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Medication use during pregnancy in Arab countries: A narrative review

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ABSTRACT

Pregnancy is an important event in women's life as it involves various physiological and anatomical alterations to match and accommodate with the development of the fetus. Due to c-morbidities and pregnancy related complications, pregnant women often requires medical management which includes medication use. We reviewed the literature for studies that assessed medication use among pregnant women in the Arabian countries. Prevalence of medication use among pregnant women from Arabian countries varied from 40% to 98.2%. The most commonly used medications were vitamin and supplements, analgesics, antibiotics, and herbal medicines. The most frequently reported justification for self-medication were: inconvenience, less expensive, previous experience with disease, and that the diseases are not serious. In conclusion, the use of medications during pregnancy were found to be prevalent among pregnant women in the Arabian countries.

Keywords: medication, use, pregnancy, pregnant women, self-medication, Arab

INTRODUCTION

Pregnancy is an important event in women's life as it involves various physiological and anatomical alterations to match and accommodate with the development of the fetus [1]. These physiological changes can contributes in a variety of pregnancy-associated complications such as nausea, vomiting, headache, heartburn, and constipation. These complications usually requires medical management which includes medication use [2]. Also, women with co-morbidities like epilepsy, hypertension, and diabetes mellitus often requires medications to manage and control these illnesses [2]. Therefore, total avoidance of medication use in pregnancy is not feasible [3].

Although safety concerns of drugs are addressed and monitored throughout the different phases of clinical trials [4]. However, due to ethical consideration, the inclusion of pregnant women in clinical trials is not commonly practiced i.e. almost all medications are distributed in the market without establishing a concerted understanding of its safety profile in pregnant women population [5]. Subsequently, most information are obtained from case-reports, epidemiological studies, and animal studies [6]. Therefore, the aim of this review was to review the literature for studies that assessed medication use among pregnant women in the Arabian countries.

METHODS

To find studies that described the medication use during pregnancy, we searched PubMed database, and google scholar search engine for English-

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TABLE 1. User profile of studies on medication use among pregnant women from Arabian countries

Study	Country	Number of women	Mean age/ age groups (years)	Educational level	Employment status	Residence	Parity	Trimester
[3]	Saudi Arabia	760	20-30 (34.2%) 30-40 (44.7%) 40-50 (21.1%)	Illiterate (7.9%) Primary (6.6%) Secondary (18.4%) University (65.8%) Postgraduate (1.3%)	House-wife (81.6%) Student (1.3%) Health-related career employee (7.9%) Other employee (9.2%)	Rural (98.68%) Urban (1.31%)	First-time pregnancy (15.8%) 1–3 previous children (28.9%) More than 3 previous children (55.3%)	N/R
[9]	Oman	139	28 ± 5	No schooling (2.2%) Primary (15.8%) Secondary (44.6%) College (17.3%) Higher education (20.1%)	Employed (36) Unemployed (64)	N/R	Primigravidia (31.7%) Multigravida (68.3%)	1st trimester (7.2%) 2nd trimester (36%) 3rd trimester (56.8%)
[11]	Sudan	340	27.5 ± 6.1	Illiterate (27.4%) Other/unknown/ Not Reported (72.6%	N/R	Rural (40%) Urban (60%)	N/R	
[14]	UAE	210	20-24 (6.7%) 25-29 (75.2%) 30-35 (18.1%)	Illiterate (5.7%) High school certificate (32.4%) University degree (41%) Master degree (13.3%) PhD (7.6%)	N/R	N/R	1-3 children (80.5%) 4-6 Children (19.5%)	N/R
[13]	Palestine	218	28.1 ± 5.7	Elementary (40.8%) High school (39.9%) University (19.3%)	N/R	Village (70.2%) City (24.8%) Camp (5%)	N/R	1st trimester (6%) 2nd trimester (8.7%) 3rd trimester (67%) Unknown (18.3%)
[10]	Egypt	1050	20-30 (34.3%) 30-40 (34.3%) 40-50 (31.4%)	Illiterate (4.8%) Read and write (17%) High (30.5%) University (46.7%) Postgraduate (1%)	Employed (39%) Unemployed (61%)	Rural (46.7%) Urban (53.3%)	First-time pregnancy (11.4%) 1–2 previous children (41%) 3-4 previous children (27.6%) 5-6 previous children (10.5%) 7 or more (9.5)	Second Trimester (100%)
[8]	Yemen	74	28 ± 4.9 16-25 (52.5%) 26-35 (27.5%) 36-45 (17.5%)	Illiterate (47.5%) Primary (25%) Secondary and above (30%)	N/R	Village (65%) City (35%)	First-time pregnancy (35%) 1–3 previous children (22.5%) 4-6 previous children (30%) 7 or more (12.5%)	1st trimester (22.5%) 2nd trimester (32.5%) 3rd trimester (45%)
[7]	UAE	140	15-20 (2.1%) 21-25 (35%) 26-30 (36.4%) 31-35 (20.7%) 36-40 (10%) 41-55 (5.7%)	Primary/ secondary school (7.1%) High school (25%) University or college (63.6%) Others (4.3%)	Student (6.4%) Housewife (65.7%) Healthcare worker (8.6%) Employed in non- healthcare sector (16.4%) Others (2.9%)	N/R	First-time pregnancy (28.6%) 1 previous child (30.7%) 2 previous children (17.1%) More than 2 previous children (23.6%)	N/R
[12]	Libya	106	15-25 (26%) 26-35 (48%) 36-45 (26%)	Primary school (5%) Secondary school (17%) University (78%)	Students (14%) Housewife (48%) Healthcare provider (16%) Others (22%)	N/R	First-time pregnancy (18%) 1 previous child (17%) 2 previous children (12%) More than 2 previous children (53%)	1st trimester (22%) 2nd trimester (29%) 3rd trimester (49%)

N/R: Not Reported

language articles using a combination of the following terms, Medication; Use; During; Pregnancy; We also used the names of different Arab countries as search terms (including Bahrain, Egypt, Iraq, Sudan, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, United Arab Emirates, Libya, Morocco, Algeria, Mauritania, Djibouti, Somalia and Yemen). The inclusion criteria were studies that assessed medication use during pregnancy. We excluded studies published in non-English language, assessed medication use in non-pregnant populations, or studies conducted in non-Arab populations/countries.

RESULTS AND DISCUSSION

A total of nine studies were retrieved from the literature, one from each of the following countries: Saudi Arabia, Oman, Palestine, Egypt, Libya, Yemen, and Sudan. Also, two studies were conducted in the United Arab Emirates UAE [3,7-14]. All nine studies employed survey/questionnaires among pregnant women about medication use during pregnancy, other information regarding the source of information, or type of medication used by them (i.e. pregnant women). The sociodemographic profile of the pregnant women from studies included in this review are shown in (Table 1).

MEDICATION USE DURING PREGNANCY IN ARABIAN COUNTRIES

The prevalence of medication use among pregnant women from Arabian countries varied from 40% to 98.2%. (Figure 1), shows that the reported prevalence of medication use during pregnancy were 40%, 48-49%, 80%, and 98.2% in Saudi Arabia, Oman, Palestine, and Sudan respectively [3,9,11,13]. This inconsistency can be a result of several factors which includes the impact of sociodemographic characteristics, such education level, race, and occupational status of pregnant women [15, 16]. Also, the sociodemographic profiles of the pregnant women from the included studies on medication use during pregnancy in Arabian countries varied (Table 1). Besides, another factor is the cultural differences between countries, as it has been reported that different cultures can have a different impact on a patient's practice and attitude towards medications [15,17]. This variation of age, race, education level, residence, occupation, and other socioeconomic characteristics (Table 1) can explain the variability of the reported prevalence of medication use during pregnancy.

The most commonly used medication were: vitamin and supplements, analgesics, antibiotics, and herbal medicines (Table 2). The most commonly reported indication for using these medications were pain, heart burn, indigestion and ulcer. The use of vitamins specifically folic acid is considered safe during pregnancy also it is recommended to avoid fetal developmental abnormalities [18-20]. Paracetamol is one of the frequently common medication used by pregnant women [21]. In this context, the use of paracetamol during pregnancy is debatable as it has been shown that overdose can be associated with increased risk of fetal death and spontaneous abortion, neurodevelopmental problems, also it has been reported that early childhood wheezing and asthma is associated with maternal use of paracetamol during pregnancy [22,23]. However, no concerted conclu-

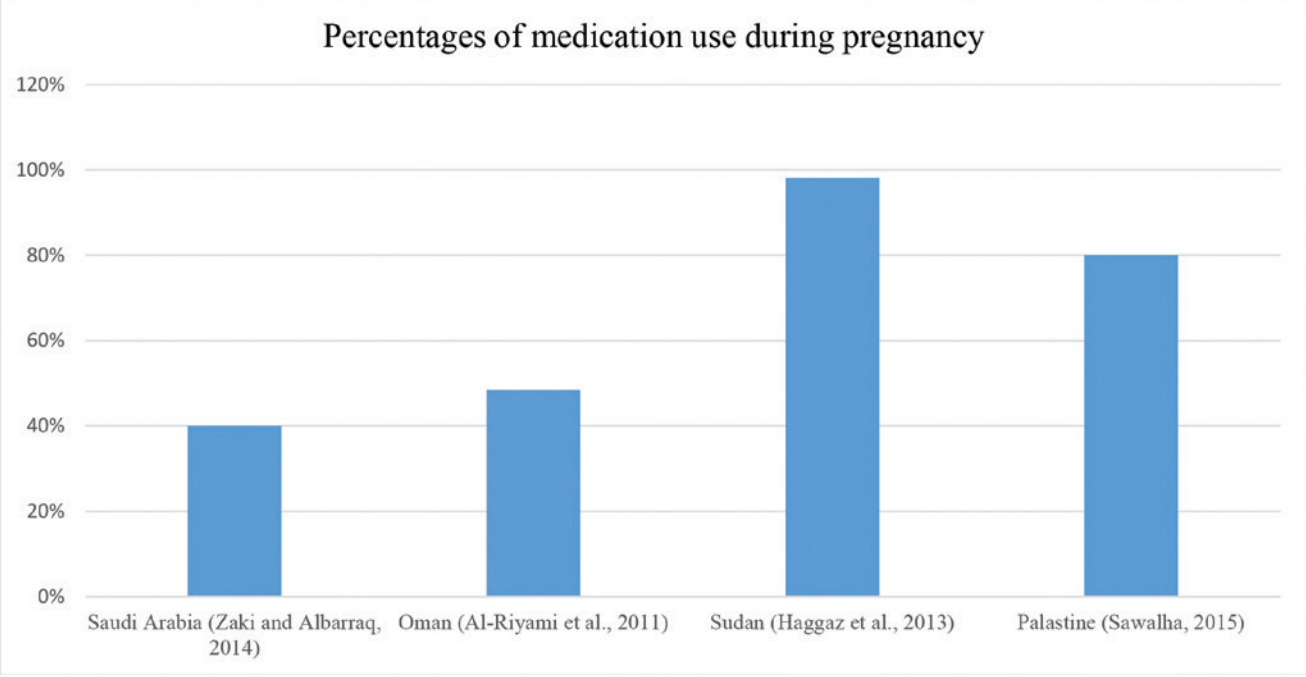

FIGURE 1. Percentages of medication use during pregnancy in different Arabian countries

TABLE 2. Prevalence and pattern of Medication use, reason, and sources of information among pregnant women from Arabian countries

Study	Medication commonly used	Indication or justification for medication use	Source of antibiotics	Source of information	Trimester in which medication used
[3]	Paracetamol (13.2%) Vitamins (13.2%) Antibiotics (2.6%) Herbal remedies (4.6%) Nausea/vomiting medications (2.6%) NSAIDs (1.3%) Antihistamines (1.3%) Heartburn medications (1.3%)	N/R	N/R	Gynecologist (58.1%) General practitioner (13%) Pharmacist (11%) The media, family and friends as well as the internet collectively contribute by 10%	N/R
[9]	Vitamin and supplements (84-95%) Herbal preparations (23.8%)	N/R	N/R	N/R	1st trimester (48%) 2nd trimester (49%) 3rd trimester (48%)
[11]	Tonics (93.8%) Antibiotics (37.6%) Antimalarial drugs (36.2%)	N/R	N/R	N/R	1st trimester (10.5%) 2nd trimester (11.3%) 3rd trimester (78.2%)
[14]	Vitamins and minerals (32.5%) Analgesics (17.5%) Antibiotics (12.5%)	N/R	Community pharmacy (70%) Leftovers of home pharmacy, herbal stores, friends/ relatives, or street markets (10% or less)		N/R
[13]	Vitamin and Supplements (More than half) OTC medications: Antipyretics (76.8%) Medications for the GIT problems (8.5%) Antibiotics (8.5%) POM: Antibiotics (39.6%) GIT medications (22.6%) POM analgesics (19.5%)	Pain Heart burn Ulcer Indigestion	N/R	N/R	N/R
[10]	Analgesics (44.8%) Vitamins (39%) Antipyretics (36.2%)	Lack of medicines at governmental hospitals OTC medication is cheaper than visiting private clinic	N/R	Pharmacists (22.7%) Internet and social media (20.9%) Family members (9.7%) Friends and personal experience (6.5%) Physician and nurses (3.2%)	Second trimester (100%)
[8]	Tramadol (57.5%) Paracetamol (47.5%) Herbal medicines (37.5%) Cough syrup (35%)	Diseases are not serious (35%) Less expensive (25%) Previous experiences (17.5%) Inconveniences at the clinic (12.5%)	Pharmacists (35%) Previous prescription (27.5%) Friend's advice (25%) OTC medications (12.5%)		N/R
[7]	Analgesia: Paracetamol (55.1%) Ibuprofen (10.3%) Vitamins and supplements: Folic acid (36.2%) Iron (28.6%) Calcium (28.6%)	N/R	N/R	N/R	N/R
[12]	Vitamins and minerals: Folic acid (83%) Multivitamins (75%) Iron (51%) Medications: Paracetamol (13%)	Previous experience with a medical condition and its drug management. Lack or the unavailability of nearby health facilities	N/R	N/R	N/R

N/R: Not Reported

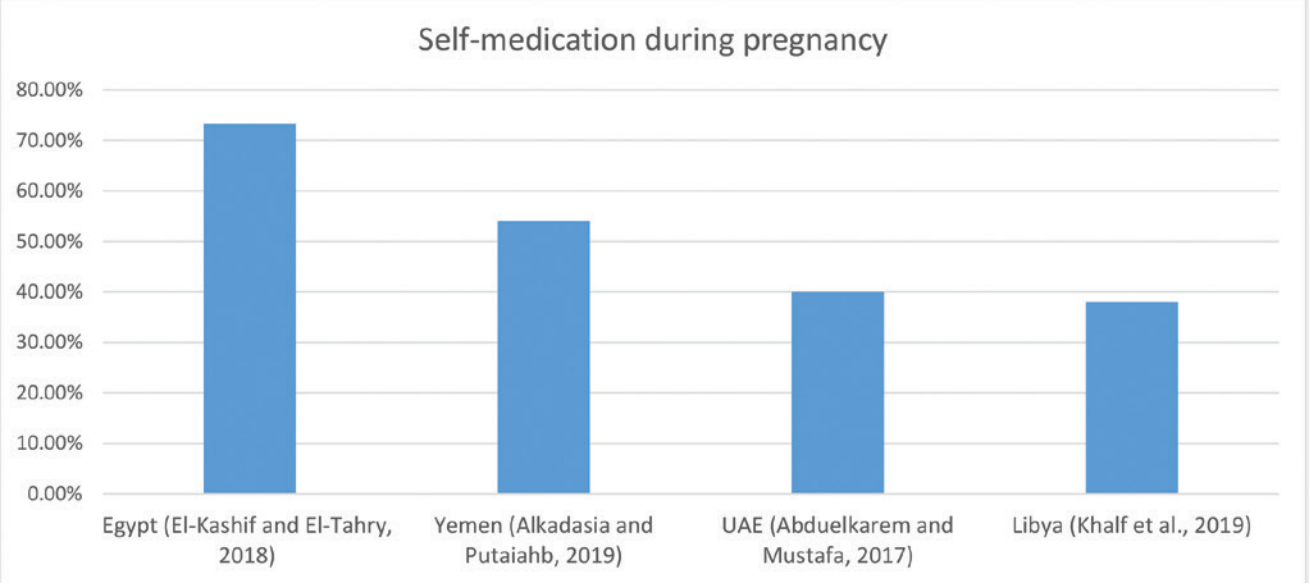

FIGURE 2. Percentages of self-medication during pregnancy in different Arabian countries

sion can be made on the relevance of these observations to humans [24-26]. To determine these observations as causal, it requires well designed cohort studies to confirm or reject these association.

Four studies have assess self-medication among pregnant women. (Figure 2) shows that self-medication during pregnancy happened in 83%, 73.3%, 54.1%, and 40% in Libya, Egypt, Yemen, and UAE respectively [7,8,10,12]. Recently, medication consumption among pregnant women became one of the major concerns, this is a result of self-medication practices that became more common in developed countries and among pregnant women [27]. Self-medication is the practice of obtaining and using of medications/drugs without a physician/practitioner's prescription to treat specific signs and symptoms [28,29]. Such practice (i.e. self-medication) can be associated with serious structural and functional adverse effects on the fetus health. Many factors can have an impact on self-medication practice such as: pregnant women's sociodemographic characteristics, knowledge, and perception about the risks of self-medication [30-34]. Evidently, sociodemographic factors can significantly impact the practice of self-medication [35]. Thus, this attitude (i.e. use of medication without prescription) can also be a result of the low level of knowledge and awareness about risks associated with self-medication during pregnancy [36,37]. Nevertheless, only few studies have assessed the knowledge, attitude, and practices KAP of pregnant women about medication use during pregnancy in the Arabian countries. Evidently, these studies showed an association between medication use and the educational background of pregnant women [3, 7]. However, the current review identified a paucity of studies regarding KAP of pregnant women towards medication use during pregnancy in Arabian countries. Finally, the lack of strict regulatory controls on selling and dispensing particular classes of medication can promote the phenomena of self-medication [38, 39]. With this regards, more than half 57.5% of women in Yemen have practiced self-medication with tramadol (Table 2). Tramadol is a prescription only medication and classified as Schedule-IV controlled substance by the United States U.S. Drug Enforcement Administration on a national level [40,41]. Moreover, it's prescription and administration should be avoided in pregnant women [42].

The most frequently reported justification for self-medication were: inconvenience, less expensive, previous experience with disease, and that the diseases are not serious. Convenience, previous experience, feeling that disease is mild, and cost saving are frequently reported reasons for self-medication by many populations in both developed and developing countries [34,43-45].

Herbal medicines consumption were reported by several studies included in the current review and its prevalence varied from 4.6% to 37.5%. Giving that most women in the studies were from rural regions, and had an education level lower than university (Table 1). Previous studies stated that higher usage of herbal preparations were identified in women resides in rural and with lower education level [2,46-48]. This can explains why usage of herbal medicine were reported frequently by some studies in this review.

With regards to the source of medication/drug related information, Gynecologist, physician and pharmacists were frequently reported as sources of information in the studies included in the current review (Table 2). This is comparable with an Italian study which reported that the majority (75.3%) of

their study participants received their information from a reliable sources of information as physicians were the most common source [49]. Also, an Iranian study reported that majority of pregnant women (59.5%) reported that the source of information were physicians [50]. Besides, pharmacists are one of the consistently reported sources of information in many populations [15,51,52]. Subsequently, pharmacy were the most commonly reported source of medication used by pregnant women (Table 2).

This review is one of the first reports to provide insights on the prevalence and consumption pattern of medication among pregnant women in the Arabian countries. However, there are limitations including the fact that identified prevalence in the current review may not represent the true prevalence due to the variations between the studies. Also, we found that the majority of the published literature was from eight countries and there was a paucity of studies assessing medication use among pregnant women from other several Arabian countries.

CONCLUSION

A widespread consumption of medication during pregnancy was observed among pregnant women in Arabian countries, similar to other parts of the world. Medication use during pregnancy can be affected by several factors including socio-demographic characteristics of pregnant women. However, there was a lack of studies that assessed determinants or predictors of medication use during pregnancy. A proper designed, multicentric, multinational studies that includes representative samples from several Arabian countries could provide an accurate estimate of the true prevalence in the region and could identify the predictors of medication use during pregnancy among pregnant women in Arabian countries.

DECLARATIONS

Conflict of interests

The authors have no conflicts of interest to declare.

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None.

Ethical considerations

Not applicable.

REFERENCES

1. Soma-Pillay P, Nelson-Piercy C, Tolppanen H, Mebazaa A. Physiological changes in pregnancy. **Cardiovasc J Afr.** 2016 Mar-Apr;27(2):89-94. doi: 10.5830/CVJA-2016-021. PMID: 27213856; PMCID: PMC4928162.
2. John LJ, Shantakumari N. Herbal Medicines Use During Pregnancy: A Review from the Middle East. *Oman Med J.* 2015 Jul;30(4):229-36. doi: 10.5001/omj.2015.48. PMID: 26366255; PMCID: PMC4561638.
3. Zaki NM, Albarraq AA. Use, attitudes and knowledge of medications among pregnant women: A Saudi study. *Saudi Pharm J.* 2014 Nov;22(5):419-28. doi: 10.1016/j.jsps.2013.09.001. Epub 2013 Oct 23. PMID: 25473330; PMCID: PMC4246410.
4. Yao B, Zhu L, Jiang Q, Xia HA. Safety monitoring in clinical trials. *Pharmaceutics*. 2013 Jan 17;5(1):94-106. doi: 10.3390/pharmaceutics5010094. PMID: 24300399; PMCID: PMC3834937.
5. Lupattelli A, Spigset O, Twigg MJ, Zagorodnikova K, Mårdby A-C, Moretti ME, et al. Medication use in pregnancy: a cross-sectional, multinational web-based study. *BMJ Open*. 2014 Feb 17;4(2):e004365. doi: 10.1136/bmjopen-2013-004365. PMID: 24534260; PMCID: PMC3927801.
6. Anitha B, Malavika S, Kumar B, Ramesh Y. Current trends in drugs avoided in pregnancy. *JDDT.* 2018 Nov;8(6):342-50. doi: 10.22270/jddt.v8i6.2035.
7. Abduelkarem AR, Mustafa H. Use of Over-the-Counter Medication among Pregnant Women in Sharjah, United Arab Emirates. *J Pregnancy.* 2017;2017:4503793. doi: 10.1155/2017/4503793. Epub 2017 Jul 19. PMID: 28804652; PMCID: PMC5540465.
8. Alkadasia MN, Putaiahb E. Study of self-medication among pregnant women and associations with socio-demographic data in Al-qaedah district, Ibb, Yemen. *JMRHS*. 2019 Feb;2(3):576-86. doi: 10.15520/jmrhs.v2i3.37.
9. Al-Riyami IM, Al-Busaidy IQ, Al-Zakwani IS. Medication use during pregnancy in Omani women. *Int J Clin Pharm.* 2011 Aug;33(4):634-41. doi: 10.1007/s11096-011-9517-y. Epub 2011 May 20. PMID: 21597985
10. El-Kashif MML, El-Tahry SE. An Assessment of the Factors Influencing the Use of over-the-Counter Medication during the Second Trimester of Pregnancy, Egypt. *IJN.* 2018 Aug;8(6):99-107. doi: 10.5923/j.nursing.20180806.01.
11. Haggaz A, Ahmed S, Gasim GI, Rayis DA, Adam I. Drugs use during pregnancy at Medani Maternity Hospital, Sudan. *Sudan J Med Sci.* 2013 Mar;8(1):13-6.
12. Khalf AM, Beshna E, Eshwika AM, Abuzebeda ES, Alkerbash S, Saad SE, et al. Evaluation of Pregnant Women Attitude Toward OTC Medications Use; A cross Sectional Study Conducted in Azawia Libya. *Lebda Med J.* 2019 Dec;6(1):238-43.
13. Sawalha AF. Consumption of prescription and non-prescription medications by pregnant women: a cross sectional study in Palestine. *Islam Univ J.* 2007 feb;15(2):41-57.
14. Sharif SI, Sharif RS. A study of medication use during pregnancy in Sharjah-United Arab Emirates. *Eur J Biomed Pharm Sci.* 2017 Mar;4:75-8.
15. Alani AHHDA, Hassan BAR, Suhaimi AM, Mohammed AH. Use, Awareness, Knowledge and Beliefs of Medication During Pregnancy in Malaysia. *Osong Public Health Res Perspect.* 2020 Dec;11(6):373-379. doi: 10.24171/j.phrp.2020.11.6.05. PMID: 33403200; PMCID: PMC7752143.
16. Bercaw J, Maheshwari B, Sangi-Haghpeykar H. The use during pregnancy of prescription, over-the-counter, and alternative medications among Hispanic women. *Birth*. 2010 Sep;37(3):211-8. doi: 10.1111/j.1523-536X.2010.00408.x. PMID: 20887537.
17. Shahin W, Kennedy GA, Stupans I. The impact of personal and cultural beliefs on medication adherence of patients with chronic illnesses: a systematic review. *Patient Prefer Adherence.* 2019 Jul 1;13:1019-35. doi: 10.2147/PPA.S212046. PMID: 31303749; PMCID: PMC6611718.
18. Gildestad T, Bjørge T, Haaland ØA, Klungsøyr K, Vollset SE, Øyen N. Maternal use of folic acid and multivitamin supplements and infant risk of birth defects in Norway, 1999-2013. *Br J Nutr.* 2020 Aug 14;124(3):316-329. doi: 10.1017/S0007114520001178. Epub 2020 Apr 2. PMID: 32238218.
19. Vollset SE, Refsum H, Irgens LM, Emblem BM, Tverdal A, Gjessing HK, et al. Plasma total homocysteine, pregnancy complications, and adverse pregnancy outcomes: the Hordaland Homocysteine study. *Am J*

Clin Nutr. 2000 Apr;71(4):962-8. doi: 10.1093/ajcn/71.4.962. PMID: 10731504.
20. Wolf HT, Hegaard HK, Huusom LD, Pinborg AB. Multivitamin use and adverse birth outcomes in high-income countries: a systematic review and meta-analysis. *Am J Obstet Gynecol.* 2017 Oct;217(4):404.e1-404.e30. doi: 10.1016/j.ajog.2017.03.029. Epub 2017 Apr 2. PMID: 28377269.
21. Werler MM, Mitchell AA, Hernandez-Diaz S, Honein MA. Use of over-the-counter medications during pregnancy. *Am J Obstet Gynecol.* 2005 Sep;193(3 Pt 1):771-7. doi: 10.1016/j.ajog.2005.02.100. PMID: 16150273.
22. Fan G, Wang B, Liu C, Li D. Prenatal paracetamol use and asthma in childhood: A systematic review and meta-analysis. *Allergol Immunopathol* (Madr). 2017 Nov-Dec;45(6):528-533. doi: 10.1016/j.aller.2016.10.014. Epub 2017 Feb 22. PMID: 28237129.
23. Petersen TG, Liew Z, Andersen AN, Andersen GL, Andersen PK, Martinussen T, et al. Use of paracetamol, ibuprofen or aspirin in pregnancy and risk of cerebral palsy in the child. *Int J Epidemiol.* 2018 Feb 1;47(1):121-30. doi: 10.1093/ije/dyx235. PMID: 29149272; PMCID: PMC5837591.
24. de Fays L, Van Malderen K, De Smet K, Sawchik J, Verlinden V, Hamdani J, et al. Use of paracetamol during pregnancy and child neurological development. *Dev Med Child Neurol.* 2015 Aug; 57(8):718-24. doi: 10.1111/dmcn.12745. Epub 2015 Apr 7. PMID: 25851072.
25. Golding J, Gregory S, Clark R, Ellis G, Iles-Caven Y, Northstone K. Associations between paracetamol (acetaminophen) intake between 18 and 32 weeks gestation and neurocognitive outcomes in the child: A longitudinal cohort study. *Paediatr Perinat Epidemiol.* 2020 May;34(3):257-266. doi: 10.1111/ppe.12582. Epub 2019 Sep 15. PMID: 31523834; PMCID: PMC7217049.
26. Trønnes JN, Wood M, Lupattelli A, Ystrom E, Nordeng H. Prenatal paracetamol exposure and neurodevelopmental outcomes in preschool-aged children. *Paediatr Perinat Epidemiol.* 2020 May;34(3): 247-56. doi: 10.1111/ppe.12568. Epub 2019 Aug 25. PMID: 31448449; PMCID: PMC8285062.
27. Abasiubong F, Bassey EA, Udobang JA, Akinbami OS, Udoh SB, Idung AU. Self-Medication: potential risks and hazards among pregnant women in Uyo, Nigeria. *Pan Afr Med J.* 2012;13:15. Epub 2012 Sep 19. PMID: 23308320; PMCID: PMC3527026.
28. Zafar SN, Syed R, Waqar S, Zubairi AJ, Vaqar T, Shaikh M, et al. Self-medication amongst university students of Karachi: prevalence, knowledge and attitudes. *J Pak Med Assoc.* 2008 Apr;58(4):214-7. PMID: 18655436.
29. Abasaeed A, Vlcek J, Abuelkhair M, Kubena A. Self-medication with antibiotics by the community of Abu Dhabi Emirate, United Arab Emirates. *J Infect Dev Ctries.* 2009 Aug 30;3(7):491-7. doi: 10.3855/jidc.466. PMID: 19762966.
30. Beyene KG, Beza SW. Self-medication practice and associated factors among pregnant women in Addis Ababa, Ethiopia. *Trop Med Health.* 2018 May 1;46:10. doi: 10.1186/s41182-018-0091-z. PMID: 29743807; PMCID: PMC5928590.
31. Gbagbo FY, Nkrumah J. Self-medication among pregnant women in two municipalities in the Central Region of Ghana. *Health Care Women Int.* 2021;42(4-6):547-562. doi: 10.1080/07399332.2020.1716235. Epub 2020 Jan 23. PMID: 31971891.
32. Yusuff KB, Omarusehe LD. Determinants of self medication practices among pregnant women in Ibadan, Nigeria. *Int J Clin Pharm.* 2011 Oct;33(5):868-75. doi: 10.1007/s11096-011-9556-4. Epub 2011 Sep 1. PMID: 21881933.
33. Liao S, Luo B, Feng X, Yin Y, Yang Y, Jing W. Substance use and self-medication during pregnancy and associations with socio-demographic data: a cross-sectional survey. *Int J Nurs Sci.* 2015 Feb ;2(1):28-33. doi: 10.1016/j.ijnss.2015.01.001.
34. Afshary P, Mohammadi S, Najar S, Pajohideh Z, Tabesh H. Prevalence and causes of self-medication in pregnant women referring to health centers in southern of Iran. *Int J Pharmaceutical Sci Res.* 2015 Feb;6(2):612. doi: 10.13040/IJPSR.0975-8232.6(2).612-19.
35. Arif Muhammed R, Al-Ani AHHDA, Omar Yassen A. Self-Medication with Antibiotic among Public Population in Erbil City. *J Pharm Res Int.* 2021 Sep;33(44B): 25-33.
36. Baghianimoghadam MH, Mojahed S, Baghianimoghadam M, Yousefi N, Zolghadr R. Attitude and practice of pregnant women regarding self-medication in Yazd, Iran. *Arch Iran Med.* 2013 Oct;16(10):580-3. PMID: 24093138.
37. Tuha A, Faris AG, Mohammed SA, Gobezie MY. Self-Medication and Associated Factors Among Pregnant Women Attending Antenatal Care at Kemisie General Hospital, North East Ethiopia. *Patient Prefer Adherence.* 2020 Oct 16;14:1969-1978. doi: 10.2147/PPA.S277098. PMID: 33116440; PMCID: PMC7584511.
38. Gebretekle GB, Serbessa MK. Exploration of over the counter sales of antibiotics in community pharmacies of Addis Ababa, Ethiopia: pharmacy professionals' perspective. *Antimicrob Resist Infect Control.* 2016 Jan 29;5:2. doi: 10.1186/s13756-016-0101-z. PMID: 26835006; PMCID: PMC4734870.
39. Rodrigues CF. Self-medication with antibiotics in Maputo, Mozambique: practices, rationales and relationships. P*algrave Commun.* 2020 Jan ;6(1):1-12. doi: 10.1057/s41599-019-0385-8.
40. Borrelli EP. Prescription controlled substance utilization: evaluating benzodiazepine dose intensity, development and application of a measurement framework, and use of tramadol among patients with higher risk. 2020.
41. Preuss CV, Kalava A, King KC. Prescription of controlled substances: benefits and risks. *StatPearls* [Internet]. 2019.
42. Subedi M, Bajaj S, Kumar MS, Yc M. An overview of tramadol and its usage in pain management and future perspective. *Biomed Pharmacother.* 2019 Mar;111:443-451. doi: 10.1016/j.biopha.2018.12.085. Epub 2018 Dec 27. PMID: 30594783.
43. Garofalo L, Di Giuseppe G, Angelillo IF. Self-medication practices among parents in Italy. *Biomed Res Int.* 2015;2015:580650. doi: 10.1155/2015/580650. Epub 2015 Jan 20. PMID: 25688359; PMCID: PMC4320888.
44. Shah SJ, Ahmad H, Rehan RB, Najeeb S, Mumtaz M, Jilani MH, Rabbani MS, et al. Self-medication with antibiotics among non-medical university students of Karachi: a cross-sectional study. *BMC Pharmacol Toxicol.* 2014 Dec 23;15:74. doi: 10.1186/2050-6511-15-74. PMID: 25534613; PMCID: PMC4320599.
45. Mohseni M, Azami-Aghdash S, Sheyklo SG, Moosavi A, Nakhaee M, Pournaghi-Azar F, et al. Prevalence and Reasons of Self-Medication in Pregnant Women: A Systematic Review and Meta-Analysis. *Int J Community Based Nurs Midwifery.* 2018 Oct;6(4):272-284. PMID: 30465000; PMCID: PMC6226611.
46. Cuzzolin L, Francini-Pesenti F, Verlato G, Joppi M, Baldelli P, Benoni G. Use of herbal products among 392 Italian pregnant women: focus on pregnancy outcome. *Pharmacoepidemiol Drug Saf.* 2010 Nov;19(11):1151-8. doi: 10.1002/pds.2040. PMID: 20872924.
47. Glover DD, Amonkar M, Rybeck BF, Tracy TS. Prescription, over-the-counter, and herbal medicine use in a rural, obstetric population. *Am J Obstet Gynecol.* 2003 Apr;188(4):1039-45. doi: 10.1067/mob.2003.223. PMID: 12712107.
48. Mothupi MC. Use of herbal medicine during pregnancy among women with access to public healthcare in Nairobi, Kenya: a cross-sectional survey. *BMC Complement Altern Med.* 2014 Nov; 14(1):1-8. doi: 10.1186/1472-6882-14-432.
49. Navaro M, Vezzosi L, Santagati G, Angelillo IF; Collaborative Working Group. Knowledge, attitudes, and practice regarding medication use in pregnant women in Southern Italy. *PLoS One.* 2018 Jun 19;13(6): e0198618. doi: 10.1371/journal.pone.0198618. PMID: 29920515; PMCID: PMC6007931.
50. Mashayekhi SO, Dilmaghanizadeh M, Fardiazar Z, Bamdad-Moghadam R, Ghandforoush-Sattari F. Study of awareness among pregnant women of the effects of drugs on the fetus and mother in Iran. *Health Policy.* 2009 Jun;91(1):89-93. doi: 10.1016/j.healthpol.2008.11.011. Epub 2009 Jan 6. PMID: 19128853.
51. Al-Ani AHHDA, Al-Ani SHHH, Rhand T Elkarib, Yousif. AO. Community pharmacists' knowledge about medication use in glucose-6-phosphate-dehydrogenase G6PD deficiency in Khartoum, Sudan: A descriptive study. *Pharma Innovation.* 2021 Jan;10(2):18-21. doi: 10.22271/tpi.2021.v10.i2a.5675.
52. Hassali MA, Shafie AA, Al-Qazaz H, Tambyappa J, Palaian S, Hariraj V. Self-medication practices among adult population attending community pharmacies in Malaysia: an exploratory study. *Int J Clin Pharm.* 2011 Oct;33(5):794-9. doi: 10.1007/s11096-011-9539-5. Epub 2011 Aug 3. PMID: 21811832.