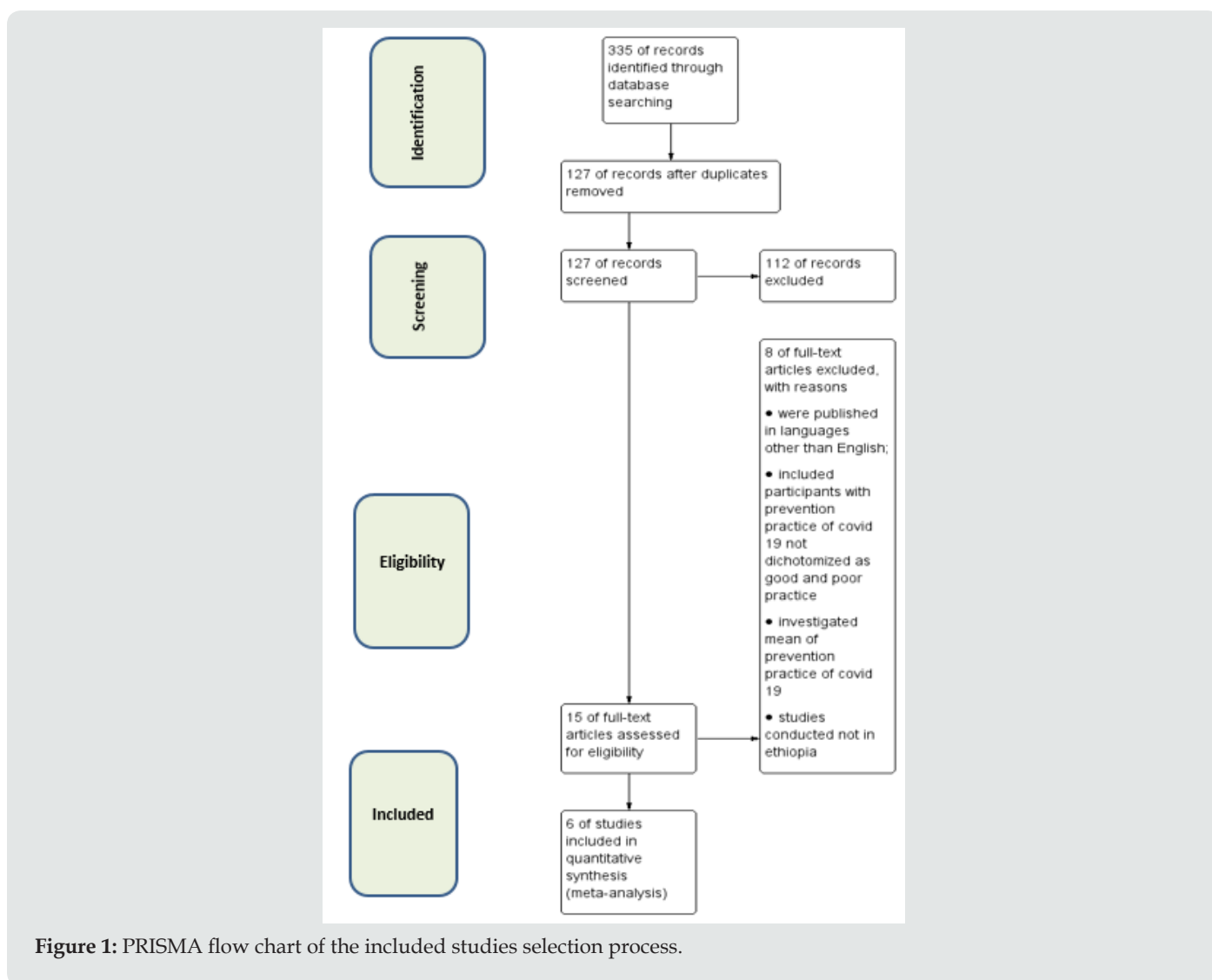## Data Sources and Search Strategy

Figure 1: PRISMA flow chart of the included studies selection process.

Review protocol does not exist since, we did not register in Cochran's library. The PRISMA statement [21] for the reporting of systematic reviews recommended by the Cochrane Collaboration was followed while conducting this meta-analysis (see Figure 1). Observational studies (cross-sectional studies) on gender and prevention practice of COVID-19'were included in our meta-analysis. Two investigators retrieved studies through internet search from the electronic databases of PubMed, SCOPUS, Google Scholar, Web of Science and MEDLINE from December to October 2020. Searches were performed using the search terms under two search themes that were combined using the Boolean operator "AND". For the theme of "prevention practice of COVID-19" a combination of text words was used: "practice of COVID-19", "socio demographic factors of COVID-19" "knowledge of COVID-19", "attitude of COVID-19" For the theme of "gender," "male" and "female" was used.

Inclusion and exclusion criteria

Studies were included in the review if; [1] the study was an observational study (cross-sectional study, case-control study, or cohort study), [2] the outcome of interest was practice of COVID-19, [3] the study reported the percentage of practice of COVID-19, according to Gender status and [4] Newcastle-Ottawa Scale (NOS) or adapted Newcastle-Ottawa Scale (NOS) score of 5 or greater indicated moderate- to high-quality studies [22].

Studies that were published in languages other than English, included participants with prevention practice of COVID-19 not dichotomized as good and poor practice, investigated mean of prevention practice of COVID-19 and studies conducted not in Ethiopia were also excluded to avoid the combination of studies that were not comparable. Two investigators independently conducted the study selection.

Data Extraction and Quality Assessment

Two reviewers independently performed data extraction and quality assessment. The following information was extracted from each eligible study: first author's name, study design, source of study population, sample size, proportion of male and female and definition of prevention practice of COVID-19. All studies reported multivariable-adjusted effect estimates based on prevention practice of COVID-19. Therefore, a result that was fully adjusted for potential confounding variables was selected. Quality assessment was conducted using the nine-star Newcastle Ottawa Scale (NOS); see Table 1. We considered studies with NOS score of 5 or greater [22]. After data extraction and assessment, the information was examined by an investigator who referred to the original articles.

Table 1: Description of original studies included (n=6), 2020.

Author / year	Sample size	Tittle / study design	Gender	Prevention practice of COVID-19	
				Good	Poor
Defar.A	6007	Knowledge, Practice and associated factors towards the Prevention of COVID-19 among high-risk groups: A cross-sectional study in Addis Ababa, Ethiopia A cross-sectional in person survey	Male	1703	1931
			Female	1223	1150
Mersha.A	428	Health professionals practice and associated factors towards precautionary measures for COVID-19 pandemic in public health facilities of Gamo zone, southern Ethiopia: a crosssectional study	Male	76	164
			Female	75	113
Dagne.K	528	revention Practice and Associated Factors of Coronavirus disease 2019 (COVID-19) Outbreak among Educated Ethiopians: An online Based Cross-sectional Survey	Male	217	209
			Female	68	34
Asemahagn.M	442	Factors determining the knowledge and prevention practice of healthcare workers owards COVID-19 in Amhara region, Ethiopia: a cross-sectional survey	Male	138	93
			Female	109	58
Akalu.Y	404	Knowledge, Attitude and Practice Towards COVID-19 Among Chronic Disease Patients at Addis Zemen Hospital, Northwest Ethiopia	Male	124	122
			Female	89	69
Woday. T	422	Knowledge, Attitude, and Practice and Associated Factors towards COVID-19 among College Students in Amhara Region, Ethiopia; A Cross-Sectional Study	Male	120	74
			Female	145	69

Analysis of Data

The relationship between Gender and prevention practice of COVID-19 was examined using the frequency of prevention practice of COVID-19 in male versus Female. A meta-analysis comparing the prevention practice of COVID-19 between male and Female in all included studies was performed. All included studies presented moderate to high quality assessment scores. Therefore, we did not performed sensitivity analyses according to NOS score and designated NOS scores from 5 to 6 as moderate and NOS scores equal to or greater than 7 as high. A fixed -effects model was used

to estimate the pooled ORs with 95% CIs because there was no evidence of heterogeneity [23]. Forest plots were used to assess the OR estimates and corresponding 95% CIs visually. Heterogeneity between studies was evaluated using the Cochran's *Q* and *I* 2 statistics [24, 25]. There was no significant heterogeneity for all studies (Q = 4.44; P = 0.49; $I2$ =0%. The probability of publication

bias was assessed using the Egger regression test [26] and Begg's funnel plot [27]. No publication bias was observed (Egger's test: *P* = 0.119, Begg's test: *P* = 0.348). We analyzed data using Revman software (version 5.1) and Meta essential software. All statistical tests were two sided. *P* < 0.05 was considered statistically significant.

Table 2: Characteristics of the included studies (n=6) according to Newcastle-Ottawa Quality Assessment Scale, 2020.

Study	Selection	Comparability	Outcome	NOS scale
Defar. A	***	**	***	8
Mersha. A	***	**	**	7
Dagne. K	***	**	*	6
Asemahagn. M	***	**	***	8
A k a l u. Y	***	**	***	8
Woday. T	***	**	*	6

Note: Each star represents a high-quality criterion accomplished by the study.

Results

Studies identified

A total of 335 articles were retrieved through electronic searching. After removing duplicates, 127 studies remained. Screening these studies by titles and abstracts indicated 15 studies were eligible for assessment by full paper. Of these, 6 studies were included in the quantitative syntheses. The 6 studies consisted of cross-sectional studies [13, 18, 20, 28-30]. The flow of studies through the review is depicted in Figure 1.

Description of original studies

These 6 studies were published between December to October 2020. The total sample size of the 6 included studies comprised subjects (range, 404– 6007), all studies (n = 6) recruited both male and female participants (Table 1). Six studies comprising 8173 participants 4087 of which had prevention practice of COVID-19 were included in the quantitative syntheses (meta-analyses). All Studies asked knowledge attitude and practice of COVID-19 but the populations (high-risk groups: Health professionals, Educated Ethiopians and Chronic Disease Patients), and prevention practice of COVID-19 definition were not identical. Therefore, the studies varied in specific way.

Prevention practice of COVID-19 measurements

The score of the practice was measured based on four items. These four items were, 1) practice of hand hygiene, 2) use of mask, 3) maintaining social distance and 4) staying home. A score ≥3 (75% and above) were classified as a good practice towards the preventive measures of COVID-19 and a score of ≤2 (50% and below) indicated a poor practice (28). All of the included studies (n = 6) used self-report to measure prevention practice of COVID-19. From the total study participants 60.82% (4971) are male and from this 47.83 % (2378) have prevention practice of COVID-19. From the total study participants 39.17% (3202) are female and from this 53.35% (1709) engaged in prevention practice of COVID-19. The overall proportion of prevention practice of COVID-19 was 29.09% and 20.91% % among male and female respectively.

The association between Gender and prevention practice of COVID-19

The pooled odds ratios for all studies revealed statistically significant association of prevention practice of COVID-19 with male relative to female OR 0.80 (95%CI 0.73 to 0.87), P < 0.00001, I2= 0%) (Figure 2).
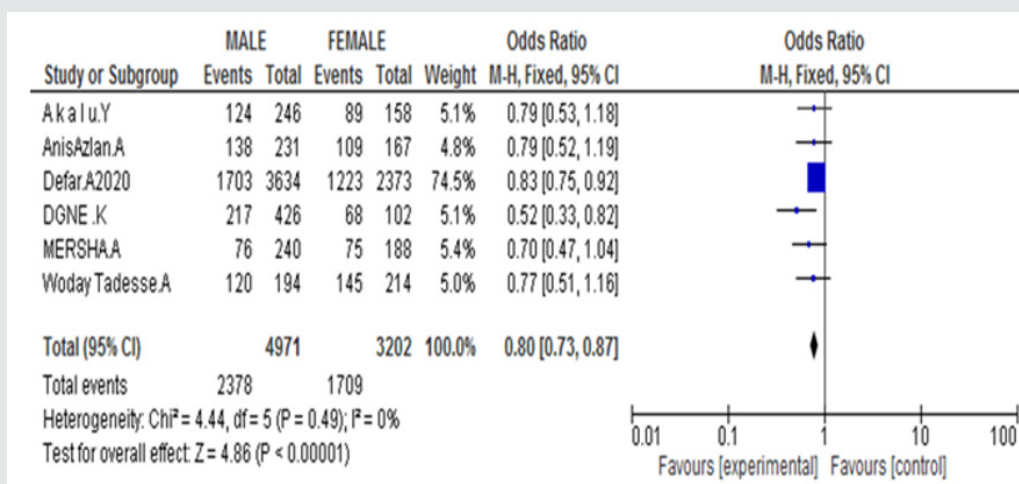
Figure 2: Forest plot for the association between Gender and prevention practice of COVID-19.

Discussion

From 8173 participants, 50% (4087) of them had prevention practice of COVID-19 this is higher compared to approximately half of the respondents (49.7%) followed infection control practices in Lebanon [17], 35.3% of health professionals had a good practice on precautionary measures [18], 25.9% of study participants had a good practice [29] And lower compared to 88.7% reported good practice in terms of following precautions to avoid COVID-19 [16], 76.8% of the respondents adhered with at least eight practices out of 10[15] , (81.39%) had a high level of practice towards preventing COVID-19 infection. [19] Also, 60.8% of respondents were taking precautions (good practice [31], (89.7%) in China (5). Overall above half (285/528, 54%) of the respondents had good COVID-19 preventive practice [32], (62%) health workers had good prevention practices towards COVID-19[30]. The differences in the practice of preventive measures could be due to variation in the cut-off values to classify good or poor practice since; the previous studies have been used different scores to classify adequate practice. In addition, the variation might be due to differences in sample size, study population and study settings. According to the results of this meta-analysis, the pooled odds ratios for all studies revealed that, odds of prevention practice of COVID-19 in Ethiopia among male decrease by 20% compared with female (OR 0.80; 95%CI 0.73 to 0.87, P < 0.00001, I2= 0%). This finding is consistent with previous study which state prevention practice towards COVID-19 was two-fold higher among female respondents when compared with males in China resident [13]. The finding of this study is also supported by other study in Birzet University students [14]. Additionally, positive practices towards COVID-19 pandemic were found to be significantly associated with the gender where females were found to have less negative practices when compared to males [15]. This might be females participate in childcare, food preparation and other tasks compared with males as a result, preventive measures are more likely to be practiced better among females to protect themselves and others from infection. In contrast, the finding of the study is inconsistent with previous studies which state gender is not associated with prevention practice of COVID-19 [16-20]. Finally, this study has some limitations. Among them, firstly, prevention practice of COVID-19 definition was not identical. Therefore, the studies may vary in specific way. Secondly, despite the fact that, Egger's test and Begg's funnel plots detected no evidence of publication bias in the meta-analysis, estimation may not be sufficiently accurate due to small number of included studies.

Conclusion

In summary, present meta-analysis of 6 observational studies indicated prevention practices towards COVID-19 were found to be significantly associated with the gender. Preventive measures are more likely to be practiced better among females to protect themselves and others from infection. Further prospective studies, using a strict case definition of prevention practices towards COVID-19 are warranted to validate our finding.

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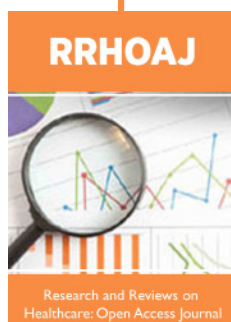
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