Exploring the Unexplored Determinants of Indian's 'Infertility Behaviors' across Urban Millennial

Stuti Gupta, Research Scholar, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India, stuti.gupta1712@gmail.com (Corresponding Author)

Kamesh Kumar, Assistant Professor, Department of Mathematics, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India, drkamesh.engineering@tmu.ac.in

Abstract: The notion of 'triggered infertility' or self-made infertility is rather a new research concept and drawn tremendous research attention. There is ample research on natural infertility and clinical management yet focus on triggered infertility is missing. The research concentrates on the proximal and distal determinants in line with bioecological approach and underline the gravity of the problem as emerging. The proximal determinants often involve the individual as an agency himself as well as the environment in which skilling is being undertaken. The distal correlates identify as the distinct uncertainties that shape up the opinion making and perception development with regard to state of triggered infertility. The research hence concludes the significant impact of millennia derived individual, vocational, career driven, health related, stress derived, contingent as well as sexual and reproductive malpractices; on triggering the state of infertility.

Key Words: Infertility, Bioecological approach, Individual determinants, Contingent aspects, Proximal determinants, Distal determinants, Deficiencies, Millennia

1.1 Introduction

Infertility across urban millennial is a burning socio-economic challenge. Infertility identifies as a state of reproductive health where bearing children is impossible without mechanical or clinical intervention. Infertility across the ages has been viewed as biological, religious and social stigma yet modern versions of infertility has more to do with the self-triggered ill responses and inactions and ill managed activities that are held acceptable under guise of modern thinking.

The notion of 'triggered infertility' or self-made infertility is rather a new research concept and drawn tremendous research attention. The triggered infertility (Bogdan, Hoffman, 2015) identifies as comprising the deliberate human action or inaction to delay, deviate or constrain the fertility and ultimately transform the fertility prospects onto infertility.

As per WHO, Infertility is triggered on account of failure of male or female reproductive system to lead to pregnancy after 12 or more months of regular un protected sexual intercourse. Such a problem has been prominent across a class of millennial who seem to engage in activities or set of activities that constrain human ability to reproduce on account of habits, pastimes, mis-information or false ideologies.

A large section of studies (Kalus, Cryzowska, 2022) concentrate on nature, on human body, on genetics and on the anthropological and on the racial attributes. Yet individual deficiencies, in competencies, lack of information about right conduct of human life, contextual occupational requirements, stress, rising digitalization and aspirations (Barbieri, Domar, Kevin, 2000); do interfere with infertility determination. There is urgent need to explore the aspects that seem to contribute directly or indirectly to the millennial infertility (Mascarenhas, Boerma, 2012).

This phenomenon has hence been described as "triggered" infertility (Cui, Wang, 2021) which comprises the extra ordinary focus on the conscious behavioral practices (Shmerling, 2020) as guiding the infertility as health outcome. The infertility (Larsen, 2005) as health outcome is believed to be more self-created and contextually determined rather than natural or as a result of disease in reproductive systems.

The research focuses on the elements that seem to drive the millennial population into state of infertility. The research concentrates on triggered infertility (Rutstein, Shah, 2004) rather than natural or disease borne infertility (Sohrab, Basir, 2020). There is ample research on natural infertility and clinical management yet focus on triggered infertility is missing.

The core idea is about the manner in which some of our own misinformation and inefficiencies and malignant practices eventually triggers the infertility? The existing studies especially those associated with fertility indexation (Karabulut, Ozkan, Oguz, 2013) seem to be biased with regard to origins of infertility in men and women comprising the millennial.

Millennial constitutes our target as this section often engages in gross malpractices (Daud, Khadija, Jabeen, 2022) with regard to fertility and infertility decisions. The paper hence is divided into three sections that concentrate on the proximal and distal determinants in line with bioecological approach (Gonzalez, Inesta, 2016) and underline the gravity of the problem as emerging.

1.2 Problem Definition

The problem definition for research focuses on exploration of impact of individual, occupational and contextual factors as leading to a triggered state of infertility in vulnerable "millennial population". The problem assumes significance as traditional family setups were particularistic about family planning at an initial age in life terminology yet the modern families are delaying the same till thirties. The research hence reviews the proximal and distal aspects as shaping the phenomenon in sections below.

1.3 Proximal and distal determinants

In literal terms, the proximal determinants often involve the individual as an agency himself as well as the environment in which skilling is being undertaken. The distal correlates identify as the distinct uncertainties that shape up the opinion making and perception development with regard to state of triggered infertility. The proximal correlates of infertility development in turn represent the neighboring as well as the core agentic(individual driven) influences whereas the distal influences on infertility development categorize as the distant and contextual influences (Chachar, Ali, 2021) that collectively impact the prospects for shaping the probability for infertility in mankind.

The construct operationalization with regard to infertility foresees a long history of being operationalized as a multi-dimensional perspective and may involve the aspects of individual decision making with regard to marriage and child conception, awareness about the changing parenthood (Yeager, Muller, 2019), pressures on individual cognitions to adhere by new verbology, employer generated influences, entertainment industry derived influences on the mindsets with regard to fashion and easy life living, government policies and attitude towards life, parental support to career development and promotion, contingent requirements and human talent based sensitivity; count as some of the prominent aspects.

The classical ecological model of perception development (Gonzalez, Inesta, 2016) concentrates on the processes between an individual and diverse levels of environment as defining the interactions across subsystems and resultant outcomes in form of individual embedment and prospective transformation (Stephan, Gruhn, Jaconelli, 2013) in outlook.

The classical Bronfenbrenner's five subsystems model (Gonzalez, Inesta, 2016) helps explain the microsystem, mesosystem, ecosystem, macrosystem, chronosystem derived influences (Tudge, 2016) on triggering of possible infertility in Indian men and women. The bioecological approach underlines the plethora of influences that impact the overall shaping of the infertility in men and women in Indian perspective. The illustration(table 1) below captures the variety of influences involving individual, vocational, career driven, health related, stress derived, contingent as well as sexual and reproductive malpractices, to name a few.

Table 1: Summarizing the determinants and contributing causes

	Nature of Determinants	Dimensions /Contributing factors as identified
Proximal Influences	Individual aspects	Individual habits (Daud, Khadija, Jabeen, 2022), Individual inclinations (Mascarenhas, Boerma, 2012) and vision for life (Malarcher, 2010), Learned malpractices (Yeager, Muller, 2019),
	Vocational/Work related	Vocational work stress (Cui, Wang, 2021), Occupational requirements (Tudge, 2016), Occupational resource requirements (Daud, Khadija, Jabeen, 2022), Work related pressures (Larsen, 2005)
	Career driven	Career related demands (Bogdan, Hoffman, 2015),Night shifts (Rutstein, Shah, 2004), Improper sleep cycles (Bogdan, Hoffman, 2015), Lack of physical mobility (Ezenwaka, Onwujekwe, 2020), Sedentary life style (Barbieri, Domar, Kevin, 2000),Employer's lack of attention to health of employees (Sohrab, Basir, 2020), Non planned programs and career cycles (Jaeger, 2017), Career growth limitations and significance attributed to sports in organizational appraisal (Krebs, 2009)
	Health and drugs	Food consumed, Junk food, Narcotics (Larsen, 2005), Drug abuse, Tobacco usage Dietary, Food and Abuse (Barbieri, Domar, Kevin, 2000), Nervous system inducing drugs (Cui, Wang, 2021)
Distal Influences	Stress aspects	Stress as leading to infertility (Rooney, Domar, 2018), Digital stress (Rutstein, Shah, 2004),Mobile usage, Laptop on lap (Barbieri, Domar, Kevin, 2000), Psychological strain (Logsdon, Gennaro, 2005), Improper diets cycles (Daud, Khadija, Jabeen, 2022)
	Contingent Influences	Pandemic (Vaughan, Shah, 2020), Entertainment programs, Fake entertainment stories (Stephan, Gruhn, Jaconelli, 2013), Cultural shift (Stephan, Gruhn, Jaconelli, 2013), Peer Influences (Stephan, Gruhn, Jaconelli, 2013) and friend circle (Chachar, Ali, 2021)
	Sexual and Reproductive health communications	Adolescent Influences (Currie, 2020),Information about on counter contraceptives, Glorification and commodification of sex (Kar, Singh, Choudhary, 2015), Adolescence mistakes (Logsdon, Gennaro, 2005), Miscommunication regarding sexual practices (Ezenwaka, Onwujekwe, 2020),Deviations in development of sexuality (Kar, Singh, Choudhary, 2015)

The 'bio-psychological individualistic' attributes have been interpreted as the individual driven dispositions (Ball, 2022) to develop themselves, to adapt to changes, sense of self awareness, resource harnessing potential and social capital. The possible 'proximal processes' enveloping the development of the triggered state of infertility has a lot to do with the proportion in which these overpower the psychological and cognitive enhancement of sexuality in men and women. The awareness development with regard to practices to be followed and the practices that are to be avoided.

The human development (Evans, 2020) across Indian millennial population is susceptible to distal influences namely the stress induced on account of climate changes, on account of uncertainties, fears of uncertainties, contingent influences as well as general religious discourses and proses. The psychological and cognitive constraints (Ashiabi, O'Neal, 2015) and inability to think out of box (Abbott, 2021) also seem to aid to triggering of infertility in mankind in India and abroad.

The social determinants (Malarcher, 2010) of triggered state of infertility also needs equal mention as these have a contingent stake in the shaping of infertility altogether. In nutshell the proximal(nearby) and distal (distant) determinants of triggered infertility in Indian urban millennial segment; have a large and dominant role in sustaining and renewal of the state of triggered infertility. The operationalization of construct hence relies on the aspects that are near to individual and aspects that are far not in neighborhood of individual millennial.

1.4 Approaches till date

Infertility (Currie, 2020) across men and women needs extensive exploration especially in Asian perspective and Indian context as youth's habits, life style, thinking about career goals; is undergoing a sea change yet the studies fail to tap the gravity of the situation in considerable manner. Most of the studies have been conducted across the lines of clinical, genomic and biological intervention and pharmaceutical advancement.

Yet the contingent and contextual approaches have been given a miss. Infertility trends in world categorically point to the insistence of direct and lateral influences that are more individual borne, personality specific, habits, attributes and media influence; as exerting significant impact on triggering and sustenance of infertility in young men and women. The clinical approaches emphasize more on the cells, the obstructions in path, tissue-based obstructions whereas genomics focus more on the DNA and gene sequencing and genetic or hereditary aspects.

The prognosis (Capri, 2017) based theoretical approach underlines the negative impact of female age in explaining the infertility challenge in millennia. The assisted reproductive technology (Shreffler, Greil, McQuillan, 2017) emphasis underlines the role of resources in maneuvering the infertility problem to lesser proportional outcomes. The OCBIL theory (Hopper, 2009) on other hand focuses more on the evolution and ecology of the climatically buffered landscape for infertility in men and women. Yet the literature remains non convergent and scattered over all that seems to trigger infertility state of reproductive health in young millennia.

The studies (Shreffler, Greil, McQuillan, 2017) seem insufficient to address the growing problem of infertility in Indian perspective. The Indian scenario is grimmer on account of religious stigma attached to the infertility and implications for marital stability.

1.5 Understanding individual triggered infertility outcomes

The individual triggered malpractices and misinformation and lifestyle is a comparatively new field of research. The research is advancing in this field on account of cognitive and psychological insights and bioecological prospects. Earlier a bogey of research used to be devoted to clinical, reproductive and genetic reasons of infertility yet the modern review perspective is utterly different.
This is a slide apart from the natural reasons of infertility and enshrines as something man-made or self-derived. Individual millennia's own habits, own illogical thinking, loss of focus under information asymmetries and information overflow. The studies (Barbieri, Domar, Kevin, 2000) have deplored upon individual, occupational and contextual factors that seem to lead to a triggered state of infertility in

vulnerable "millennial population". The reference to man-made aspects is there as these are self-curated rather than produced by nature or a part of genetic transmission or mutation.

In nutshell there are proximal (nearby) and distal (distant) determinants of triggered infertility in Indian urban millennial segment. The operationalization of construct hence relies on the aspects that are near to individual and aspects that are far not in neighborhood of individual millennial. Infertility across men and women needs extensive exploration especially in Asian perspective and Indian context as youth's habits, lifestyle, thinking about career goals; is undergoing a sea change yet the studies (Yeager, Muller, 2019) fail to tap the gravity of the situation.

A reproductive biology study (Keasri, Agarwal, Henkel, 2018)attributed the instance of radiations as leading to 66 per cent of cases of short to long term infertility in men and women alike. The radiations from cell phone (in range of 0.9 to 2.45 GHz), from cell phone tower (in range of 800-1200 MHz), from laptop (in range of 300 Hz-10 MHz), from microwave oven (in range of 2.45 GHz), from wireless (in range of 2.4 GHz); all collectively seem to impact the pituitary and reproductive organ functioning in one way or other. The era of killer fashion and skin tights is further exerting its impact on the reproductive health and versatility. These self-made choices are injuring the urban youth more than the rural youth in perspective. Infertility trends in world (Inhorn, Patrizio, 2015) indeed points towards the incidence of man-made aspects as over powering the reproduction debate and population growth discourses. The studies (Rutstein, Shah, 2004) differ substantially with regard to determinants of infertility in millennial population. Some studies underline role of biological and clinical aspects like the hormones, genetics or stress and depression. Some studies (Capri, 2017) figure out role of addiction to smoking or to alcohol or to locally available substitutes to alcohol; as shaping infertility; yet the scope for study is not addressed properly. The studies (Capri, 2017) on subject matter reflect well on the man-made angle to infertility in men and women.

1.6 Review of trends in India

The trends for women fertility were reviewed with aid of World Bank data on India with regard to fertility, life expectancy for women, contraceptive usage, death rate, mortality of infant and respective birth rate. The data was sourced from the World Bank for the years 1960-2021 with regard to Indian perspective and regression was undertaken to ascertain the pattern of relationship. The regression equation points to varying impact of life expectancy for women, contraceptive usage, death rate, mortality of infant and respective birth rate on women's fertility across the period of research.

Regression Equation = Constant + 0.10(mortality infant) + 0.84(birth rate) + 0.68(death rate) - 0.002(contraceptive usage) + 0.015 (life expectancy)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.058	.804		-1.317	.224
	MORTALITY_INFANT	.010	.003	.339	3.684	.006
	BIRTH_RATE	.084	.007	.524	12.400	.000
	DEATH_RATE	.068	.009	.214	7.859	.000
	CONTRACEPTIVE	-.002	.001	-.026	-1.778	.113
	LIFE_EXPECTANCY	.015	.011	.094	1.437	.189

a. Dependent Variable: FERTILITY

The fertility though declining in Indian perspective, remains a function of life expectancy for women, contraceptive usage, death rate, mortality of infant and birth rate. The fertility rate was observed as declining from 5.906 births per women in 1960s to 2.184 births per women in 2021s. This marks significant impact of economic, sociological, personal, individualistic, cognitive, and physiological and health related interferences in fertility determination over the period of time in Indian perspective.

1.7 Conclusions

The research hence concludes the significant impact of millennia derived individual, vocational, career driven, health related, stress derived, contingent as well as sexual and reproductive malpractices; on triggering the state of infertility. The bioecological approach underlines the plethora of influences that impact the overall shaping of the infertility in men and women in Indian perspective and enhances our understanding of the phenomenon across its emerging realities.

The millennia's individual deficiencies, in competencies, lack of information about right conduct of human life, contextual occupational requirements, stress, rising digitalization and aspirations; will always interfere with fertility determination. There is urgent need to explore the aspects that seem to contribute directly or indirectly to the millennial infertility. This phenomenon has hence been described as "triggered" infertility which comprises the extra ordinary focus on the conscious behavioral practices as guiding the infertility as health outcome.

1.8 Directions for further study

The further research is desirable across areas of socio-demographic divides that are equally influencing the dynamics of the infertility development and growth. The pan SAARC region research is desired to tap the infertility patterns and spread over the regional topography. The index development approach with scale development focus can be incorporated.

The triggering of infertility is not a phenomenon limited to developed economies yet spreading across developing and low developing economies as well. The cultural shift and development of culture of global consumption and marked increase in global trade exchanges has a marked impact on global spread of infertility. Infertility is now more being interpreted as triggered as this involves more of the human borne inefficiencies that are taking us to the state of irreversible crisis mode. The corrective policy action and policy implementation is possible only with extensive exploration and identification of the underlying currents.

1.9 References

Abbott. (2021). Think outside the brain box. *Nature, 596*(1), 181-82.

Ashiabi,O'Neal. (2015). Child Social development in context: An examination of some propositions. *SAGE Open, 2*(3), 1-13.

Ball. (2022). A tour of the evolution of minds. *Nature, 603*(1), 221-222.

Barbieri,Domar,Kevin. (2000). Six steps to increased fertility: An integrated medical and mind/body program to promote conception. *Harvard,* 47-49.

Bogdan,Hoffman. (2015). The relationship among infertility, self-compassion and well-being for women with primary or secondary infertility. *Psychology of Women Quarterly, 2*(1), 2-4.

Capri. (2017). A prognosis-based approach to infertility: Understanding the role of time. *Human Reproduction, 32*(8), 1556-59.

Chachar,Ali. (2021). Developmental Understanding of death and grief among Children during COVID-19 Pandemic: Application of Bronfenbrenner's Bioecological model. *Frontiers in Psychiatry,* 24-25.

Cui,Wang. (2021). Effects of self-esteem on the associations between infertility related stress and psychological stress. *Psychology Research and Behavior Management, 14*(1), 1245-55.

Currie. (2020). A bio-ecological approach to understanding the determinants of adolescent sexual and reproductive health and its application. *Glasgow University Papers*, 21-23.

Daud,Khadija,Jabeen. (2022). Comparison study of infertility issues in rural and urban areas. *Saudi Journal of Medicine, 7*(1), 35-37.

Evans. (2020). Bronfenbrenner's Ecological systems theory. *Developmental Psychology*, 2-3.

Ezenwaka,Onwujekwe. (2020). Exploring factors constraining utilization of contraceptive services among adolescents in South East Nigeria: An application of the socioecological model. *BMC Public Health*, 1162.

Gonzalez,Inesta. (2016). Current perspectives and key elements from a bioecological model. *Employee Relations, 38*(6), 962-64.

Hopper. (2009). OCBIL Theory: Towards an integrated understanding. *Springer Science+Business, 322*(2), 49-84.

Jaeger. (2017). Negotiating Complexity: A Bioecological Systems perspective on development. *Human Development, 59*(4), 163-71.

Kalus,Cryzowska. (2022). Perceived partner's self-control and social support effects on relationship satisfaction in couples experiencing infertility. *International Journal of Environmental ResePublic Health, 19*(1970), 4-7.

Kar,Singh, Choudhary. (2015). Understanding normal development of adolescent sexuality. *Journal of Human Reproductive Sciences, 8*(2), 70-74.

Karabulut,Ozkan,Oguz. (2013). Predictors of fertility quality of life in infertile women: Analysis of compounding factors. *European Journal of Obstetrics and Gynecology and Reproductive Biology, 170*(1), 193-97.

Keasri,Agarwal,Henkel. (2018). Radiations and Male fertility. *Reproductive biology and Endocrinology, 16*(118), 34-35.

Krebs. (2009). Bronfenbrenner's Bioecological theory of Human Development and the process of development of sports talent. *International Journal of Sport Psychology, 40*(1), 109-114.

Larsen. (2005). Research on Infertility: Which definition should we use? *Fertility and Sterility, 83*(4), 846-49.

Logsdon,Gennaro. (2005). Bioecological model for guiding social support, research and intervention with pregnant adolescents. *Issues in Mental Health Nursing, 26*(3), 327-29.

Malarcher. (2010). Social determinants of sexual and reproductive health: Informing future research and programme implementation. *World Health Organization* , 123-24.

Mascarenhas,Boerma. (2012). National, Regional and global trends in infertility prevalence since 1990: A systematic analysis of 277 health surveys. *PLoS Med, 9*(2), 1356.

Rooney,Domar. (2018). The relationship between stress and infertility. *Translational Research*, 41-42.

Rutstein,Shah. (2004). Infecundity Infertility and Childlessness sin developing countries. *WHO* , 23-25. Shmerling. (2020). Fertility and diet: Is there a connection? *Harvard Health*, 2-3.

Shreffler,Greil,McQuillan. (2017). Responding to Infertility: Lessons from growing body of research and guidelines for practice. *Family Relations, 66*(4), 644-49.

Sohrab,Basir. (2020). Employers. It's time to talk about infertility. *Harvard Business Review*, 13-14.

Stephan,Gruhn,Jaconelli. (2013). Feeling Younger, Being Stronger: An experimental study of subjective age and Physical functioning among Older Adults. *The Journals of Gerontology, 68*(3), 1-5.

Tudge. (2016). Implicit versus explicit ways of using Bronfenbrenner's Bioecological theory. *Human Development, 59*(2), 195-199.

Vaughan,Shah. (2020). Infertility remains a top stressor despite the COVID-19 pandemic. *Reproduction Biomedicine Online, 41*(3), 425-26.

Yeager,Muller. (2019). A national experiment reveals where a growth mindset improves achievement. *Nature, 573*(7774), 365-67.