

Health and well-being issues of Nepalese migrant workers in the Gulf Cooperation Council countries and Malaysia: a systematic review

Article (Accepted Version)

Paudyal, Priyamvada, Kulasabanathan, Kavian, Cassell, Jackie A, Memon, Anjum, Simkhada, Padam and Wasti, Sharada Prasad (2020) Health and well-being issues of Nepalese migrant workers in the Gulf Cooperation Council countries and Malaysia: a systematic review. *BMJ Open*, 10 (10). a038439 1-18. ISSN 2044-6055

This version is available from Sussex Research Online: <http://sro.sussex.ac.uk/id/eprint/94055/>

This document is made available in accordance with publisher policies and may differ from the published version or from the version of record. If you wish to cite this item you are advised to consult the publisher's version. Please see the URL above for details on accessing the published version.

Copyright and reuse:

Sussex Research Online is a digital repository of the research output of the University.

Copyright and all moral rights to the version of the paper presented here belong to the individual author(s) and/or other copyright owners. To the extent reasonable and practicable, the material made available in SRO has been checked for eligibility before being made available.

Copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

1 **Health and Wellbeing Issues of Nepalese Migrant Workers in the Gulf**
2 **Cooperation Council Countries and Malaysia: A Systematic Review**

3
4
5 **Priyamvada Paudyal¹, Kavian Kulasabanathan¹, Jackie Cassell¹, Anjum Memon¹, Padam**
6 **Simkhada², Sharada Prasad Wasti³**

7
8 **¹Department of Primary Care and Public Health, Brighton and Sussex Medical School,**
9 **Brighton UK; ²Faculty of Health, University of Huddersfield, UK; ³Green Tara Nepal,**
10 **Kathmandu, Nepal**

11
12 **Corresponding Author:** Dr Priyamvada Paudyal

13 Department of Primary Care and Public Health, Brighton and Sussex Medical School, Room 322,
14 Watson Building, Village Way, Falmer, BRIGHTON, BN1 9PH, UK
15 +44 (0) 1273 644548; p.paudyal@bsms.ac.uk

16
17
18 **Running Title: Health issues of Nepalese migrant workers in Gulf Countries and**
19 **Malaysia**

20 **Abstract:**

21

22 **Objective:** To summarise the evidence on health and wellbeing of Nepalese migrant workers
23 in the Gulf Cooperation Council (GCC) countries and Malaysia

24

25 **Design:** Systematic Review

26

27 **Data Sources:** EMBASE, MEDLINE, Scopus and Global Health databases

28

29 **Eligibility Criteria:** Studies were eligible if they: 1) included Nepalese migrant workers aged
30 18 or older working in the GCC countries or Malaysia or returnee migrant workers from these
31 countries; 2) were primary studies that investigated health and wellbeing status/issues; and 3)
32 were published in English language before 8 May 2020.

33

34 **Study Appraisal:** All included studies were critically appraised using Joanna Briggs Institute
35 study specific tools.

36

37 **Results:** A total of 33 studies were eligible for inclusion; 12 studies were conducted in Qatar,
38 eight in Malaysia, nine in Nepal, two in Saudi Arabia and one each in UAE and Kuwait. In
39 majority of the studies, there was a lack of disaggregated data on demographic characteristics of
40 Nepalese migrant workers. Nearly half of the studies (n=16) scored as ‘high’ quality and the rest
41 (n=17) as ‘moderate’ quality. Five key health and wellbeing related issues were identified in this
42 population: a) occupational hazards; b) sexual health; c) mental health; d) healthcare access and e)
43 infectious diseases.

44

45 **Conclusion:** To our knowledge, this is the most comprehensive review of the health and well-
46 being of Nepalese migrant workers in the GCC countries and Malaysia. This review highlights
47 an urgent need to identify and implement policies and practices across Nepal and destination
48 countries to protect the health and wellbeing of migrant workers.

49

50 **Protocol Registration:** The review protocol was developed and registered on the University
51 of Sussex website

52

53 **Key Terms:** *Migration, GCC countries, Health, Wellness, Nepalese*

54 Word Limit 300

55 Word Count: 264

56

57 **Strengths and Limitations**

- 58 • This review is the most comprehensive review to date on this population.
- 59 • The review did not restrict studies based on particular health outcomes, peer reviewed
60 studies looking at a range of health issues in this population were included.
- 61 • Meta-analysis was not conducted as there was heterogeneity in the outcome measured
62 and the measurement tools used in the studies.

63

64 **Introduction**

65 Migration is the overarching narrative of our time, and its impact is increasingly being
66 recognised in global public health agendas. The United Nations (UN) Sustainable Development
67 Goals (SDGs) identify migration as a catalyst for development and recommend that ‘no-one
68 should be left behind’ to achieve Universal Health Coverage for all¹. According to the World
69 Migration Report 2020, the number of international migrants has reached approximately 272
70 million, and two third of these are estimated to be labour migrants². Labour migration has been
71 a key determinant of population changes in Asia, especially in Gulf Cooperation Council
72 (GCC) countries, a major destination for workers within Asia².

73

74 Nepal is a low-income country going through a demographic transition, with an ageing
75 population and attendant chronic diseases. According to the Nepal Migration Report 2020, over
76 four million labour approval were issued to Nepalese workers in the last decade since
77 2008/2009³. The Nepal Demographic and Health Survey (2016) reported that nearly half (47%)
78 the households have at least one family member who migrated in the last 10 years either in
79 internal or international destinations⁴. These migrant workers contribute over a quarter of the
80 country’s gross domestic product (GDP) through remittance from abroad. The migration
81 outflow consists predominantly of low-skilled male workers, primarily to Malaysia and the
82 GCC countries³.

83

84 Labour migration contributes significantly to the sociocultural and economic development of
85 both origin and destination countries. However, migrant workers experience specific
86 vulnerabilities, and face a range of health risks while working abroad. These risks are
87 particularly significant for Nepalese workers in the GCC countries, as they are often employed
88 in occupations considered 'difficult, dirty, and dangerous (3Ds)'. These are sectors with higher
89 occupational risks such as agriculture, construction, transport and heavy industry. Furthermore,
90 Nepalese migrant workers consistently work for longer hours as compared to native workers⁵
91 ⁶ and are often exposed to factors which promote poor health and wellbeing, including low
92 wages, poor housing, an unhealthy diet, and difficulty in accessing health services^{5, 7}. Many
93 Nepalese migrant workers die abroad every year including a significant number that are
94 unexplained, while a large number return home with debilitating injuries, and both mental and
95 physical illness⁵. This systematic review identified and summarised the evidence from primary
96 studies on the health and wellbeing of Nepalese migrant workers in the GCC countries and

97 Malaysia, the destination countries for 88% of labour migration. This review was conducted as
98 a part of University of Sussex internally funded Global Challenges Research Fund (GCRF)
99 project to develop a culturally relevant intervention to support the health and wellbeing of
100 Nepalese migrant workers in GCC countries.

101

102 **Methods**

103 **Protocol Registration**

104 This study protocol was registered at the University of Sussex ([http://sro.sussex.ac.uk](http://sro.sussex.ac.uk/id/eprint/86400/)
105 [/id/eprint/86400/](http://sro.sussex.ac.uk/id/eprint/86400/)). The study followed the PRISMA (Preferred Reporting Items for Systematic
106 Reviews and Meta-Analyses) guidelines and recommendations of the Cochrane Collaboration
107 (www.prisma-statement.org).

108

109 **Electronic Search**

110 A combination of migration specific search terms (migration, migrant, emigrant, immigrant,
111 expatriate, foreign worker, labor migration, left-behind, migrant families) and country specific
112 search terms (Nepal, Nepalese, Nepali, UAE, United Arab Emirates, GCC, Gulf Cooperation
113 Council, Middle East, Bahrain, Saudi Arabia, Oman, Qatar, Kuwait, Malaysia) were used to
114 identify relevant studies using EMBASE, MEDLINE, Scopus and Global Health databases
115 (Appendix 1). The search aimed to identify all relevant studies regardless of any health
116 outcomes used. As such, no health outcome specific terms were used to limit the electronic
117 search. Reference lists of the relevant studies including those of related systematic reviews and
118 reference lists of the selected studies were further screened to identify potentially eligible
119 studies.

120

121 **Inclusion and Exclusion Criteria**

122 Studies were eligible if they: 1) included Nepalese migrant workers aged 18 or older working
123 in the GCC countries or Malaysia or returnee migrant workers from these countries; 2)
124 provided primary data on health and wellbeing status/issues (physical health, mental health,
125 accidents and injuries); and 3) were published in English language before 8 May 2020.

126

127 **Article Screening and Selection**

128 Once the electronic search was completed, the identified articles were exported to Rayyan
129 (<https://rayyan.qcri.org/welcome>) and screening was carried out by two reviewers (SW and
130 KK) independently to identify eligible articles. The titles of the identified studies were screened

131 to remove any duplicates and irrelevant articles. The abstract of all remaining articles was
132 screened to identify eligible full text articles. Full text articles were reviewed and a consensus
133 was reached to finalise the articles for inclusion. If more than one study were published using
134 the same data source (e.g. routine healthcare data), we used the study with the largest sample
135 size. Any disagreement over eligibility of studies was resolved through discussion with the
136 third reviewer (PP).

137

138 **Data Extraction and Synthesis**

139 The information extracted from each article included: study reference (authors, publication
140 year and country), study design and settings, participants' characteristics (sample size, age, and
141 gender), health outcomes and key findings (Table 1). Extracted data were analysed and a
142 summary of the narrative synthesis is reported in the results section. Meta-analysis was not
143 conducted as there was heterogeneity in the outcome measured and the measurement tools used
144 in the studies.

145

146 **Quality Assessment**

147 The PRISMA guideline suggests that systematic review should assess the risk of bias (based
148 on theoretical grounds) rather than study quality (the best authors could do in the setting).
149 However, we assessed the latter as the studies included in this review were predominately
150 cross-sectional in nature with methodological limitations⁸. Quality assessment for this review
151 was done using the Joanna Briggs Institute (JBI) Critical Appraisal Tools⁹. The JBI prevalence
152 study critical appraisal tool was used for cross-sectional studies estimating the prevalence of
153 the condition. The tool contains nine items covering domains related to sampling, outcome
154 assessment, statistical analysis and response rate. Each item was scored one if the response was
155 'Yes' and scored zero if the response was 'NO' or 'Unclear'. As in the previous review¹⁰,
156 studies with eight or more 'Yes' response were rated as 'high' quality, four to seven as
157 'moderate' and three or below as 'low' quality. Similarly, the JBI analytical cross-sectional
158 study critical appraisal tool was used for cross-sectional studies reporting effect sizes. The
159 checklist contains eight items covering domains related to sampling, exposure, outcome,
160 confounding factors, and statistical analysis (maximum possible score eight). Studies were
161 categorised as high quality (seven or above), moderate quality (between five and six) or low
162 quality (four and below). Qualitative studies were assessed by using the JBI qualitative study
163 critical appraisal tool. The checklist contains ten items with domains covering methodological

164 approach, data collection, analysis and interpretation, researcher's role, participants' voice and
165 ethics. The studies were rated high quality (eight and above), moderate quality (between five-
166 seven) or low quality (four and below) as on the previous publication¹¹. The assessment was
167 undertaken independently by two reviewers (SW and KK) with any discrepancies resolved by
168 a third reviewer (PP). As the number of studies in this population is limited, we did not exclude
169 studies based on quality assessment. The results of the quality assessment are presented in
170 Appendix 2.

171 **Results**

172

173 **Screening Results**

174 Database searches yielded 2770 articles. After duplicate removal, titles of the 2562 articles
175 were screened and 2253 were excluded. Abstracts of the remaining 309 publications were
176 further screened and 215 of these were excluded. Full text screening of the remaining 94 papers
177 were carried out and a further 61 papers were excluded for various reasons (Figure 1).
178 Altogether, 33 papers were included in this review; 31 were quantitative and two were
179 qualitative studies.

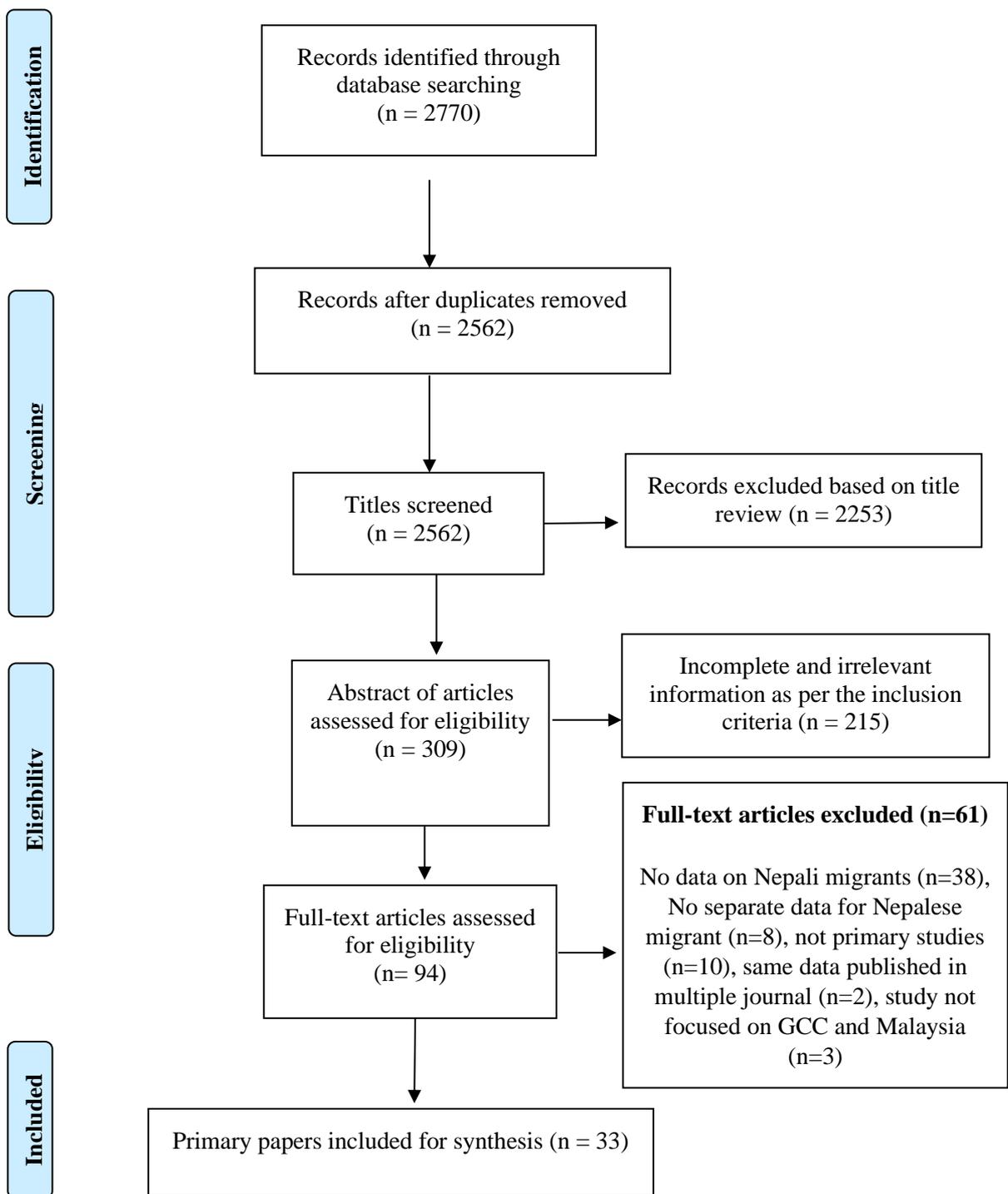


Figure 1: PRISMA Flow Diagram of Study Selection

Study Characteristics

A total of 33 papers were included in the review among them 12 studies were conducted in Qatar¹²⁻²³, eight in Malaysia²⁴⁻³¹, nine in Nepal^{5 7 32-38}, two in Saudi Arabia^{39 40}, one each in UAE⁴¹ and Kuwait⁴² respectively. Two study included all GCC countries and Malaysia^{7 38}, another two study included Malaysia, Qatar and Saudi Arabia^{32 33} and further two included in Qatar, Saudi Arabia and UAE^{5 34} (Table 1). The study design varied across the studies; the review included 13 retrospective analysis of routine healthcare data^{7 12-15 18 20 25 35 37 39 40 42} and 18 cross-sectional studies^{5 16 17 19 21-24 26-34 41}. Only two studies were qualitative in nature^{36 38}. Nine studies focused specifically on Nepalese migrants as their primary study population^{5 7 32-38} whilst the remaining 24 studies mentioned Nepalese migrant workers as part of a sub-analysis (Table 1). In majority of the studies, there was a lack of disaggregated data on demographic characteristics of Nepalese migrant workers. There was a paucity of research with female migrant workers, with just one study identified in this review⁷. The study mainly fell into two categories: those exploring the health risks and experiences of migrants while abroad and those focusing on infectious diseases (mostly done as a part of arrival screening).

Studies Exploring Health Risk and Experiences

Occupational Health and Hazards

Seven studies (four high quality and three moderate quality) specifically assessed occupational morbidity, mortality, and fitness to work in the destination countries^{15 20 25 32 35 36 39}. Majority of these studies were conducted in male migrant workers and the sample of Nepalese migrants varied from 20 to 38,908. Adhikari et al (2017) reported that around one-fifth (17%) of migrant workers had experienced work related accidents³². Poor working environment and not being registered with a doctor was associated with a greater perceived health risk at the work place. Another study reported that over a quarter (27.9%) of migrant workers had experienced occupational injuries: more than half (52%) of these workers fell from a height, 21% had injuries due to fall of a heavy object, 17% had motor vehicle accident injuries, 5% had machinery injuries and remaining 5% had other work related injuries¹⁵. In a study conducted in Saudi Arabia, Nepalese migrant workers were the third-most unfit population to work; 1.6% were unfit due to the presence of infectious disease and 5.3% due to non-communicable disease³⁹. Another study reported that more than one quarter (25.4%) of migrants had traffic related pedestrian injuries during abroad work²⁰ (Table 1). A study by Pradhan et al conducted a retrospective analysis of Government of Nepal data from 2009–2017 and recorded 1345

deaths, of which workplace accident and road traffic accidents contributed to 12% and 10% deaths respectively³⁵. 33 cases of work-related ocular injuries were reported in one study among Nepalese patients of the 440 patients attending a hospital in Malaysia²⁵. One qualitative study explored workplace accidents in GCC and Malaysia and reported several issues faced by the workers including lack of workplace safety, long working hours resulting in dehydration and heat stroke and injuries and accidents related issues including life-long disability³⁶.

Sexual Health

Only one moderate quality study in this review assessed the knowledge, attitudes and perceptions (KAP) of HIV/AIDS related risks³⁴. The study was conducted among 408 adult Nepalese migrants (92% male) with at least six months of work experience in one of the three Gulf countries (Qatar, Saudi Arabia and UAE). The study showed that 91% of respondents had concerns about HIV/AIDS, and 17.2% of workers reported having sexual intercourse with a partner other than their spouse within the last 12 months. More than half (59%) of the respondents perceived themselves at high risk of being infected due to their sexual activities³⁴ (Table 1).

Mental Health

Five studies (all moderate quality) examined mental health issues among migrant workers. The sample of Nepalese migrants workers in these studies ranged between 20 to 1354^{7 21 33 35 38}. One study on Nepalese female returnee migrant workers from Middle East and Malaysia reported the prevalence of mental health problems as 8.3%⁷. Another study reported that almost a quarter (23%) of labour migrants to Malaysia, Qatar and Saudi Arabia had experienced mental health issues, with a strong positive link between perceived health risk in the work environment and mental health status³³. Third study reported a paradoxical finding with 4% increase in the predicted probability of depressive symptoms among Nepalese migrant workers compared to Arab, for every unit increase in perceived quality of life²¹. One study analysed Nepalese government's report and looked at 1354 deaths in Nepalese migrant workers, of which 8.5% were due to suicide³⁵. The fifth quality qualitative study reported various mental health problems among the workers including loneliness, social isolation, tensions, anxiety, attempt to suicide³⁸ (Table 1).

Healthcare Access

Five studies (one high and four moderate quality) focused on labour migrants' healthcare access issues and the number of Nepalese workers in these studies ranged between 20 to 942 respectively^{5 7 32 37 38}. Adhikari et al (2017) reported that workers who were not registered with a doctor had poor health outcomes compared to those who were registered³². Another study also reported that only 36.5% workers had access to health insurance and about half (48.7%) did not have paid sick leave during their health problems⁵. Another study on Nepalese female returnee migrant workers reported that only 11% of respondents received health services during their abroad work⁷. The fourth study reported that only insurance 68% of the workers had health insurance abroad and only 20% underwent regular health check-up³⁷. In the qualitative study, participants reported poor access to mental health services related, mainly related to communication problems, and stigma to mental health³⁸ (Table 1).

Other Health Issues

A total of five studies (two high and three moderate quality) involving participants number ranging between 44 to 1354 reported various health issues^{7 19 22 35 37}. One study on Nepalese female returnee migrant workers reported a prevalence of workplace abuse, torture or maltreatment at the workplace, and physical harm at 41%, 31% and 11%, respectively⁷. Clinical prevalence of oral lesions among migrant workers was found to be 4.6%¹⁹. Third study looked at the chronic kidney disease among workers and found that 13.6% of workers had diabetic nephropathy³⁷. In the study by Pradhan et al, cardiovascular disease, natural/others reasons and murder contributed to 42%, 25% and 1.7% of deaths respectively³⁵. The last study reported that of patients attending to the emergency medical service in Qatar, out-of-hospital cardiac arrest among Nepalese migrant patients was found to be 11.6%²² (Table 1).

Studies on Infectious Diseases (Parasitic and Bacterial Infections, TB and Hepatitis E)

Of the 33 included studies, 17 studies (nine high and eight moderate quality) reported the proportion of sero-and/or faeco positive cases of infectious diseases (parasitic and bacterial Gastroenteric infections, tuberculosis, hepatitis E)^{12-14 16 17 19 23 24 26-31 40-42}. The number of Nepalese workers included in these studies ranged between 12 to 1429. In several of these studies, Nepalese migrant workers had the higher proportion of infectious disease cases among the population studied. These infectious diseases included, toxoplasmosis (46.2%, working in Malaysia)²⁴, tuberculosis (7%, Saudi Arabia and 11%, Qatar)^{14 40}, tuberculosis meningitis

(37.5%, Qatar)¹⁸, diarrhoeal bacterial infection (26.6%, Qatar)¹⁶, protozoan ova/cysts (13.7%), helminths (6.2%), and hookworms (4.3%, Qatar)¹², Hepatitis E (74%, Qatar)¹⁷, Brugian Lymphatic Filariasis (BmR1) (2.9%, Malaysia) and parasitic infection (BmSXP) (13%, Malaysia)²⁶. Moreover, prevalence of salmonella among Nepalese migrant food handlers (3.7% Malaysia)²⁸, mean knowledge of food cleanliness and hygiene (73.1%, Malaysia) and symptom of foodborne illness (18.4% Malaysia)³⁰ (Table 1).

Overall Quality Assessment

More than half of the cross-sectional prevalence studies (54% n=15/28) scored as 'high' quality and remaining were of moderate quality^{7 12 15-17 19 26 28 30 35 37 40 41}. Similarly, three analytical studies were rated as moderate quality^{21 32 33} and the two qualitative studies were rated as one high and one of moderate quality^{36 38}. None of the studies were rated as poor quality. The results of the quality assessment scores are presented in Table 1 and details is presented in Appendix 2.

1 **Table 1: Characteristics of studies included (n=33)**

2

Author, Year, Country	Study Design and Setting	Participant Characteristics	Health Outcomes (Measurement Tools)	Key Findings	QA Scores
Health risk and experiences related issues					
Dhakal et al, 2020, Nepal	Hospital record data evaluated from the hospital data in Nepal (January – July, 2019)	Returnees migrant participants – 44 Gender – Male – 95% (n=42) Age – Mean age 37.2 years	Healthcare access and prevalence of Chronic Kidney Disease (CKD)	<ul style="list-style-type: none"> - Workers with health insurance 68.2% (95% CI 52.4-81.3) (n=30) - Underwent for routine health check-ups annually 20.4% (95% CI 9.8-35.3) (n=9) - No regular health check-up 79.5% (95% CI 64.7-90.0) (n=35) - Exposed to chemicals 27.3% (95% CI 14.9-42.7) (n=12) - Patients were unknown about cause of CKD 77.3% (95% CI 62.1-88.5) (n=34) - Had diabetic nephropathy .13.6% (95% CI 5.1-27.3) (n=6) - Death due to kidney failure (n=1) 	Moderate
Khaled and Gray, 2019, Qatar	Cross-sectional survey, February 2016	Migrant workers in Qatar Total participants – 2520 Nepalese – 26% (n=655) Gender-NR Age - NR	Depressive symptoms	<ul style="list-style-type: none"> - Compared to Arabs, Nepalese migrant experienced 4%, increase in the predicted probability of depressive symptoms, for every unit increase in perceived quality of life. 	Moderate
Regmi et al, 2019, Nepal	Qualitative Study (data collected in 2017)	Returnee migrants in Nepal from Qatar, Saudi Arab, Malaysia, Oman, UAE Sampled - 20	Various health issues	<ul style="list-style-type: none"> - Unfair treatment and discrimination at work - Poor working and living arrangements – dirty toilets and bathrooms - Lack of security, loneliness and poor social life at work place/social isolation - Mental health problems – tensions, anxiety and attempt to suicide and poor access to mental health services - Poor communication facilities - Only formality of pre-departure training package – contents good but poor implementation 	Moderate
Adhikary et al. 2019, Nepal	Qualitative study (July to September, 2011)	Returnee migrants, interviews conducted interviews in Nepal – 20 Male – All Mean age – 31.3 years	Workplace accidents among Nepali male workers in Qatar, Saudi Arabia and Malaysia.	<p>Work place related issues:</p> <ul style="list-style-type: none"> - Not safe workplace - High work pressure - No medical supports from employer in host country - Long working hours, mostly without timely food and drinking water resulting in dehydration and heat stroke - Communication difficulty due to language barriers 	High

Author, Year, Country	Study Design and Setting	Participant Characteristics	Health Outcomes (Measurement Tools)	Key Findings	QA Scores
				<ul style="list-style-type: none"> - Injuries and accidents related issues - Fall from the roof, trapped in the hole - Injured back bone, legs, hands and head - Life-long disability 	
Pradhan et al, 2019, Nepal	Retrospective analysis of Government of Nepal provided data (2009 – 2017)	Nepali migrant workers in Qatar Total sample – 1354 Gender –NR Age – NR	Analysed the deaths of Nepalese migrant workers	Causes of death due to: <ul style="list-style-type: none"> - Cardiovascular –42% (95% CI 39.5-42.8) (n=571) - Suicide – 8.5% (95% CI 7.1-10.1) (n=116) - Workplace accident – 12.4% (95% CI 10.7-14.3) (n=169) - Road traffic accident – 10.1% (95% CI 8.5-11.8) (n=137) - Murder – 1.7% (95% CI 1.0-2.5) (n=23) - Natural/others reasons for death – 25% (95% CI 22.6-27.3) (n=338) 	Moderate
Adhikary et al, 2018, Nepal	Cross-sectional questionnaire-based survey	Male Nepalese construction workers, worked in host countries (Malaysia, Qatar and Saudi Arabia) for >6 months. Total participants – 403 Age - NR	Self-reported health and wellbeing status	13.2% (95% CI 10.0-16.8) (n=53) reported poor/very poor health, relating to: <ul style="list-style-type: none"> - Age older than 40 year reported as poor health (OR= 3.0, 95% 1.0-9.0) - Poor work environment (OR= 6.8, 95% CI 3.2 – 14.6) - Health risks at work (OR= 4.7, 95% CI 2.1-10.5) - Prevalence of mental health issues was 23% overall - strong link between perceived health risks and mental health status. 	Moderate
Adhikary et al; 2017, Nepal	Cross-sectional questionnaire-based survey	Male Nepalese construction and factory workers, worked >6 months in Malaysia, Qatar or Saudi Arabia. Total participants – 423 Age -NR	Self-reported perceived health risks and accidents at work	Poor or very poor work environment (rated by the workers) associated with greater perceived health risk at work (OR 2.5, 95% CI=1.5-4.4) Prevalence of accidents at work=17% <ul style="list-style-type: none"> - Variables associated with accidents at work included: >Age 40 and above vs 20-29 (OR= 4.0, 95% CI=1.7-9.7) - Not Satisfied accommodation vs satisfied with accommodation (OR=1.9, 95% CI=1.1-3.4) - Poor or very poor work environment vs good/good to fair environment (OR 3.5, 95% CI=1.8-6.7) - Working in Middle-East vs Malaysia. (OR .3.6, 95% CI=1.5-8.5) Not registered with a doctor vs registered (OR=0.3, 95% CI=0.1-0.7)	Moderate
Simkhada et al, 2017, Nepal <i>[Data for GCCs and Malaysia</i>	Retrospective analysis of NGO collected data (July 2009 to July 2014)	Returnee Nepalese female migrant workers from GCC and Malaysia Total participants-942 GCC=933	Various health issues while working in GCC, middle-east and Malaysia	Proportion female with health problems - 24% (95% CI 21.3-26.8) (n=226) <ul style="list-style-type: none"> - Abuse at workplace -37% (95% CI 33.6-39.9) (n=346) - Accident at workplace - 1.1% (95% CI 0.5-1.2) (n=10) - Mental health problem - 8.3% (95% CI 6.6-10) (n=78) 	Moderate

Author, Year, Country	Study Design and Setting	Participant Characteristics	Health Outcomes (Measurement Tools)	Key Findings	QA Scores
<i>provided by the authors</i>	via Paurakhi Nepal (NGO)	Malaysia=9 Median age 31 (IQR 37) Age range – 14-51 years	(prevalence calculated using information available from client Information Form/Sheet)	<ul style="list-style-type: none"> - Torture or maltreatment at the workplace 30.9% (95% CI 27.9-33.9-) (n=291) - Pregnancy at work place - 3.1% (95% CI 2.1-4.3) (n=29) - Sexual abuse – 51.7% (95% CI 32.5-70.5) (n =15/29) - Physical harm -10.9% (95% CI 9.0-13.1) (n=103) <p>Received health services – 10.8% (95% CI 8.9-12.9) (n=102)</p>	
Irfan et al, 2016, Qatar	Cross-Sectional study (June 2012-May 2013)	Patients attending to the emergency medical service in Qatar Total participant – 447 Nepalese – 11.6% (n=52) Gender-NR Age – Median age 51 years (range 39-66 years)	Proportion of out of hospital cardiac arrest	Out-of-hospital cardiac arrest among Nepalese migrant patients – 11.6% (95% CI 8.8-14.9) (n=52). No further data.	High
Min et al, 2016, Malaysia	Retrospective cross-section of routine healthcare data (January 2011 to December 2013)	Patients attending to the eye casualty with work-related ocular injuries, in Hospital Sultan Ismail in Johor Bahru, Malaysia Total 440 work-related ocular traumas. Nepalese – 21.7% (n=33) Gender –NR Age - NR	Work related ocular traumas	33 cases of Nepalese work-related eye injuries. Causes range from open globe injuries due to being hit by a machine, nail, wood and metal whilst grinding.	High
Al-Thani et al, 2015, Qatar	Retrospective analysis of hospital trauma registry records 2010-2013 Hamad Trauma Centre	Total migrant participants - 2015 Nepalese –28% (n=563) Male – 98% (n=1972) Female –2% (n=43) Age – NR	Proportion of occupational injuries and mortality cases	Overall proportion of occupational injury cases – 27.9% (n= 563), of which <ul style="list-style-type: none"> - Falls from height – 52.4% (95% CI 48.1-56.5) (n=295) - Fall of a heavy object – 20.4% (95% CI 17.1-24) (n= 115) - Motor vehicle crashes injuries - 17% (95% CI 14.2-20.6) (n=97) - Machinery injuries - 5% (95% CI 3.1-6.9) (n= 27) - Others – 5% (95% CI 3.4-7.3) (n=29) 	Moderate
Latifi et al, 2015, Qatar	Retrospective analysis of routine healthcare data	Total traffic related pedestrian injuries (TRPI) patients – 601 Total Nepalese expat TRPI patients – (n=147) Gender –NR Age – NR	Pedestrian morbidity and mortality	<ul style="list-style-type: none"> - 25.4% (95% CI 21.0-18.0) of TRPI were of Nepalese migrant workers (vs 16.0% of the general population of Qatar being Nepalese). - 51.4% of TRPI with positive blood alcohol were Nepalese migrant workers. 	High

Author, Year, Country	Study Design and Setting	Participant Characteristics	Health Outcomes (Measurement Tools)	Key Findings	QA Scores
Joshi et al, 2014, Nepal	Cross-sectional study	Nepalese migrants with experience of >6 months in Qatar, Saudi Arabia or United Arab Emirates. Total participants – 408 Males – 92.4% (n=377) Aged between 26-35 – 53.4% (n=218)	Knowledge of HIV/AIDS and risk perceptions	Risk perceptions of HIV/AIDS: - Concerned about HIV/AIDS – 90% (95% CI 86.3-92.4) (n=366) - Perceived themselves at high risk of being infected due to their sexual activities - 59.2% (n=397) Sexual behaviour: - 17.2% (95% CI 13.6-21.1) (n=70) had sexual intercourse with a partner other than their spouse during the last 12 months of their stay abroad.	Moderate
Kavarodi et al, 2014, Qatar	Population-based cross-sectional study	Low income expatriate workers from Indian sub-continent (living in Qatar for >6 months) Total participants – 3,946 Nepalese – 5.4% (n=213) Gender – NR Age - NR	Clinical prevalence of suspected oral lesions	- Oral Lesions in of Nepalese workers 4.7% (95% CI 2.1-7.8) (n=10).	High
Alswaidi et al, 2013, Saudi Arabia	Review of Ministry and Health data from Saudi expat worker fitness screening programme (1997–2010)	Total number of registered expatriate workers - 4 272 480 Nepalese – 0.9% (n=38 908). Females – 14% (n=5 367) Males – 86% (n=33 541) Age – NR	Proportion of 'unfit' to workers.	Cases of unfitness among Nepalese workers by gender: - Unfit males – 1.99% (95% CI 1.8-2.1) (n=669) - Unfit females – 1.2% (95% CI 0.9-1.5) (n=64) - Overall unfit – 1.9% (95% CI 1.7-2.0) (n=733) Nepalese migrants were the third most unfit population. Nepalese migrants as proportion of all those with: - Infectious causes of unfitness (incl. hepatitis, HIV, TB) – 1.6% (n=379) - Non-communicable causes of unfitness – 5.3% (n= 354)	High
Joshi et al, 2011, Nepal	Cross-sectional questionnaire survey, Kathmandu (International Airport and nearby hotels/lodges).	Returnee Nepalese male and female migrant workers from Qatar, Saudi Arabia and UAE (n=408) Male = 377 (92.4%) Female = 31 (7.6%) Mean Age (SD) – 32 (6.5) years Age ranges – 18-53 years	Prevalence of health problems using self-reported/questionnaire survey	Prevalence of health problem(s) – 56.6% (95% CI 51.6-61.4) (n=231) - Most common problems: - Headache or fever - 30.7% (95% CI 24.8-37.1) (n=71) - Respiratory symptoms - 21.2% (95% CI 16.1-27.0) (n=49) - Musculoskeletal problems – 19.9% (95% CI 14.9-25.6) (n=46) - Gastrointestinal illness – 19.5% (n=45) - Injuries/poisoning – 13.9% (95% CI 9.6-18.9) (n=32) Prevalence of some type of injury or accident at their workplace - 25% (95% CI 20.8-29.5) (n=102)	High

Author, Year, Country	Study Design and Setting	Participant Characteristics	Health Outcomes (Measurement Tools)	Key Findings	QA Scores
				<ul style="list-style-type: none"> - Health insurance in host countries- 36.5% (95% CI 31.8-41.4) (n=149) - Sought health services or treatment in the working countries- 83.1% (95 % CI 42.1-51.0) (n=192) - Lack of provision of leave during health problem(s)- 48.7% (n=19) 	
Infectious diseases related issues					
Al-Awadhi et al, 2019, Kuwait	Retrospective analysis of routine healthcare data (2015 to 2017)	Migrant workers in Kuwait Total examined participants – 1000 Nepalese – 3.3% (n=33) Age - NR Gender-NR	Prevalence of T solium by screening blood using a sensitive taeniasis-specific anti-rES33 antibody assay.	<ul style="list-style-type: none"> - 6.1% (95% CI 0.7-20.0) (n=2) of Nepalese migrant worker sample tested for T Solium taeniasis-specific IgG antibodies 	High
Sahimin et al, 2019 Malaysia	Cross-sectional study (September 2014 – August 2015)	Migrant workers from manufacturing, services, agriculture and plantation, construction and domestic work sectors in Malaysia Total participants - 610 Nepalese -(n=103) Gender – NR Age - NR	Measure prevalence of <i>E. dispar</i> and <i>E. histolytica</i>	<ul style="list-style-type: none"> - <i>E. dispar</i> 4.9% (95% CI 1.4-12.2)and <i>E. histolytica</i> infections 3.7% 95% CI (0.8-10.4) 	High
Sahimin et al, 2018, Malaysia	Cross-sectional study	Migrant workers in Malaysia. Total stool samples examined – 388 Nepalese –20.9% (81) Gender –NR Age - NR Gender –NR Age - NR	Prevalence of <i>Giardia duodenalis</i> and <i>Cryptosporidium parvum</i>	<ul style="list-style-type: none"> - <i>Giardia duodenalis</i> 1.8% [0.7–3.7] and <i>Cryptosporidium parvum</i> 0.3 [0.0–1.4] respectively 	High
Dafalla et al, 2017, UAE	Cross-sectional survey conducted at public health clinic	Immigrant workers – food handlers, babysitters, housemaids, drivers working in Sarjaha, UAE Total participants– 21,347 (number of Nepalese workers not reported) Total infected population –3.3% (n=708) Gender –NR Age – NR	Prevalence of parasitic infections (Examined microscopically and screened for intestinal parasites)	<ul style="list-style-type: none"> - Proportion of infected migrant workers that are Nepalese – 6.2% (95% CI 4.5 – 8.2) (n=44) - All protozoal infections: 7% (95% CI 5.9 – 8.6) (n=33) - All helminth infections: 4.2% (95% CI 9.8 – 35.3) (n=9) 	Moderate

Author, Year, Country	Study Design and Setting	Participant Characteristics	Health Outcomes (Measurement Tools)	Key Findings	QA Scores
Noordin et al, 2017, Malaysia	Cross-sectional survey (September 2014 to August 2015)	484 migrant workers from manufacturing, services, agriculture and plantation, construction and domestic work sectors. Nepalese – 21.3% (n=103) Gender –NR Age – NR	Prevalence of parasitic infections	- Sero-prevalence of brugian Lymphatic Filariasis [BmR1] – 2.9% (95% CI 0.6 – 8.2) (n=3) - Prevalence of parasitic infections (BmSXP) –12.6% (95% CI 6.8 – 20.6) (n=13)	Moderate
Sahimin et al, 2017, Malaysia	Correctional survey (Sept. 2014- Aug. 2015)	484 migrant workers Nepalese respondents- 20.5% (n = 99) Conducted at five working sectors (manufacturing, construction, plantation, domestic and food services)	Sero-prevalence T. gondii through Questionnaire survey and laboratory blood tests	Sero-prevalence: - IgG – 74.7% (95% CI 65.0 – 82.9) - IgM – 6.1% (95% CI 2.3 – 12.7)	High
Woh et al, 2017, Malaysia	Cross-sectional study	Healthy, asymptomatic migrant food handlers. Total participants – 317 Nepalese – 25.2% (n=80) Gender –NR Age – NR	Prevalence of Salmonella carriers, using stool samples	- Prevalence of salmonella amongst Nepalese migrant food handlers – 3.7% (95% CI 0.7 – 10.5) (n=3)	Moderate
Abu-Madi et al, 2016a, Qatar	Retrospective analysis of routine healthcare data (2005 to 2014)	Records held at Hamad Medical Corporation data-base for subjects referred for stool examination Total participants - 29,286 Nepalese – 4.8% (n=1429) Gender –NR Age - NR	Proportion of helminth infections positive cases.	- Highest proportion of helminth infections among Nepalese workers – 15.3 % (95% CI 13.39–17.12)	High
Abu-Madi et al, 2016b, Qatar	Retrospective analysis of routine healthcare data	Recently arrived migrant workers in Qatar Total participants – 2,486 Nepalese – 15% (n=373) Gender –NR Age - NR	Presence of intestinal parasites (helminths and protozoa)	Proportion of positive cases in Nepalese migrant workers: - Helminths combined - 6.2% (95% CI 3.8–9.6) - Hookworms - 4.3% (95% CI 2.4–7.3) Protozoa combined - 13.7% (95% CI 10.0–18.2)	Moderate
Humphery et al, 2016, Qatar	Community-based survey, Doha	Total participants– 126 Nepalese – 29.3% (n=37) All male population Median age (IQR) in years = 33 (27–39)	Prevalence of gastrointestinal pathogens (detected using polymerase chain reaction)	- Total prevalence of gastrointestinal pathogens = 62.7% (95% CI 53.6 – 71.1) (n=79) - Gastrointestinal pathogens amongst Nepalese migrant workers – 26.6% (95% CI 10.6 – 24.3) (n=21)	Moderate

Author, Year, Country	Study Design and Setting	Participant Characteristics	Health Outcomes (Measurement Tools)	Key Findings	QA Scores
Woh et al, 2016, Malaysia	Cross-sectional survey (October 2014 to May 2015)	Migrant food handlers living in Malaysia Total participants – 383 Nepalese – 24.8% (n=95) Gender – NR Age - NR	Knowledge and practices regarding the food handlings	Mean knowledge scores on: - Symptom of foodborne illness among Nepalese migrant – M = 18.4%, SD = 28.8 - food cleanliness and hygiene – M= 73.1%, SD = 15.3 Proportion of food handling practices among Nepalese migrant – - Poor practices - 21.9% (n=7) - Moderate – 14.3% (n=32) - Good – 43.8% (n=56)	Moderate
Imam et al, 2015, Qatar	Retrospective analysis of routine healthcare data (January 2006 and December 2012)	Patients with suspected or confirmed tuberculous meningitis. Total participants – 80 Nepalese – 37% (n=30) Gender –NR Age - NR	Clinical presentation, diagnosis, treatment, outcome, and the incidence of adult tuberculous meningitis	- 30/80 patients with tuberculous meningitis were Nepalese (37.5% (95% CI 26.9-49.0). No further data.	High
Chattu and Mohammad, 2013, Saudi Arabia	Retrospective analysis of routine healthcare data from Qassim region (January 2005 to December 2009)	Migrant workers (n= 165) Male – 42% (n=70) Female –58% (n=95) Age - NR	Proportion of reported TB cases, using laboratory test	- Proportion of migrant workers with tuberculosis from Nepal: 7% (95% CI 3.8-12.3) (n=12).	Moderate
Abu-Madi et al, 2011, Qatar	Cross-sectional survey (June – September, 2009)	Patients resident in Qatar who were randomly recruited and conducted survey – 1538 Nepalese – 15.3% (n=236) Gender – Male – 98.3% (n=232) Female – 1.7% (n=4) Age – mean age 28.2 years	Prevalence of intestinal parasitic infections among food handlers and housemaids)	Prevalence of all types of parasitic infections (species) – 29.7%, (95% CI 25.51 - 34.15) - Helminths – 23.7%, (95% CI 19.91-27.98) - Hookworms – 17.8%, (95% CI 14.40-21.73) - A. lumbricoides – 2.5%, (95 CI 1.40-4.50) Prevalence of all Protozoa – 9.7%, (95% CI 7.23-12.93) - B. hominis – 3%, (95% CI 1.69-5.01) - Prevalence of non-pathogenic: - Amoebae – 3%, (95% CI (.69-5.01) - G. duodenalis – 3.4%, (95% CI 2.02-5.52)	High
Ibrahim et al, 2009, Qatar	Community based survey, Alkhor hospital.	anti-HEV IgG Nepalese migrants nationally – 86 58 of these seen at Alkhor Hospital. Gender –NR	Prevalence of Hepatitis E (using ELISA test) and other clinical symptoms	Prevalence of acute HEV amongst those seen at Alkhor Hospital – 74% (95% CI 60.9-84.7) (n=43) - admitted to hospital – 95.3% (95% CI 84.1-99.4) (n=41)	Moderate

Author, Year, Country	Study Design and Setting	Participant Characteristics	Health Outcomes (Measurement Tools)	Key Findings	QA Scores
		Aged 26.7 (SD-5.6, range 19–41 years)			
Chan et al, 2008, Malaysia	Cross-sectional survey conducted in a plantation and detention camp of Malaysia	Total foreign migrant workers - 501 Nepalese – 5% (n=26) Gender –NR Age - NR	<i>Toxoplasma gondii</i> IgG and IgM seroprevalence	- Prevalence of <i>Toxoplasma gondii</i> IgG – 46.2% (95% CI 26.5-66.6) (n=12) - Prevalence of <i>Toxoplasma gondii</i> IgM – 11.5% (95% CI 2.4-30.0) (n=3)	High
Al-Marri, 2001, Qatar	Population-based retrospective analysis (January 1996 to December 1998)	Total cases of positive <i>M. tuberculosis</i> culture and sensitivity – 406 Nepalese migrant cases – 11% (n=44) Gender –NR Age - NR	Drug resistant cases of TB (where positive isolates identified)	- Of total 386 cases of pulmonary TB (321 expats) identified, 11% (95% CI 7.9-14.2) n= 44, Nepalese cases of TB, of which 9 cases were drug resistant.	High

3

4 **Discussion**

5 To our knowledge, this is the most comprehensive review of the health and well-being
6 status/issues of the Nepalese migrant workers in the GCC countries and Malaysia. The resultant
7 lack of disaggregated demographic data means that the overall characteristics of Nepalese
8 participants is difficult to determine. The dissonance between issues covered in the peer-
9 reviewed and grey literature for this population, namely in national and international media
10 and in government reports, is notable. Disproportionately few studies focused on occupational
11 mental, and sexual health of migrant workers.

12

13 ***Occupational Health***

14 Our review identified seven papers focusing on occupational morbidity, mortality and fitness
15 to work in the destination countries^{15 20 32 35 36 39}. Only three of these focused solely on Nepalese
16 migrants, and none compared occupation or working conditions with morbidity and mortality
17 experienced^{32 36 35}. This a crucial gap in the literature and further studies are needed to guide
18 policy change. There has been widespread media coverage of the poor working conditions
19 faced by Nepalese migrant workers and health impacts of these conditions are highlighted by
20 the plight of manual labourers working for the forthcoming 2022 FIFA Qatar World Cup. Close
21 to a fifth of labour migrants to Malaysia, Qatar and Saudi Arabia had experienced a workplace
22 accident³². According to a Nepalese government report, there were circa 7,467 deaths among
23 Nepalese migrant workers abroad between 2008/09 and 2018/19, and over 40% of the deaths
24 were deemed either of natural or other/unidentified cause³. Despite these workers being young
25 (mean age 29 years) and fit (assessed by health screening both at home and destination
26 countries), the magnitude of the proportion of these deaths is unusual in these groups³. This
27 raises questions about robustness of post-mortem investigative practices and classification
28 methodologies, a concern highlighted by both the Nepalese government and civil society
29 groups⁴³. Indeed, Pradhan et al suggest that many deaths attributed to cardiovascular diseases
30 and ‘natural causes’ correlate with longer hours worked in high temperatures in this setting³⁵.
31 It is worth noting that Nepalese migrant workers themselves are not oblivious to these
32 occupational risks- those who reported a poor or very poor work environment were found to
33 be 3.5 times more likely to suffer a workplace accident³².

34

35

36

37 ***Mental Health***

38 Five studies in the review reported on mental health issues. Adhikari et al (2018) reported that
39 almost a quarter of labour migrants to Malaysia, Qatar and Saudi Arabia had experienced
40 mental health issues, with a strong positive correlation between perceived health risk in the
41 work environment and mental health status³³. The qualitative study by Regmi et al (2019)
42 highlighted various mental health problems among the workers including loneliness, anxiety,
43 and attempt to suicide³⁸. Similar findings were reported in a cross-sectional study of 5000
44 migrant workers in Shanghai, where 21% reported mental disorders such as obsessive-
45 compulsive disorder, anxiety, and hostility⁴⁴.

46 The Nepalese government report suggests that suicide is a significant cause of mortality in
47 labour migrants to GCC countries and Malaysia, and there is evidence that mental health is an
48 underexplored issue facing this population⁴⁵⁻⁴⁷. Only one of the study in this review looked at
49 the suicide cases with nearly 10% of the deaths in these workers resulting from suicide³⁵. The
50 paucity of peer-reviewed studies exploring risk factors of poor mental status and psychiatric
51 morbidity for this population requires urgent attention.

52 Migration for work is a time of significant turmoil: new language, new culture and poor
53 working conditions. Loss of protective familial and wider social networks exacerbate feelings
54 of homesickness, loneliness and hopelessness that commonly develop amongst this
55 population⁴⁸⁻⁵⁰. Psychiatric under-diagnosis is common in deprived populations and is
56 compounded by poor screening of those with pre-existing psychiatric conditions⁵¹⁻⁵⁴. The result
57 is lack of mental health support and omission of medications in destination contexts that can
58 worsen conditions. Most common psychiatric morbidity in this population centred around
59 depressive and anxiety-related disorders, although the impact of addiction particularly of
60 alcohol consumption remains underexplored^{47 55-57}. The impacts of labour migration on the
61 mental health of left-behind families is also important, but beyond the scope of this review⁴⁵
62 ⁵⁸.

63 ***Sexual Health***

64 Only a single study in this review examined sexual health issues amongst this population and
65 exploring HIV/AIDS knowledge, attitudes and perceptions amongst Nepalese migrant
66 workers. Joshi et al; (2014) reported that over 17% had had sexual intercourse with someone
67 other than their spouse or partner during the final 12 months of their stay abroad³⁴. This
68 highlights higher levels of sexual risk taking behaviour, echoed by studies focusing on
69 Nepalese migrants to India, which showed widespread use of local female sex-workers by male

70 Nepalese migrant populations, multiple sexual partners and low levels of condom use. Whilst
71 there may be differences between the Indian and GCC or Malaysian contexts, the authors note
72 there is a clear dearth of evidence around non-HIV/AIDS related sexual health of these
73 migrants, and the impact of this on left-behind families^{59 60}. Similar findings also revealed from
74 the studies in Bangladesh and China among migrant workers at high risk of heterosexual HIV
75 acquisition^{61 62}.

76

77 ***Infectious Disease***

78 Out of 33 studies, 17 studies focused on migrant workers in a destination country and provided
79 minimal disaggregated analysis on the Nepalese sub-population. Majority of these were done
80 as a part of arrival screening and focus on infectious diseases were conducted from a destination
81 country perspective. Overwhelmingly, the discussion sections of these studies focused on
82 Nepalese migrant workers as potential vectors for transmitting infectious diseases to native
83 population. This health security framing overlooks Nepalese labour migrants as a vulnerable
84 population by virtue of their poor socioeconomic status in their origin country as well poor
85 working and living conditions, and poor access to healthcare in destination countries^{5 63 64}.
86 Similar findings were also reported in a study from Singapore where a relatively high
87 prevalence of malaria, hepatitis and tuberculosis was reported among migrant workers in
88 Singapore⁶⁵. Migrant workers in South Asia generally appear to have a greater prevalence of
89 infectious diseases due to the complex interaction of several factors- this includes higher
90 prevalence of infectious diseases in their native countries together with aforementioned poor
91 access to healthcare and low socioeconomic status⁶. Acknowledgment and consequent
92 introduction of policies to improve these structural drivers of infectious diseases amongst
93 Nepalese migrants would be a more holistic approach that might both better protect the local
94 population and improve the health and wellbeing of the vulnerable migrant population⁶⁶.

95 ***Literature Gap for Female Migrant Workers***

96 Women comprise only 7% of Nepalese labour migrant abroad⁵. However, the role of women
97 in the migration story is far more significant and complex than this figure betrays with regards
98 to true numbers of women migrating, roles of women 'left behind' and how it has influenced
99 gender norms in Nepalese society. The complex interplay between various factors such as
100 socio-cultural norms, women's role in decision-making, and freedom to mobility reflect on
101 their health from access to sexual and reproductive health services to gender-based violence⁶⁷.
102 Just one study has previously attempted to capture health outcomes among female migrants⁷.

103 They highlighted that almost a quarter of female Nepalese migrants faced multiple health
104 problems and over 40% had faced workplace abuse, with close to half of the 3% that reported
105 becoming pregnant whilst away doing so as a result of sexual abuse⁷.

106 Female labour migration from Nepal has increased significantly over the past decade, driven
107 by increasing demands in primarily GCC destination countries, poor agricultural employment
108 opportunities and a slowly-changing gender norms⁶⁸. One third of remittances to Nepal are
109 from female migrant workers^{7 69}. Higher proportion (90%) of female labour migrants are
110 undocumented workers in Gulf countries and this may have resulted from the restrictive
111 governmental labour migration policies such as prohibition of women to work in the Gulf
112 domestic sector⁷⁰. Precarious channels of migration bring greater risks of exploitation and harm
113 to health⁷¹, yet neither the peer-reviewed literature in health, nor do wider literatures reflect the
114 magnitude of these issues. More work is required on the health of Nepalese female migrants
115 abroad, as well the challenges in reintegration that they face on their return⁶⁸.

116 *Strengths and Limitations*

117 This review has several strengths. As mentioned earlier, the review is the most comprehensive
118 review to date on this population. As GCC and Malaysia are the most attractive destinations
119 for migration, the findings of this review will have important research implications in terms of
120 highlighting the research gap on specific health problems of migrant workers in general as well
121 as the lack of research focus on female migrant workers. This review also has important
122 practical implications, such as informing the design of culturally appropriate care and outreach
123 for Nepalese workers. Secondly, not restricting studies based on particular health outcomes,
124 peer reviewed studies looking at a range of health issues in this population were included.
125 Screening of studies and quality assessment was conducted by two independent reviewers,
126 ensuring low risk of selection bias in this review. We applied research design specific quality
127 assessment tools, providing the accurate ratings of the articles. However, there were a number
128 of limitations. The review did not systematically include grey literature although a number of
129 key reports were used as reference points to compare to our findings from the peer-reviewed
130 literature. The risk of missed studies by only searching English language databases is noted,
131 particularly through exclusion of relevant Nepalese peer-reviewed journals. Also, recent
132 guidelines have been published on reporting of narrative synthesis without meta-analysis⁷²,
133 however these guidelines are more applicable for intervention studies, thus we have not used
134 these in this narrative systematic review. As the number of qualitative studies were very small

135 (n=2), we reported the key findings from these studies rather than conducting a separate meta-
136 synthesis.

137 **Conclusion**

138 This review identified a number of health issues among Nepalese migrant workers in the GCC
139 countries and Malaysia, namely those centred on occupational, mental and sexual health of
140 migrants, and infectious disease, together with health-related issues facing female labour
141 migrants. Whilst there are early signs that Nepal may be moving beyond its predominantly
142 remittance economy, there is no doubt that labour migration to Malaysia and the GCC countries
143 is the reality facing an entire generation of working age Nepalese. The studies identified by the
144 review highlight the need for improved health support, whether through regular health checks
145 in destination countries, more stringent policies and legislation around permissible working
146 conditions or better preparation for migration through more relevant pre-departure training.
147 The findings suggest the urgent need to progressive policy changes, both in Nepal and
148 destination countries, to better protect the health of labour migrants and improve their access
149 to essential health services and acceptable working conditions.

150 **Patient and public involvement** This review was conducted as a part of a project to develop
151 a culturally relevant intervention to support the health and wellbeing of Nepalese migrant
152 workers in GCC countries. Migrants workers were involved throughout the project duration,
153 including the formulation of research question for this systematic review.

154

155 **Authors Contribution:** PP and JC designed and supervised the study. PP wrote the review
156 protocol, conducted the literature search, and wrote the final draft of the manuscript. SW and
157 KK screened the articles, extracted the data, carried out quality assessment and contributed to
158 the initial drafts. PP, JC and AM obtained funding for the study. JC, AM and PS reviewed and
159 edited the manuscript. All authors read and approved the final manuscript.

160 **Funding:** This review was funded from Research England's institutional allocation from the
161 Global Challenges Research Fund (Reference Number G2626).

162 **Conflict of Interest:** None declared.

163 **Data Availability Statement:** All relevant data are provided in the manuscript or uploaded
164 as supplementary information.

References

- 166 1. UN. The sustainable development goals report 2019. 2019 ed. New York: United Nations,
167 2019.
- 168 2. IOM. World migration report 2020: International Organization for Migration, 2019.
- 169 3. MLESS. Nepal labour migration report 2020. Kathmandu, Nepal: Ministry of Labour
170 Employment and Social Security, 2020.
- 171 4. NDHS. Nepal Demographic and Health Survey 2016. Kathmandu: Ministry of Health and
172 Population (MoHP) Nepal and ICF International Inc 2017.
- 173 5. Joshi S, Simkhada P, Prescott GJ. Health problems of Nepalese migrants working in three
174 Gulf countries. *BMC Int Health Hum Rights* 2011;11(3)
- 175 6. Mucci N, Traversini V, Giorgi G, et al. Migrant workers and physical health: An umbrella
176 review. *Sustainability* 2019;11(1):232.
- 177 7. Simkhada P, Van Teijlingen E, Gurung M, et al. A survey of health problems of Nepalese
178 female migrants workers in the Middle-East and Malaysia. *BMC Int Health Hum Rights*
179 2018;18(4)
- 180 8. Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA statement for reporting systematic
181 reviews and meta-analyses of studies that evaluate health care interventions:
182 explanation and elaboration. *Journal of clinical epidemiology* 2009;62(10):e1-e34.
- 183 9. JBI. The Joanna Briggs Institute critical appraisal tools for use in JBI systematic reviews:
184 Checklist for systematic reviews and research syntheses, 2017.
- 185 10. Farsani SF, Brodovicz K, Soleymanlou N, et al. Incidence and prevalence of diabetic
186 ketoacidosis (DKA) among adults with type 1 diabetes mellitus (T1D): a systematic
187 literature review. *BMJ open* 2017;7(7):e016587.
- 188 11. Evans C, Tweheyo R, McGarry J, et al. Crossing cultural divides: A qualitative systematic
189 review of factors influencing the provision of healthcare related to female genital
190 mutilation from the perspective of health professionals. *PloS One*
191 2019;14(3):e0211829.
- 192 12. Abu-Madi MA, Behnke JM, Boughattas S, et al. Helminth infections among long-term-
193 residents and settled immigrants in Qatar in the decade from 2005 to 2014: temporal
194 trends and varying prevalence among subjects from different regional origins. *Parasites*
195 *& Vectors* 2016;9(1):153.
- 196 13. Abu-Madi MA, Behnke JM, Ismail A, et al. Assessing the burden of intestinal parasites
197 affecting newly arrived immigrants in Qatar. *Parasites and Vectors* 2016;9(619)
- 198 14. Al-Marri M. Pattern of mycobacterial resistance to four anti-tuberculosis drugs in
199 pulmonary tuberculosis patients in the state of Qatar after the implementation of DOTS
200 and a limited expatriate screening programme. *The Int J of TB and Lung Disease*
201 2001;5(12):1116-21.
- 202 15. Al-Thani H, El-Menyar A, Consunji R, et al. Epidemiology of occupational injuries by
203 nationality in Qatar: evidence for focused occupational safety programmes. *Injury*
204 2015;46(9):1806-13.
- 205 16. Humphrey JM, Ranbhise S, Ibrahim E, et al. Multiplex polymerase chain reaction for
206 detection of gastrointestinal pathogens in migrant workers in Qatar. *American J of Trop*
207 *Med and Hygiene* 2016;95(6):1330-37.
- 208 17. Ibrahim AS, Alkhal A, Jacob J, et al. Hepatitis E in Qatar imported by expatriate workers
209 from Nepal: Epidemiological characteristics and clinical manifestations. *J of Med*
210 *Virology* 2009;81(6):1047-51.
- 211 18. Imam YZ, Ahmedullah HS, Akhtar N, et al. Adult tuberculous meningitis in Qatar: a
212 descriptive retrospective study from its referral center. *European Neurology* 2015;73(1-
213 2):90-97.

- 214 19. Kavarodi AM, Thomas M, Kannampilly J. Prevalence of oral pre-malignant lesions and its
215 risk factors in an Indian subcontinent low income migrant group in Qatar. *Asian Pac J*
216 *Cancer Prev* 2014;15(10):4325-9.
- 217 20. Latifi R, El-Menyar A, Al-Thani H, et al. Traffic-related pedestrian injuries amongst
218 expatriate workers in Qatar: a need for cross-cultural injury prevention programme. *Int*
219 *J of Injury Control and Safety Promotion* 2015;22(2):136-42.
- 220 21. Khaled SM, Gray R. Depression in migrant workers and nationals of Qatar: An exploratory
221 cross-cultural study. *International Journal of Social Psychiatry* 2019;65(5):354-67.
- 222 22. Irfan FB, Bhutta ZA, Castren M, et al. Epidemiology and outcomes of out-of-hospital
223 cardiac arrest in Qatar: A nationwide observational study. *International Journal of*
224 *Cardiology* 2016;223:1007-13.
- 225 23. Abu-Madi MA, Behnke JM, Ismail A, et al. Comparison of intestinal parasitic infection in
226 newly arrived and resident workers in Qatar. *Parasites & Vectors* 2011;4(1):211.
- 227 24. Chan B, Amal RN, Noor Hayati M, et al. Seroprevalence of toxoplasmosis among migrant
228 workers from different Asian countries working in Malaysia. *Southeast Asian J of Trop*
229 *Med and Public Health* 2008;39(1):9.
- 230 25. Min NN, Vasudevan SK, Jasman AA, et al. Work-related ocular injuries in Johor Bahru,
231 Malaysia. *International Eye Science[Article]* 2016;16(3):416-22.
- 232 26. Noordin R, Mohd Zain SN, Yunus MH, et al. Seroprevalence of lymphatic filariasis among
233 migrant workers in Peninsular Malaysia. *Transactions of The Royal Society of Trop*
234 *Med and Hygiene* 2017;111(8):370-72.
- 235 27. Sahimin N, Lim YA, Ariffin F, et al. Socio-demographic determinants of *Toxoplasma*
236 *gondii* seroprevalence in migrant workers of Peninsular Malaysia. *Parasites and*
237 *Vectors* 2017;10(1):238.
- 238 28. Woh PY, Thong KL, Behnke JM, et al. Characterization of nontyphoidal *Salmonella*
239 isolates from asymptomatic migrant food handlers in Peninsular Malaysia. *J Food*
240 *Protection* 2017;80(8):1378-83.
- 241 29. Sahimin N, Lim YA, Noordin R, et al. Epidemiology and immunodiagnostics of
242 *Strongyloides stercoralis* infections among migrant workers in Malaysia. *Asian Pacific*
243 *Journal of Tropical Medicine* 2019;12(6):250.
- 244 30. Woh PY, Thong KL, Behnke JM, et al. Evaluation of basic knowledge on food safety and
245 food handling practices amongst migrant food handlers in Peninsular Malaysia. *Food*
246 *Control* 2016;70:64-73.
- 247 31. Sahimin N, Douadi B, Lim ALY, et al. Distribution of *Giardia duodenalis* (Assemblages A
248 and B) and *Cryptosporidium parvum* amongst migrant workers in Peninsular Malaysia.
249 *Acta Tropica* 2018;182:178-84.
- 250 32. Adhikary P, Sheppard ZA, Keen S, et al. Risky work: Accidents among Nepalese migrant
251 workers in Malaysia, Qatar and Saudi Arabia. *Health Prospect* 2017;16(2):3-10.
- 252 33. Adhikary P, Sheppard ZA, Keen S, et al. Health and well-being of Nepalese migrant
253 workers abroad. *Int J of Migration, Health and Social Care* 2018;14(1):96-105.
- 254 34. Joshi S, Prescott GJ, Simkhada P, et al. Knowledge and risk perceptions about HIV/AIDS
255 among Nepalese Migrants in Gulf Countries: a cross-sectional study. *Health Science*
256 *Journal* 2014;8(3):350-60.
- 257 35. Pradhan B, Kjellstrom T, Atar D, et al. Heat stress impacts on cardiac mortality in Nepali
258 migrant workers in Qatar. *Cardiology* 2019;143(1):37-48.
- 259 36. Adhikary P, Keen S, Van Teijlingen E. Workplace accidents among Nepali male workers
260 in the Middle East and Malaysia: A qualitative study. *Journal of immigrant and*
261 *minority health* 2019;21(5):1115-22.
- 262 37. Dhakal N, Shah D. SAT-136 Chronic kidney disease in migrant workers in Nepal. *Kidney*
263 *International Reports* 2020;5(3):S58.

- 264 38. Regmi PR, Aryal N, Van Teijlingen E, et al. Nepali migrant workers and the need for pre-
265 departure training on mental health: a qualitative study. *Journal of Immigrant and*
266 *Minority Health* 2019;1-9.
- 267 39. Alswaidi F, Memish Z, Al Hakeem R, et al. Saudi Arabian expatriate worker fitness-
268 screening programme: a review of 14 years of data. *Eastern Medit Health J*
269 2013;19(7):664-70.
- 270 40. Chattu VK, Mohammad A. Tuberculosis an important global health issue in this era-a cross
271 sectional study of epidemiology of TB among South Asian workers in Saudi Arabia.
272 *Indian J Public Health* 2013;4:278.
- 273 41. Dafalla AIA, Almuhairi SASO, AlHosani MHJ, et al. Intestinal parasitic infections among
274 expatriate workers in various occupations in Sharjah, United Arab Emirates. *Rev Inst*
275 *Med Trop Sao Paulo* 2017;59(e82)
- 276 42. Al-Awadhi M, Iqbal J, Ahmad S. Cysticercosis, a Potential Public Health Concern in
277 Kuwait: A New Diagnostic Method to Screen Taenia solium Taeniasis Carriers in the
278 Expatriate Population. *Medical Principles and Practice* 2019 doi: DOI:
279 10.1159/000504625
- 280 43. Patisson P. Majority of Nepal migrant deaths “should be treated as murder”, Global
281 development. The Guardian [Internet]. The Guardian. 2014 .
282 [https://www.theguardian.com/global-development/2014/may/20/nepal-migrant-](https://www.theguardian.com/global-development/2014/may/20/nepal-migrant-deaths-treated-murder)
283 [deaths-treated-murder](https://www.theguardian.com/global-development/2014/may/20/nepal-migrant-deaths-treated-murder) (21 October, 2019, date last accessed). 2014
- 284 44. Yang H, Gao J, Wang T, et al. Association between adverse mental health and an unhealthy
285 lifestyle in rural-to-urban migrant workers in Shanghai. *J Formosan Medl Assoc*
286 2017;116(2):90-98.
- 287 45. JPAN. Migrant worker and mental health in Nepal. *J Psych Assoc of Nepal* 2014;1(1)
- 288 46. Poudel A. Mental health of migrant workers is a pressing issue, but it has been ignored
289 [Internet]. [https://kathmandupost.com/valley/2019/05/18/mental-health-of-migrant-](https://kathmandupost.com/valley/2019/05/18/mental-health-of-migrant-workers-is-a-pressing-issue-but-it-has-been-ignored)
290 [workers-is-a-pressing-issue-but-it-has-been-ignored](https://kathmandupost.com/valley/2019/05/18/mental-health-of-migrant-workers-is-a-pressing-issue-but-it-has-been-ignored) (21 October, 2019, date last
291 accessed), 2019.
- 292 47. Chapagai M, Pant S, Tulachan P, et al. Psychiatric morbidity among repatriated Nepalese
293 foreign labor migrants-a hospital based study. *J Instit Med* 2017;41(1)
- 294 48. Maselko J. Social epidemiology and global mental health: expanding the evidence from
295 high-income to low-and middle-income countries. *Current Epid Reports*
296 2017;4(2):166-73.
- 297 49. Weston G, Zilanawala A, Webb E, et al. Long work hours, weekend working and
298 depressive symptoms in men and women: findings from a UK population-based study.
299 *J Epid Com Health* 2019;73(5):465-74.
- 300 50. Donini A. Social suffering and structural violence: Nepali workers in Qatar. *Int Dev Policy*
301 2019:178-99. <http://journals.openedition.org/poldev/3077> (24 October, 2019, date last
302 accessed).
- 303 51. Murphy JM, Olivier DC, Monson RR, et al. Depression and anxiety in relation to social
304 status: A prospective epidemiologic study. *Archives of General Psychiatry*
305 1991;48(3):223-29.
- 306 52. Lao CK, Chan YM, Tong HHY, et al. Underdiagnosis of depression in an economically
307 deprived population in Macao, China. *Asia-Pacific Psychiatry* 2016;8(1):70-79.
- 308 53. Pulkki-Råback L, Ahola K, Elovainio M, et al. Socio-economic position and mental
309 disorders in a working-age Finnish population: the health 2000 study. *The European J*
310 *of Public Health* 2011;22(3):327-32.
- 311 54. Pocock NS, Chan Z, Loganathan T, et al. Moving towards culturally competent health
312 systems for migrants? Applying systems thinking in a qualitative study in Malaysia and
313 Thailand. *PloS One* 2020;15(4):e0231154.

- 314 55. Poudel KC, Jimba M, Okumura J, et al. Migrants' risky sexual behaviours in India and at
315 home in far western Nepal. *J Trop Med Hyg* 2004;9(8):897-903.
- 316 56. Bam K, Thapa R, Newman MS, et al. Sexual behavior and condom use among seasonal
317 Dalit migrant laborers to India from Far West, Nepal: a qualitative study. *PLoS One*
318 2013;8(9):e74903.
- 319 57. Simkhada PP, Regmi PR, Van Teijlingen E, et al. Identifying the gaps in Nepalese migrant
320 workers' health and well-being: a review of the literature. *J of Travel Med* 2017;24(4)
- 321 58. Aryal N, Regmi PR, van Teijlingen E, et al. Adolescents left behind by migrant workers: a
322 call for community-based mental health interventions in Nepal. *WHO South-East Asia*
323 *J of Public Health* 2019;8(1):38-41.
- 324 59. Aryal N, Regmi P, Teijlingen E, et al. Knowing is not enough: migrant workers' spouses
325 vulnerability to HIV. *SAARC J TB, Lung Diseases and HIV/AIDS* 2016;13(1):9-15.
- 326 60. Thapa S, Bista N, Hannes K, et al. Vulnerability of wives of Nepalese labor migrants to
327 HIV infection: integrating quantitative and qualitative evidence. *Women and Health*
328 2016;56(7):745-66.
- 329 61. Urmi AZ, Leung DT, Wilkinson V, et al. Profile of an HIV testing and counseling unit in
330 Bangladesh: majority of new diagnoses among returning migrant workers and spouses.
331 *PloS One* 2015;10(10):e0141483.
- 332 62. Ning C, Jiang J, Ye L, et al. Comparison of three intervention models for promoting
333 circumcision among migrant workers in western China to reduce local sexual
334 transmission of HIV. *PloS one* 2013;8(9):e76107.
- 335 63. Seddon D, Adhikari J, Gurung G. Foreign labor migration and the remittance economy of
336 Nepal. *Critical Asian Studies* 2002;34(1):19-40.
- 337 64. Bhandari P. Relative deprivation and migration in an agricultural setting of Nepal. *Popn*
338 *and Envnt* 2004;25(5):475-99.
- 339 65. Sadarangani SP, Lim PL, Vasoo S. Infectious diseases and migrant worker health in
340 Singapore: a receiving country's perspective. *J of Travel Med* 2017;24(4)
- 341 66. Castelli F, Sulis G. Migration and infectious diseases. *Clinical Microb Infect*
342 2017;23(5):283-89.
- 343 67. Colombini M, Mayhew SH, Hawkins B, et al. Agenda setting and framing of gender-based
344 violence in Nepal: how it became a health issue. *Health Policy and Planning*
345 2015;31(4):493-503.
- 346 68. Gioli G, Maharajan A, M G. Neither heroines nor victims: Women migrant workers and
347 changing family and community relations in Nepal [Internet]. 2017.
348 <https://www.refworld.org/pdfid/5a1bf0374.pdf> (21 October, 2019, date last
349 accessed).2017.
- 350 69. TheWorldBank. Migration and remittances factbook 2016 advanced edition [Internet].
351 2016. [https://siteresources.worldbank.org/INTPROSPECTS/Resources/334934-
352 1199807908806/4549025-1450455807487/Factbookpart1.pdf](https://siteresources.worldbank.org/INTPROSPECTS/Resources/334934-1199807908806/4549025-1450455807487/Factbookpart1.pdf) (21 October, 2019, date
353 last accessed) 2016
- 354 70. WOREC. Women and migration. [Internet] 2012. [https://issuu.com/worecnepal
355 /docs/migration-and-women](https://issuu.com/worecnepal/docs/migration-and-women) (24 Nov, 2019, date last accessed)2012.
- 356 71. Pyakurel UP. Restrictive labour migration policy on Nepalese women and consequences.
357 *Sociology and Anthropology* 2018;6(8):650-56.
- 358 72. Campbell M, McKenzie JE, Sowden A, et al. Synthesis without meta-analysis (SWiM) in
359 systematic reviews: reporting guideline. *bmj* 2020;368.

360