

# A Systematic Review on the Prevalence of Postpartum Depression and the associated Risk Factors in Asia

## Authors

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## Abstract:-

### Background

Postpartum Depression is a major mental health concern affecting mothers and their infants. Various studies have been conducted across the Asian continent to estimate the prevalence and the risk factors associated with Postpartum Depression. The main objective of this current review is to determine the burden of postpartum depression in across the Asian continent to synthesize the important risk factors and to provide evidence-based data in order to prioritize maternal mental health and wellbeing. This review aims to assess the prevalence of Postpartum Depression in Asia and to ascertain risk factors for PPD in the period 2000-2020.

### Methods

The literature search was done using electronic database like PubMed, Elsevier, PlusOne, Research Gate and Google Scholar. Search terms like postnatal depression, postpartum depression, risk factors, Asian Mothers were used to find relevant literature.

### Result

Fifty-eight studies about postpartum depression were selected that were conducted across various Asian countries. The prevalence of postpartum depression varied widely due to the different cut off points and varying timelines used in different studies. 2 Studies in India (Gujarat and Karnataka) recorded the highest prevalence 48.50% and 46.90% respectively. 2 Studies conducted in Iran and Kuwait recorded the highest prevalence 40.40% and 45.90% respectively. 20 studies recorded a prevalence rate between 20%-40%. 6 studies estimated a prevalence less than 15%. The risk factors associated with PPD were classified under five different categories. They are 1.Socio-demographic variables, 2.Pregnancy and Birth Related Variables, 3.Infant Variables, 4.Family Relationships and Psychosocial factors.

### Conclusion

The review highlights the burden of Postpartum depression and recommends frequent screening for maternal distress in the last trimester of pregnancy and in the post-partum period needs to be carried out by health care workers when mothers come for their postnatal review or at the immunization clinics.

**Keywords:-** “Postpartum” or “Postnatal” or “Perinatal”, “Depression” or “Distress” “Prevalence” or “Incidence”, “India” and “Asia” and “Arabic Region”

## I. INTRODUCTION

A new-born can bring a whirlwind of excitement and but at the same time it can be one of the most stressful and tiresome phases for many mothers. As a woman transitions into the role of a mother, she witnesses a challenging period that involves significant psychological, social and physiological changes. The broad spectrum of postpartum psychiatric disorders can be divided into three categories: postpartum blues; postpartum psychosis and postpartum depression. (1,2) Postpartum blues, has a prevalence of 300–750 per 1000 mothers globally, may resolve in a few days to a week, has a minimal negative impact and usually requires only reassurance. (1) The American Psychological Association describes postpartum depression (PPD) as, “a serious mental health issue characterized by a prolonged period of emotional disturbance, occurring at a time of major life change and increased responsibilities in the care of a new-born infant”. The prevalence of PPD has been estimated as 100–150 per 1000 births. (3) A meta-analysis performed by WHO reports that the burden of perinatal mental health disorders is high in low- and lower-middle-income countries (1). It has also been difficult to establish prevalence of PPD because of underreporting by mothers themselves. Symptoms of PPD are often underestimated by both mothers and care providers as normal, natural consequences of childbirth. A meta-analysis in developing countries showed that the children of mothers with postpartum depression are at higher risk of being underweight and stunted growth. Moreover, mothers who are depressed are more likely not to breastfeed their babies and do not seek appropriate health care. (4) A World Health Report states that maternal depression results in lower birth weight of infants, higher rates of underweight at 6 months of age, poor long-term cognitive development, higher rates of antisocial behaviour and more frequent emotional problems among their children. (5) Despite the launch of India’s national mental health programme in 1982, maternal mental health is still not a significant part of the programme. There

is a deficit in dedicated maternal health services in health-care facilities, and health workers lack mental health training. The availability of mental health professionals is limited or non-existent in peripheral health-care facilities. In addition to that, there is currently no screening tool designed for use in clinical practice and no data are routinely collected on the proportion of perinatal women with postpartum depression. (6)

## II. OBJECTIVES & FEATURES

Our current understanding of the epidemiology of postpartum depression is largely based on a few regional studies. The main objective of this current review is to fill this gap, by providing an updated estimate of the burden of postpartum depression in across the Asian continent to synthesize the important risk factors and to provide evidence-based data for prioritizing maternal mental health and wellbeing. This review aims to assess the prevalence of PPD in Asia and to ascertain risk factors for PPD in these settings. Although systematic reviews were published based on studies from India, Arabic Region and other Asian countries individually for different time lines, there is no comprehensive review of postpartum depression prevalence and associated risk factors across the Asian continent for a vast time period of 2000-2020.

## III. METHODOLOGY

The literature search was done using electronic database like PubMed, Elsevier, PlusOne, Research Gate and Google Scholar. Search terms like postnatal depression,

postpartum depression, risk factors, Asian Mothers were used to find relevant literature. Studies were eligible for review if they a) were conducted in the period 2000-2020b) assessed the risk factors) conducted in Asia. Studies about treatment methods or interventions, studies about biological and genetic risk factors; studies about antepartum depression unless they were about both ante- and postpartum depression were excluded.

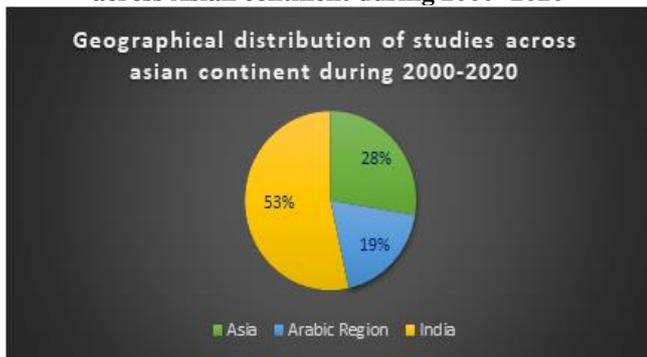
## IV. RESULTS

Fifty-eight studies about postpartum depression were selected that were conducted across various Asian countries. The studies are grouped under studies performed in India, in the Arabic Region and other Asian countries like Pakistan, Japan, China etc. It is to be noted that 31 studies from India, 11 studies from the Arabic region and 16 studies from other Asian countries were reviewed for this study. The special feature of this study is that studies conducted across a time span of 20 years (2000-2020) have been chosen for this systematic review. Of the 58 studies, the majority of 32 studies have been conducted in the very recent time period 2015-2020. It is significant to note that a maximum of 22 studies in the recent time period 2015-2020 were conducted in various states of India like Maharashtra, Madhya Pradesh, Delhi, Gujarat and Karnataka. 16 studies are chosen which fall under the time period 2010-2015. 8 studies have been conducted during 2000-2009. Moreover 55 out of 58 studies analysed the risk factors associated with PPD. Please refer to Table 1 indicating the number of studies contributed from three geographical regions India, Arabic Region and other Asian countries.

**Table 1: Geographic distribution and number of studies across India, Arabic Region & other Asian Countries during 2000-2020**

India		Arabic Region		Other Asian Countries	
Place of Study	No. of studies	Place of Study	No. of studies	Place of Study	No. of studies
Tamil Nadu	3	Riyadh	1	Srilanka	1
Pondicherry	1	Saudi Arabia	1	Pakistan	2
Kerala	2	Sudan	1	Philippines	1
Pondicherry	1	Jordan	1	China	2
Andhra Pradesh	3	Bahrain	1	Iran	3
Karnataka	5	Cyprus	1	Indonesia	1
Gujarat	4	Lebanon	1	Turkey	1
Goa	1	Laos	1	Maldives	1
Madhya Pradesh	2	Syria	1	Vietnam	1
Maharashtra	2	UAE	1	Oman	1
Delhi	2	Kuwait	1	Thailand	1
Nepal	3				
Assam	1				
Rajasthan	1				
Jharkhand & Orissa	1				

**Fig 1.1 showing the geographical distribution of studies across Asian continent during 2000 -2020**



### Time & Place of Recruitment

All the 58 studies recruited mothers in their postnatal period. Please refer Table 1 showing the Geographic distribution and number of studies across India, Arabic Region & other Asian Countries during 2000-2020. The initial screening was done in a range of 1-8 weeks. Some studies followed up participants until 12 months postpartum. Twenty-two studies from various states in India recruited mothers from Hospitals for the studies. 11 studies from Arabic Region and 11 studies from other Asian countries recruited mothers from Hospitals. It is also significant to note that 4 studies in China (8 centres), Saudi Arabia (5 centres), Sudan (2 centres) and Jordan (4 centres) performed multi-centre hospital studies. 12 studies were exclusively community based studies wherein 6 studies were conducted in India and 6 in other Asian countries. 2 studies conducted in Madhya Pradesh and Nepal recruited mothers from a combination of hospital and community.

### Study Design

Forty-two studies adopted a cross-sectional research design to estimate the prevalence of PPD. Longitudinal panel approach was adopted only by 9 studies wherein the mothers were screened for PPD multiple times in different time intervals to assess the level of depression. The other research designs used across the remaining studies used a case control study to determine the risk factors, Quasi-Experimental Study, observation study, randomised control trial.

### Sampling Size & Sampling Method

8 studies used the Probability Sampling Method wherein simple random sampling was used in 3 studies (Madhya Pradesh, Bahrain and Iran). Cluster sampling was used in a study conducted in Karnataka and Indonesia. Systematic Random Sampling was used in Assam. In a study conducted in Thailand, Stratified Multistage sampling was used for Stage 1 and Simple Random Sampling was used in Stage 2. 17 studies used the Non-probability Sampling techniques. It was used in 1 study conducted in Tamil Nadu, 1 conducted in Andhra Pradesh and 2 conducted in Gujarat. Convenient Sampling was used in studies conducted in Maharashtra, Pakistan, Jordan, Kuwait, Riyadh and Syria. Consecutive sampling was used in studies conducted in Karnataka, China and Vietnam. In many studies the small sample size became a major limitation to

generalise the results to the entire population. However, community studies when compared to hospital studies had a bigger sample size. There were exceptions like the study conducted in Thailand had a huge sample size of 1731 samples.

### Scale of Measurement

Out of 58 studies, 46 studies used Edinburgh Postpartum Depression Scale (EPDS) to screen postpartum Depression. However, different cut-off scores were used in different studies. A systematic review by Gibson et al. stated that cut-off points at 9/10 and 12/13 for PPD were widely accepted cut-off points to indicate possible and probable depression respectively. (7) The sensitivity of the English Version of EPDS was 86% and the specificity was 78%. However, different cut-off scores were used in different studies. In 15 studies, the cut-off score was calculated at  $\geq 13$ . In 4 studies the cut-off score used was  $> 13$ . 4 studies used a cut-off score  $\geq 12.7$  studies used a cut-off score  $> 12.6$  studies used a cut-off score  $\geq 10.1$  study used a cut-off score 10, 1 study used 10.5 and another study used a cut-off score 9. In a study conducted in Jordan, the EPDS score were classified as mild, moderate and severely depressed. The mild score range was calculated at 10-15, the moderate score range was calculated at 16-20 and the severe score range was calculated  $> 21$ . In India, the English Version of EPDS was translated to the regional languages like Tamil, Kannada, Gujarati and Assamese. In the other Asian countries like Thailand, the Thai version of EPDS scale was used. Arabic and Persian version of the scale was used in Arabic region. In a study conducted in Vietnam and Turkey, the Vietnamese and Turkish version of the scale was used accordingly. Please refer Table 2 showing the summary of the studies with prevalence and tools used

Apart from EPDS being used to screen postpartum depression, other tools were also used in some studies. In a study conducted in Andhra Pradesh, the Hamilton Rating scale for Depression. The screening categories were 0-8 : Low probability depression 8-12 : Baby blues 13-14 : Possibility of depression 15+ : Highly probability of depression. In a study conducted in Gujarat, Predictive Index for PPD was used to screen depression. The Kessler-10 item scale was used to screen depression in Jharkhand and Orissa. A combination of Brief Psychiatric Rating Scale (BPRS), Hamilton Anxiety Rating Scale (HARS), and Hamilton Rating Scale for Depression (HDRS) was used to screen depression in a study conducted in Delhi. In a study conducted in Pakistan, Aga Khan University Anxiety and Depression Scale (AKUADS) was used. A study conducted in Zabol (Iran) used Beck Depression Inventory to screen the level of PPD.

## V. PREVALENCE OF POSTPARTUM DEPRESSION

The prevalence of postpartum depression varied widely due to the different cut-off points and varying timelines used in different studies. Please refer Table 2 showing the summary of the studies with prevalence and tools used. 2 Studies in India (Gujarat and Karnataka)

recorded the highest prevalence 48.50% and 46.90% respectively. 2 Studies conducted in Iran and Kuwait recorded the highest prevalence 40.40% and 45.90% respectively. 6 studies estimated a prevalence less than 15%. Of the 6 studies, 4 of them were estimated in India (Tamil Nadu, Pondicherry, Gujarat and Delhi-Prevalence % 11%, 10.2%, 12.5% and 12% respectively) and 2 of the in China and Thailand (7.45% and 8.4% respectively). 20 studies recorded a prevalence rate between 20%-40%. 12 studies were conducted in India and 8 were conducted in other Asian countries like Pakistan, Philippines, Turkey, Vietnam, Iran, Bahrain Laos, Syria and Azerbaijan. The minimum rate of prevalence recorded was 20% in Gujarat and the maximum recorded was 40.4% in Iran.

8 studies were performed with a cut-off score of  $>10$ ,  $>10.5$  and  $\geq 10$ . One study conducted in Gujarat using a cut-off score of  $>10.5$  reported a high percentage of prevalence of 48.5%. 31 studies were conducted with the EPDS cut-off scores as  $\geq 11$ ,  $>12$ ,  $\geq 12$ ,  $\geq 13$ . One amongst these 31 studies was conducted in Indonesia in the year 2018 used a prospective longitudinal research design and the screening was performed at 1, 2 and 3 months postpartum. The percentage of prevalence was 18.37%, 15.19%, and 26.15% at one, two and three months respectively. Furthermore, there were 2 studies conducted in Karnataka and Srilanka using an EPDS score  $>9$ . The rate of prevalence in the study in Karnataka was recorded as 18%. In the study conducted in Srilanka, the samples were divided into S1 and S2. S1 recorded a prevalence of 15.5% and S2 AT 7.8%. One

study conducted in Jordan in 2013, had classified the level of depressive symptoms as mild - 10-15, moderate - 16-20, severe- $>21$ . The results were the number of mothers with mild symptoms were 39%, the number of mothers with moderate symptoms were 28% and the number of mothers with severe symptoms were 16%.

A study conducted in Madhya Pradesh estimated the prevalence using Patient Health Questionnaire (PHQ-9). It was a study based on Community and Facility. The percentage of prevalence in the community was 8.8% and the facility was 18.5%. A study conducted in Andhra Pradesh in 2016 had employed the Hamilton Rating scale for Depression to screen depressive symptoms and the cut off range for various stages were given as 0-8 : Low probability depression 8-12 : Baby blues 13-14 : Possibility of depression 15+ : Highly probability of depression. In a longitudinal study conducted in Oman, depressive symptoms were screened at 2 and 8 weeks postpartum with a prevalence rate of 13.5% and 10.5% respectively. This study reported that out of 236 mothers, 74 mothers (i.e) 31.4% of mothers had depressive symptoms. In a cross sectional study conducted in Karnataka, it was observed that the mothers who underwent C-Section had a prevalence rate of 20% when compared to the mothers who had vaginal birth had a prevalence of 16%. As mentioned earlier, the variation in the level of prevalence has been majorly based on the sample size, the tool used for measurement and the time period of evaluation (no. of weeks postpartum and the cut-off score).

**Table 2. showing the summary of the studies with prevalence and tools used**

Author and Place of Study	Setting	Research Design	Tools	Cut off score	Data collection period	No of women	No of mothers with PPD
India							
Latha et al(2017) Tamil Nadu	Hospital	Case control	EPDS(Tamil)	$>12$	2-3 days postpartum, 6-8 weeks postpartum	256	23%
Shriraam, et al(2019) Tamil Nadu	Hospital	Cross sectional	EPDS	$\geq 10$	6 weeks postpartum	365	11%
Chandran et al(2002) Tamil Nadu	Community	randomised placebo control trial	CIS-R(Tamil)	NA	last trimester, 6-12 weeks postpartum	359	11%
Poomalar GK et al(2014) Pondicherry	Hospital	Cross sectional	EPDS	$\geq 13$	NA	254	26(10.2%)
Santhosh Kuriakose et al(2020) Kerala	Hospital	Cross sectional	EPDS	$\geq 11$	2-4 weeks upto 1 year	250	27.60%
Heera Shenoy et al(2019) Kerala	Hospital	Cross sectional	EPDS	$>13$	2-6 weeks	119	35(29.4%)

Author and Place of Study	Setting	Research Design	Tools	Cut off score	Data collection period	No of women	No of mothers with PPD
Ch. Beaula Rani et al(2019) Andhra Pradesh	Community	Cross sectional	EPDS	NA	NA	100	30(30% - mild depression & 18% moderate depression)
P. Latha et al(2016) Andhra Pradesh	Hospital	Cross sectional	EPDS	NA	0-6 weeks	60	11(18.33%) of them had low probability of depression, 33(55%) of them had baby blues, 11(18.33%) of them had high probability of depression, 5(8.33) of them had possibility of depression
Lakshmi Bhuvana G et al(2016)Andhra Pradesh	Hospital	prospective observational study	Hamilton Rating scale for Depression	0-8 : Low probability depression 8-12 : Baby blues 13-14 : Possibility of depression 15+ : Highly probability of depression	1 week postpartum	236	74(31.4%)
Siddharudha Shivalli et al(2015) Karnataka	Hospital	Cross sectional	EPDS	$\geq 13$	4-10 weeks	118	31.40%
Avita Rose Johnson et al(2015) Karnataka	Hospital	Cross sectional	EPDS	$\geq 13$	6-8 weeks	123	46.90%
Anamika Agarwala et al(2019) Karnataka	Hospital	Cross sectional	EPDS	$\geq 10$	6 months	410	21.50%
Ganraj Bhat Sankapithilu et al(2010) Karnataka	Hospital	Cross sectional	EPDS	$>12$	0-3 months postpartum	100	20%(10)-C-SEC,16%(8)-Normal
Suguna A et al(2015) Karnataka	Hospital	Cross sectional	EPDS	$>9$	NA	180	18%
Desai Nimisha D et al(2012) Gujarat	Hospital	Cross sectional	EPDS	NA	upto 1 year postpartum	200	12.50%

Author and Place of Study	Setting	Research Design	Tools	Cut off score	Data collection period	No of women	No of mothers with PPD
Himadri L. Patel et al(2015) Gujarat	Hospital	Cross sectional	EPDS	>10.5	NA	134	48.50%
Vidhi Prakash Modi et al(2018) Gujarat	Hospital	Cross sectional	EPDS	(22-30)-10/4% (12-21)-16.4% <12-199(79.6%)	1-6 weeks	250	20.40%
Dr. Darshana Hirani(2015) Gujarat	Community	Cross sectional	EPDS	≥10	1-6 weeks	516	12.00%
Vikram Patel et al(2002) Goa	Hospital	NA	EPDS	NA	6-8 weeks and 6 months postpartum	270	59(23%)
Sujit D. Rathod(2018) Madhya Pradesh	Community & Facility	Cross sectional	EPDS	NA		224-Community & 130-Facility	8.8% - community & 18.5% - facility
Gita Guin et al(2018)Madhya Pradesh	Hospital	prospective observational study	EPDS	≥13	NA	500	64(12.8%)
Dhwani.Prakash. Sidhpura et al(2018) Maharashtra	Hospital	Observational Study	MKS & EPDS	≥10	6 weeks primiparous women	300	Mean Scores - s 1.58, 10.58 and 14.80 of upper, middle and lower SES women
Nikhil Dhande(2018) Maharashtra	Community	Cross sectional	EPDS	NA	1-6 weeks postpartum	67	24%
Saurav Basu et al(2019) Delhi	Hospital	Cross sectional	EPDS	≥10	less than 1 year infant	210	61(29%)
Adya Shanker Srivastava et al(2015) Delhi	Hospital	longitudinal study	BPRS,HARS,HDRS	NA	1st day to 4 weeks postpartum	100	12% depression,4% anxiety
Kamal Narayan Kalita et al(2010) Assam	Hospital	Cross sectional	EPDS	>13	6 weeks	100	

Author and Place of Study	Setting	Research Design	Tools	Cut off score	Data collection period	No of women	No of mothers with PPD
SIGNE DØRHEIM HO-YEN(2007) Nepal	Hospital and Community	Cross sectional	EPDS	>12	5-10 weeks	426	17%
N Shrestha et al(2015) Nepal	Community	cohort	EPDS	>13	6 weeks	200	20(10%)
Arju Chand Singh et al(2019) Nepal	Hospital	Cross sectional	EPDS	≥13		100	17%
Kirti Iyengar et al(2012) Rajasthan	Community	longitudinal study	EPDS	NA	6-8 weeks and 12 months	1542	
Audrey Prost(2012) Jharkhand & Orissa	Community	Cross sectional	Kessler-10 item scale	NA	6 weeks	5801	11.50%
<b>Arabic Region</b>							
Raneem Seif Al Nasr et al(2020) Riyadh	Hospital	Cross sectional	EPDS	≥12		174	67(38.5%)
Lamia I. Alasoom et al(2014) Saudi Arabia	Multicenter Hospital -5	Cross sectional	EPDS	10-12 Moderate ≥13 - severe		450	17.80%
Dina Sami Khalifa et al(2016)	Multicenter Hospital -2	Cross sectional	EPDS	≥12	3 months	238	20(9.2%)
Dalal Bashir Moh'd Yehia et al(2013) Jordan	Multicenter Military Hospital -4	Cross sectional	EPDS	mild - 10-15 moderate - 16-20 severe- >21		300	
F.H. Al Dallal et al(2012) Bahrain	Hospital	Cross sectional	EPDS	≥12	8 weeks postpartum	237	37.10%
Martha Moraitou et al(2010) Cyprus	Hospital	Cross sectional	EPDS and BDI	>12	1 week postpartum	226	13.70%
M. Chaaya et al	Community	NA	EPDS	>12	3-5 months postpartum	396	21%
Souphalak Inthaphatha(2020) Laos	Hospital	Cross sectional	EPDS	≥10	6-8 weeks postpartum	428	31.80%
Mayada Roumieh et al(2019) Syria	Hospital	Cross sectional	EPDS	≥13	3-4 weeks postpartum	1105	28.20%

Author and Place of Study	Setting	Research Design	Tools	Cut off score	Data collection period	No of women	No of mothers with PPD
KATHERINE GREEN et al(2006) UAE	Hospital	longitudinal study	EPDS	$\geq 13$	3 months and 6 months postpartum	125	22%
Nour Alhamdan et al(2017) Kuwait	Hospital	Cross sectional	EPDS	$\geq 12$	6 months	658	45.90%
<b>Other Asian Countries</b>							
Qiping Fan et al(2019) Srilanka	Hospital	Cross sectional	EPDS	$>9$	10 days,4 weeks	S1 - 523,S2 - 826	S1 - 15.5%,S2 - 7.8%
Tashakori A et al(2009) Pakistan	Hospital	Cross sectional	EPDS	$>12$	1 week postpartum	210	21.40%
Niloufer S Ali et al(2009) Pakistan	Community	Quasi-experimental study	Home environment/Family relationship questionnaire, Post-natal questionnaire, Aga Khan University Anxiety and Depression Scale (AKUADS):	NA	1,2,6,12 months postpartum	420	28.80%
Atif Rahman(2007)Pakistan	Community	longitudinal study	Self-Reporting Questionnaire (SRQ), Brief Disability Questionnaire (BDQ), and a modified Life Events Checklist.	NA	3,6,12 months	701	73 (56%)
Maria Delina E et al(2014) Philippines	Hospital	Cross sectional	EPDS	$>10$	2-8 weeks postpartum	115	22.61%
Ai-Wen Deng et al(2014) China	Community	Cross sectional	Chinese Version of Edinburgh Postnatal Depression Scale, Hamilton Depression Scale and Social Support Rating Scale.	$\geq 13$	4-5 months	1823	27.37%
haixin Bo et al(2020) China	Multicenter Hospital - 8	Cross sectional	World Health Organization Quality of Life Questionnaire, EPDS(Chinese version)	$\geq 13$	antenatal period and 1 week postpartum	1060	7.45%

Author and Place of Study	Setting	Research Design	Tools	Cut off score	Data collection period	No of women	No of mothers with PPD
Irma Nurbaeti et al(2018) Indonesia	Hospital	prospective longitudinal study design	EPDS	$\geq 13$	1,2 and 3 months postpartum	283	18.37%, 15.19%, and 26.15% at one, two and three months
Ayse Figen Turkcapar et al(2015) Turkey	Hospital	Cross sectional	EPDS	$\geq 13$	6-8 weeks	671	15.40%
R. Abdul Raheem et al(2018) Maldives	Hospital	Prospective cohort study	EPDS	$\geq 13$	36 weeks ,1 and 3 months postpartum	458	27% at 1 month and 12% at 3 months
J.R.W. Fisher et al(2004) Vietnam	Hospital	Cross sectional	EPDS	$> 12$	6 weeks postpartum	506	166(33%)
Irاندokht Asadi Sadeghi Azar et al(2012) Zabol,Iran)	Hospital	Cross sectional	Beck Depression Inventory	$\geq 17$	2-8 weeks	408	40.40%
Pegah Taherifard et al(2013) Ilam,Iran	Hospital	Cross sectional	EPDS	$\geq 13$		197	
Fatma Ibrahim Al Hinai(2014) Oman	Community	longitudinal study	EPDS(Arabic)	$\geq 13$	2 and 8 weeks postpartum	282	13.5% at 2 weeks,10.5% at 8 weeks
Benjaporn Panyayong et al(2013) Thailand	Hospital	Cross sectional	EPDS(Thai) Self-administered Q	$\geq 13$	6 and 8 weeks postpartum	1731	8.40%
Maryam Rouhi et al(2012)Azerbaijan,Iran	Hospital	Cross sectional	EPDS	$> 13$	8 weeks postpartum	1200	36.30%

## VI. RISK FACTORS ASSOCIATED WITH POSTPARTUM DEPRESSION

The risk factors associated with PPD were classified under five different categories. They are 1.Socio-demographic variables,2.Pregnancy and Birth Related Variables,3.Infant Variables,4.Family Relationships and Psychosocial factors.Please refer Table 3 showing the factors identified to be associated with Postpartum Depression.

### 1.Socio-demographic Variables

The most prominent variable associated with PPD Low Income or Socio-Economic Status (SES). It has been reported that 22 studies indicate that the low income or SES contributes majorly as a risk factor to PPD. The various

aspects that form a part of the SES are mentioned Financial Dependence ,Low income, low family income, low asset ownership, annual household income, economic deprivation and poverty. The second major risk factor associated with PPD is the Age reported in 19 studies.2 studies conducted in Iran (Zabol and Azerbaijan) revealed that the younger marital age is associated with PPD. In a study conducted in UAE , higher marital age is associated with PPD.2 studies conducted in India(Kerala and Delhi),India observed that getting married at young age is a risk factor associated with PPD. To the contrary, a study conducted in Jharkhand & Orissa revealed that higher maternal age was associated with PPD. Level of Education was a risk factor in 6 studies. In a study conducted in Karnataka ,India it is observed that higher level of education has been associated with PPD. In 1 study conducted in Tamil Nadu, illiteracy was a contributing

factor to PPD.4 studies conducted in Iran, Pakistan, Syria and Kuwait indicated that low level of Education is associated with PPD. In a study conducted in Gujarat, the marital status (Single) is found to be a risk factor associated with PPD.

## 2. Pregnancy & Birth Related Variables

The prominently associated pregnancy and birth related variables associated with PPD were Unplanned/Unwanted Pregnancy, Obstetric Complications during Pregnancy, Mode of Delivery and Parity. In 5 studies conducted in Nepal, Pondicherry, Gujarat and Karnataka it is observed that multiparity is associated with PPD. In one study conducted in UAE and 1 study conducted in Delhi, Primiparity was associated with PPD.3 study in Karnataka, 1 study conducted in Gujarat and 1 study conducted in Jharkhand, it was found that the Obstetric complications in the antepartum period/during labour were associated with PPD. Unwanted/Unplanned pregnancy was associated with PPD in 6 studies conducted in Saudi Arabia, Pakistan, Vietnam, Laos, Kuwait and Iran. It is also observed that out of 33 studies conducted in India none have reported that Unplanned/unwanted pregnancy has an association with PPD.3 studies conducted in Srilanka, Jordan and China reported that the mode of delivery as a variable associated with PPD.3 studies conducted in Delhi, Andhra Pradesh and Jharkhand found mode of delivery to be associated with PPD. A study conducted in Andhra Pradesh reported that PPD was associated with previous miscarriages and who are having abnormalities in the previous child in the case of consanguineous marriage.

## 3. Infant Variables

Factors that are closely associated with the infant variable are Preference for baby boy, issues related to Infant Feeding and Low birth weight of the Infant.7 studies in India reported that there was a preference for baby boy (2 studies in Tamil Nadu, 1 Karnataka, 2 studies in Gujarat, 1 study in Madhya Pradesh, 1 study in Maharashtra). It is also observed that only 2 studies in Indonesia and Pakistan in the other Asian countries apart from India, the preference for a baby boy was not found to be associated with PPD. This shows that there is a strong preference for baby boy in some places of India. Infant feeding related issues like difficulty to breastfeed, completely no breastfeeding, formula feeding and frequent feeding were significant risk factors associated with PPD.5 Studies conducted in Pakistan, Indonesia, UAE, Kuwait reported Infant feeding.4 studies conducted in Gujarat, Jharkhand, Kerala and Laos reported low birth weight as a risk factor associated with PPD.

## 4. Marital & Family Relationship Variables

The most important variables associated with PPD are Lack of support from husband, marital disharmony and

relationship issues with mother-in-law.10 studies revealed that the lack of support from husband and being unable to confide in partner as a strongest predictors associated with PPD.7 studies indicated that difficulties with mother-in-law (1 Tamil Nadu, 1 Gujarat, 1 Kerala, 1 China, 1 Zabol, 1 UAE) were strongly associated with PPD.4 Studies revealed that Marital disharmony-1 Tamil Nadu, 1 Goa, 1 Indonesia, 1 Thailand to be associated with PPD.5 Studies in Tamil Nadu, Pondicherry, Kerala, Sudan, Pakistan reported that domestic violence and addiction in husband as a predictor for PPD.

## 6. Maternity Care Related Factors

Mohammad et al. investigated the factors related to the maternity care of during labor and birth and their associations with PPD. Factors found to be significantly associated with PPD at 6-8 weeks postpartum were: duration of labor exceeding 11 hours; more than 8 vaginal exams; lying in lithotomy position during labor; episiotomy or painful suturing; labor more painful than expected; dissatisfaction with pain relief measures during labor; postpartum haemorrhage; overall poor quality of care; unhelpful doctors; mother's desire to talk more about birth; mother not always kept informed; decisions were made without taking mother's wishes into account; mother felt pressured to have baby quickly; doctors and midwives were not encouraging nor reassuring; mothers wanted more information during labor; mothers wanted more information about why induction was necessary; mother felt worried, anxious or frightened when labor began; mother did not feel confident in labor; mother was not composed but was frightened or helplessness. Chung *et al.* reported that women who showed a significant degree of depression in the third trimester of pregnancy had an increased risk for the need of epidural anesthesia, cesarean section, or instrument-assisted vaginal birth during childbirth compared with less depressed or non-depressed mothers.

## 7. Psychosocial factors

Twelve studies indicated that stressful life events have been a major trigger associated with PPD.10 studies revealed that past history of psychiatric illness is associated with PPD.5 studies tell us that lack of physical support (absence of care giver apart from mother) and 5 studies reveal that lack of social support are associated to the presence of PPD.8 Studies have revealed that Antenatal depression, anxiety and stress to be strongly associated with PPD. According to Biaggi et al. the most relevant factors associated with antenatal depression or anxiety were the lack of social support from the partner; history of domestic abuse/violence; personal history of mental illness; unplanned or unwanted pregnancy; adverse life events and high levels of perceived stress; complications in pregnancy in the past/present and pregnancy loss.

**Table 3 showing the factors identified to be associated with Postpartum Depression**

Category	Variable	Number of Studies	Associated factor
Socio-demographic Variables	Age	19	Young marital age,High marital age
	Education	6	Illetracy,higher education
	Income /Socio-economic Status(SES)	22	Financial Dependence,Low income,low family income,low asset ownership,annual hhousehold income,Economic deprivation,poverty,housing condition,unemployment
	Access to transportation	2	
	Access to maternal health care facilities	2	
Pregnancy & Birth Related Variables	Parity	4	Primiparous,multiparity
	Obstetric Complications during Pregnancy	6	High risk pregnancy,multigravida
	Mode of Delivery	8	
	Poor antenatal care	1	
	Previous Miscarriages	2	
	Abnormalities in previous child	1	
	Unplanned/Unwanted Pregnancy	6	
Infant Variables	Infant health issues	6	
	Infant Feeding	5	No breastfeeding,difficulty in breastfeeding,mixed feeding,frequent feeding
	Low birth weight of the Infant	5	
	Preference for boy baby	10	
	Still Birth/Neonatal death	2	
Marital & Family Relationship Variables	Relationship difficulties with mother-in-law	8	
	Self	1	low self esteem,body image,increased weight
	Marital Disharmony	8	
	Domestic Violence	7	Addiction in husband
	Lack of support from husband	12	
	Family Structure	2	Nuclear family,joint family,single mother
	Type of Marriage	1	
Psychosocial Variables	Stressful life events	12	
	Lack of Physical support	5	Lack of support apart from mother,child care stress
	Antenatal Depression,Anxiety & Stress	8	Mood swings,low mood during pregnancy,sleep disturbances
	Past history of psychiatric Illness	10	Family history of Psychiatric illness,history of pms
	Physical Co-morbidity	2	
	Suicidal Ideation	3	
	Low social support	5	
	Major financial problems	1	

## VII. DISCUSSION

To the best of our knowledge this review is very comprehensive in terms of studying Postpartum Depression and the associated risk factors in Indian and other Asian mothers in the time period 2000-2020.This study reviewed 31 studies conducted in India and 27 studies from other Asian countries. In this review studies have been included that have a cross sectional or longitudinal research design.

The strongest socio-demographic risk factor associated with PPD is low income or low socio-economic status. The related variables associated with this factor were financial Dependence, Low income, low family income, low asset ownership, annual household income, Economic deprivation, poverty, housing condition, unemployment. The perception of mothers towards the mode of delivery on a broader view did not seem to have a high association with PPD. However in a study at Delhi women who underwent

C-section suffered more (21.05%) when compared to women who underwent vaginal birth (12.9%)(32). It was interesting to note that in Lebanon, women who lived in the Beka valley were pleased to be delivered vaginally whereas women residing in Beirut had the perspective that vaginal delivery is a source of fear, pain, and stress compared with caesarean section. This perspective is also influenced by the pace of life and the higher level of educated population in Beirut, the capital city(57).

It is important to note that many mothers continue to be hesitant to express their depressive symptoms and reach out to mental health professionals. In the study of Chandran et al, none of the mothers had sought help for their symptoms, although many were functionally impaired and were barely coping with their responsibilities. One possible reason for the health services to be less utilized could be the belief held by mothers, family members and even the area health workers that this state is a normal part of pregnancy and the post-partum period. According to Shriram, et al., most women with depression (92.5%) did not seek any form of health care. (9).

Another critical support that is required during the postpartum phase is emotional support especially for women who have experienced complicated pregnancies and had still births. In the study conducted by Shriram, et al. among two women who had still birth, one woman was depressed and the other woman delivered twins and one baby was alive. She expressed her views that receiving strong emotional support from her mother-in-law because of which she could overcome the death of her child without going into depression(9). It was interesting to note that in the study conducted by Avita Rose Johnson et al that the antenatal mothers residing with the family of birth during pregnancy as opposed to with the husband, was related to postnatal depression (18). Staying with the husband during pregnancy could help the mother receive more support from the husband and could reduce the level of postnatal depression. This reiterates that fact that family support is of significant importance for postpartum women in combating depression. As a new mother and home maker, the mother will also require physical support to resume household work. Kirti Iyengar et al in her study mentioned that most common challenge was to resume household work (defined as inability to do household work or doing it with difficulty). At 6-8 weeks, a larger proportion of women with severe and less-severe complications reported difficulty in resuming their household work (37).

In India preference to male child is deeply ingrained. In Indian culture, girl goes to her husband's house after marriage, changes her last name to husband's last name and expected to adapt and follow his family lineage. Whereas the male stays with his parents till death and he will continue their family pedigree, support parents in their old age, perform funeral rites and inherit ancestral property. Birth of baby girl is considered stressor many families in Indian societies and hence could be a strong predictor of postnatal depression. According to the Jordanian cultural and traditional practices and Arabic Muslim societies,

mothers who delivered baby boy son is considered desirable and traditionally receive more social support.

Contrary to the common perception that education leads to the empowerment and there by reduction in postnatal depression, in the study conducted by A. Agarwala et al. It was observed that level of education; could be a risk factor associated with postpartum depression. It showed that higher level of education of the mothers increased the possibilities of developing PPD. This could be possibly due to the fact that educated women were more involved in their career and had challenges in less managing baby, career and household work. Work related stress can also be a strong factor leading to depression(19). In contrast to this study, low educational status was found to be a risk factor for postpartum depression by Gupta et al. in Delhi. In that study it was attributed those women with low educational status were not able to think logically and were unable to take decision both emotionally and economically.

### **Role of the Government in supporting Mothers in the postpartum period**

There is a significant role of the Government and its policies that can contribute to the enhancement of the maternal and infant wellbeing in the postpartum period. Omani women receive great support from the government in education, job opportunities, civil service and social insurance. In addition, mothers receive support during the first 40 days from their families and possibly housemaids which helps to lower the stress of being a new mother(63). In Indonesia, currently family do not need to pay money for delivery because the birth process in Indonesia is covered by government national health insurance. Although India is implementing a cash-transfer scheme that pays Rs 1,400 to women delivering in government institutions, the findings of study suggest that women need financial support to meet their own and their infants' health needs in the postpartum year (36).

In collaboration with the Programme for Improving Mental Health Care (PRIME) research consortium, the Madhya Pradesh state government started integrating mental health care services for depression into the primary health care sector, which includes perinatal health services, in Sehore District in 2013 (29). In 2016, nurses in district hospitals across the state received training to screen and detect perinatal depression and provide basic psychological interventions.(27).The growing number of suicides as a major contributor to maternal mortality in Kerala has been identified in a confidential review of maternal deaths in Kerala. The program 'Amma Manassu' implemented by the Department of Health and Family Welfare in Kerala mainly focussed and aimed at reducing the maternal deaths due to suicide(12).

### **VIII. LIMITATIONS**

One of the major limitations is employing a cross sectional study design. The major shortcoming in a single time point evaluation in the postpartum period is over estimating the prevalence as there is exclusion of cases that

may have also pre-existing depression in the antenatal period which does not necessarily classify as postpartum depression. (33). Owing to the small sample size, it is difficult to replicate to the general population. Factors such as domestic violence, marital disharmony and lack of social support are also well-established risk factors for postpartum depression in mothers. However, to reduce nonresponse, social support was used as a proxy for the other variables in some studies which is viewed as a limitation of this study. Another important limitation is the reliance on a self-reported depression screening tool rather than clinician diagnosis. Although the EPDS has been validated among a broad range of populations, cultural and economic factors may have caused women to over-report or under-report depressive symptoms. (62). Women with abortion or stillbirth failed to come for follow up during the study period. Therefore, the association with postpartum depression could not be studied. (17)

## IX. IMPLICATIONS FOR CLINICAL PRACTICE

There is a paucity of research in developing countries addressing the impact of post-partum depression on the cognitive, emotional and physical development of infants born to mothers with postnatal distress. Research aimed at measures to prevent post-partum depression and to elucidate what treatments work best – and are practical in low-income countries – is also urgently required. (8). The studies reiterate the fact that Maternal mental health awareness programs about PPD and encouraging breastfeeding should be implemented in the antenatal and postnatal periods to help early detection and reduction of PPD among women. Frequent screening for maternal distress in the last trimester of pregnancy and in the post-partum period needs to be carried out by health care workers when mothers come for their postnatal review or at the immunization clinics. Mothers with high symptoms have to be directed to receive guidance from a psychiatrist for further assessment.

## X. CONCLUSION

From the studies performed so far it is very evident that further research in the field of maternal mental health is not only required to reiterate the burden of the problem in developing and developed countries, but also to help the Government to formulate policies and programs that would exclusively cater to Maternal mental health and Infant Wellbeing. In order to generalise the results to the population, it is recommended to have larger sample size involving heterogeneous population. Another step to aid the generalisation will be to conduct a greater number of community-based studies involving people from different geographic location and varied socio-economic status. It is also to be noted that a longitudinal study design will give the researcher more clarity and perspective to understand the prevalence and associated risk factors in a phased manner and assess the progress accordingly. Another important recommendation is to assess the gender preferences prior to giving birth and screen women for depression at the time of gender reveal (at birth, legally, in India), and should

establish whether any change in depressive symptoms associated with unmet gender preference is still persistent.

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