# Original Article

# Precautionary Behaviour for COVID-19 among General Population in Hills, West Bengal, India : A Pilot Study

## Sandip Saha[1], Pasang Lahmu Sherpa[2], Nilanjana Ghosh[3], Biplab Mandal[4]

Background : Precautionary behaviour is important for prevention of disease spread. Preparedness for pandemic requires understanding and monitoring of disease-related perceptions and psychological responses in the general public and can be assessed by Health Behavioural Model (HBM).

Objectives : This study aims to assess the COVID-19 related precautionary behaviour among population in hills of West Bengal, India conforming to the health belief models.

Methods: A descriptive cross-sectional study was conducted among 351 participants with purposive sampling. The questions were formed in simple way to make it easier for the general population to understand and answer respectively. Based on Health Belief Model with its 6 constructs answers were rated on 5-point Likert scale with 5 being highest score and 1 the lowest. Data was analysed using principles of descriptive and inferential statistics.

Result : Majority of subjects were educated and males. Risk perception and vaccination intent was high. Majority study subjects agreed that perceived severity and susceptibility was high and disagree that perceived benefits were high. Majority stated that they were not sure how they will respond to others in times of need.

Interpretation and Conclusion :  Study concludes that risk perception is high and perceived preventive behaviours were higher among majority of subjects. However, a larger study is recommended.

Coronavirus disease 2019 (COVID 19) is an infectious disease caused by an RNA virus, Severe Acute Respiratory Syndrome coronavirus 2, SARS CoV -2 [1]. The outbreak of Coronavirus was first identified in Wuhan, China, in December 2019[2]. It spread rapidly, posing threat to the health care system all over the world. The most common presenting clinical symptoms are fever and cough, in addition to other non-specific symptomatology, such as fatigue, dyspnoea, headache, muscle soreness, diarrhoea and loss of smell and taste sensation can occur[3]. Majority of the patients experience mild symptoms. Some have moderate respiratory illness and do not require any specific treatment. The disease is more severe in high risk groups comprising of older people more than 60yrs of age, and those with other ailments like diabetes, cardiovascular disease, chronic respiratory illness, cancer and other major illness. This disease mainly spreads through droplets of saliva and discharge from the nose when an infected person coughs or sneezes.  The best way to prevent and slow down transmission of COVID-19 virus is to have a knowledge regarding the modes of transmission of the disease and ensure preventive measures to protect and prevent further transmission of the virus. WHO declared COVID-19 as Global pandemic on 11th

[1]MD, Assistant Professor, Department of Medicine, North Bengal Medical College, Sushrutanagar 734012 and Corresponding Author

[2]MD, Associate Professor, Department of Medicine, North Bengal Medical College, Sushrutanagar 734012

[3]MD, Assistant Professor, Department of Community Medicine, North Bengal Medical College, Sushrutanagar 734012

[4]MD, Assistant Professor, Department of Medicine, North Bengal Medical College, Sushrutanagar 734012

**Editor's Comment :**
- To understand sociodemographic profile of the study subjects
- To determine risk perception and vaccination intent among study participants
- To ascertain the precautionary behaviours conforming to health belief model among the study participants

March and recommended all countries to increase their level of preparedness and identify, manage and care for new cases of COVID-19. Guidelines were issued for all individuals to take care of their own health and take certain precautionary measures like washing hands frequently with soap and water or using hand sanitizer, maintaining social distancing of at least 1 metre, following cough and sneeze etiquette and avoid touching eyes, nose and mouth.

Perception about the disease and related risks will increase preparedness and psychosocial response in the general public during any pandemic[4.] This is turn will automatically bring some behavioural changes in a person so as to avoid or reduce the chances of acquiring the disease. Such behavioural changes to perceived risks have been earlier seen during Influenza pandemic and outbreak of SARS in 2003.This precautionary behaviour can be assessed using health belief model (HBM) which predicts a person's  belief about health related problems,  perceived susceptibility, perceived severity, perceived benefit, barrier of action, self-efficacy and cue to action[6,7].  All these components of HBM vary between individuals and they help us to predict health related behaviours and uptake of health services[7,8].

Perceived susceptibility is the subjective assessment of risk of developing a health related problem and Perceived severity is assessment of the severity of a health problem and its potential

consequences[6,7,10]. The individuals with high perceived susceptibility and perceived risk will engage in positive behavioural practices so as to reduce the risk of developing the disease. The individuals with low perceived susceptibility and perceived risk will deny the risk of developing the disease and will not have a positive behavioural pattern. Perceived benefits refer to an individual's assessment of the value or efficacy of engaging in a health-promoting behaviour to decrease risk of disease[6]. Perceived barriers refer to an individual's assessment of the obstacles to behavioural changes and it may prevent engaging in health promoting behaviour. The cue to action or trigger, is necessary for prompting engagement in health-promoting behaviours[9]. Self-efficacy refers to an individual's perception of his or her competence to successfully perform a behaviour[10].

The first case of COVID-19 in India was reported on 30th January 2020. Due to its high infectivity rate, the health bodies around the world, including the Ministry of Health and Family Welfare (MOHFW), Government of India announced total lockdown to restrict movement, initiate social distancing and facemask wearing regulations to curb down the transmission of COVID-19 in India[11-13].

As there is no study in the hills on these issues, this study was conducted to assess the COVID-19 related behavioural changes amongst the people in hills and the outcome of those precautionary behaviours in the containment of the disease outbreak. The hills of West Bengal includes districts of Darjeeling and Kalimpong. Darjeeling district further includes Kurseong and Mirik as subdivision. These hills comprises of rough difficult terrains with harsh climate and has its own logistic constraints. Health care availability and accessibility is compromised and hence though density of population is less than plains the other contributing factors make it mandatory to assess their precautionary behaviour as these are hard to reach areas catering vulnerable and marginalized population. Moreover, Kalimpong, district first reported a positive patient in hills on 24th March 2020[2] and all the 11 primary contacts had tested positive which was a ringing bell for the district administration of all the hilly areas. Moreover these are tourist locales with lots of homestays and foreign tourists favourite destination is Darjeeling the queen of hills. Since International travels were mainly implicated as the source of transmission hence it is prerogative to understand risk perception and modify their precautionary behaviour if needed since lodge owners are suffering from huge financial losses due to lockdown in peak season.

### Materials and Methods

A descriptive cross-sectional study was conducted with data collection for two months, June and July 2020. The study population was selected by convenience sampling. Their phone numbers were collected from various associations like Hotel Owner's Association, Himalayan transport coordination committee and local municipalities. Permission was taken from the respective concerned authority. To minimise personal contact during outbreak, a mixed method study design was executed after pre sensitisation with telephonic interviews to elicit various themes identified for in-depth interview. Soft copy of the questionnaire / Google form Application prepared in English and local language Nepali was shared in various on line platforms like WhatsApp Messenger, Electronic mail and Facebook Messenger. Based on Health Belief Model with its 6 constructs answers was rated on 5 point Likert scale with 5 being highest score and 1 the lowest[7]. Data was analysed using principles of descriptive and inferential statistics. The questionnaire included information on following points and data was collected by online method after taking consent. Study variables were social demographic profile of the study population, their risk perception and vaccination intent and questions pertaining Health Belief Model (HBM) which includes Perceived susceptibility, Perceived Severity, Benefit of Action, Barrier to Action, Cue to Action and Self-Efficacy. The study inclusion criterion were willing, healthy adults who are permanent residents living in hills of Darjeeling and whose livelihood were mainly dependent on tourism like people running hotels, home-stays and lodges, drivers plying tourist vehicles.

### Results

A total of 351 responses were recorded as they complied initially. However 327 responses could be recorded in entirety and 24 were non responders.

(a) Sociodemographic Profile: Majority of study subjects belonged to Darjeeling district (72.5%), of age range 18-30 years (41.7%). 42.6% study participants were graduates, 62.4% males and 35.5% were self-employed as depicted in Figs 1,2 and 3 respectively. 50% were married and 59.3% resided in nuclear families and lived in pukka houses. 77.1% were suffering from chronic disease for which they were under treatment.
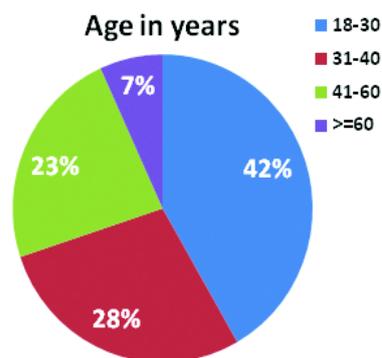


Fig 1 — Diagram showing Age distribution of the Study population in hills of West Bengal

(b) Vaccination intent was found to be considerably high. 81.1% opined in favour. Interestingly risk perception was found to be very high among 87.2% of study subjects. Significant
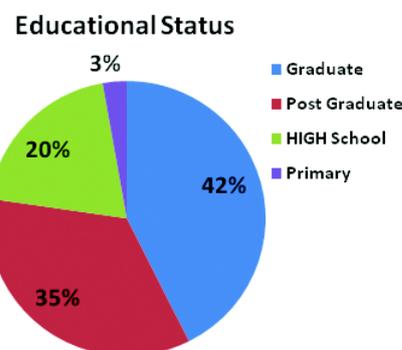


Fig 2 — Diagram showing Educational status of the study population

association was found to exist among risk perception and employment status of study subjects (p < 0.001) with those salaried fearing more of the disease due to inadvertent exposure and compulsory attendance at office.

(c) Six domains Health Belief Model was applied to understand the pattern of precautionary behaviour among the study subjects. The results have been expressed verbatim and quantitative estimated have also been given, being a mixed method study (Fig 4).

1. Perceived susceptibility of disease was estimated by assessing knowledge of study subjects. As high as 91.2% had correct knowledge on the transmission dynamics and agent causing the pandemic. 73.9% opined social media was responsible for information dissemination. Risk perception was higher among those who were educated and 34.3% opined those in hills were more at risk due to tourists visiting their place and it being their main source of livelihood. 91.5% were aware of the symptoms.

2. Perceived severity of disease was assessed and it was seen that majority opined disease was self-limiting and risky only for elderly or immunocompromised. As study subjects were literate, the response was anticipated. However, they avoided hospitals and only 13.1% had visited health care facility while 50.7% had resorted to alternative therapy. Interestingly 38% opined in favour of safe homes if tested positive and only 45.2% felt severe symptoms can be managed in a hospital better. However, 53.2% opined migrant labourers played a pivotal role in disease transmission dynamics.

3. Perceived benefits were assessed and almost all study participants agreed that the pandemic was better avoided and had incurred huge harm. However the importance of precautionary behaviours was stressed by 54.2% cases and needed to be
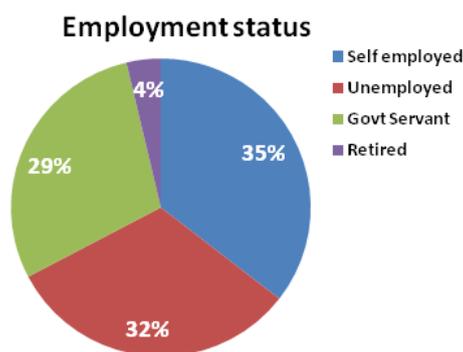


Fig 3 — Diagram showing Employment status of the study population

stringently followed was opined by 92.2% cases and the rest few opined they were indifferent to it as they knew they would be attacked by COVID sooner or later. On assessing on a 5 point Likert's scale 56.1% agreed masks were an absolutely essential, 68.1% strongly agreed to benefits of handwashing, 42.6% strongly agreed to maintaining cough etiquettes. Necessity of lockdown was strongly agreed by 88.7%. These are indicative of the positive responses of the preventive strategies despite the odds and promise a similar enforcement of precautionary behaviour in a sustaining fashion with similar geopolitical distribution. Maintaining social distancing was strongly agreed upon by 73.9%

4. Cue to action was however not responded well as majority opined neither agree nor disagree to any proactive steps to be taken by community to prevent the pandemic spread. However 86.4% opined they would contact nearby health facility for taking care of a tested positive patient in their community and prefer they stay in safe homes rather than in community. The fear and stigma of the disease could be felt.

5. Perceived Barrier was high among the study subjects as majority strongly agreed that the pandemic and the subsequent lockdown had a huge impact on their economy as majority sustained on tourism. 67.2% opined Government should have been applying a phased approach and thought of alternative ways of livelihood for those thriving on tourism industry and tea export business. Many tea gardens faced acute crisis and study subjects strongly disagreed to the sudden lockdown enforcements. 47.1% often worried about COVID-19 and 57.5% felt lockdown affecting general well-being . 40.1% expressed their anguish over having no idea when and where the pandemic ends and death toll stops.

6. Self-efficacy was not understood by majority of study subjects. However 56.4% opined they could tie over the pandemic by following the Government directives. This is an encouraging finding as 40.7% also opined they understood the meaning and methods of asymptomatic transmission hence stayed back home.

### DISCUSSION

The country have never faced such a pandemic where prevention remains the mainstay. HBM is perceived to not only predict future behaviour of residents of the area but also anticipate behavioural dynamics of similar population in such remote inaccessible settings where internet connectivity is also an issue. Source of livelihood being tourism, the industry is hit hard. Yet, positive response to lockdown and in-depth understanding of situation by residents is encouraging. Policies needs to be drafted in accordance for sustaining the population though. Interestingly 24.6% population asked on sequel of the Covid pandemic in terms of their pulmonary functions, morbidity and mortality rates.
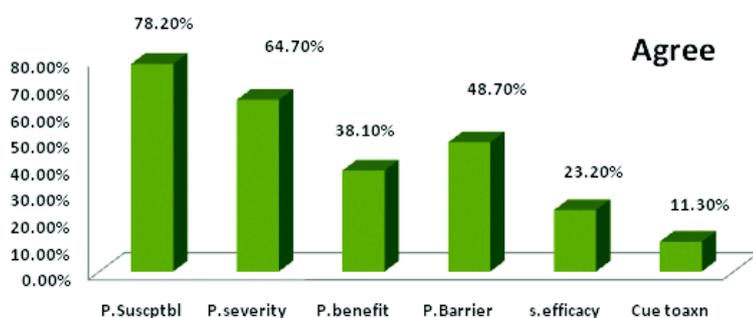


Fig 4 — Showing percentage of study subjects agreeing to the various domains of the Health Belief Model

16.2% asked about the Government strategies to combat stigma, ostracization of health care workers and means to fight unemployment, social pathology and dwindling economic losses. Since law enforcements are not self-sustaining behavioural models hence applying HBM to understand the precautionary behaviours and reasons behind is anticipated to go a long way in fighting the most dreaded pandemic which hit face of mother earth.

Health behaviour model reflected the perceived severity and susceptibility to be higher than the perceived benefits. Not many studies have been conducted regarding the precautionary behaviour among hilly population. HBM indicates that diffusion of sustainable behaviour and its persistence depends on human perceptions rather than law enforcements. Population in hills, have their unique set of challenges due to remote geographical terrain and thriving mainly on tourism and tea industry for livelihood gets badly affected due to lockdown. Hence the benefits needs to be weighed along with the perceived barriers.

Similar studies on HBM concluded that people's intent is the main driving force regarding behavioural dynamics in combating a disease. As COVID is new and not many diseases had prevention as mainstay hence the risk of not adhering to precautionary behaviours is not felt earlier. Other studies found literate and employed people to be more compliant to the rules. They also found those who were self employed were however prone to break the protocols of preventive behaviour as business was the sole source of livelihood. However, HBM applied to Avian Influenza and SARS cases clearly showed like in present study higher perceived severity and susceptibility than other diseases. Risk perception was also high as was vaccination intent. However perceived threats and self-efficacy was low in contrast to present study. However more studies on the area are in the making and recent spikes of reinfection may alter the course of preventive therapies altogether[14-17].

## CONCLUSION

Present study conducted in hilly areas for the first time concluded that risk perception and vaccination intent was high among the study subjects. Majority of study subjects were educated and employed. However perceived susceptibility and severity was very high as compared to perceived benefits and cue to action. This shows that COVID-19 pandemic has had a huge impact on precautionary behaviour as perceived by applying the health behaviour model and hence can be inferred that diffusion of sustainable behaviour change among the hilly population will be more if and when implemented.

## LIMITATIONS

Online method of data collection has its own restrictions and elicitation of information may remain suboptimal. Connectivity remains an issue in hills. Moreover, precautionary behaviours elicited in hilly areas will have its own set of unique challenges given the difficult geographic terrains and hence the results are to be interpreted in accordance viz. accessibility of health services still being lower they already follow preventive strategies as mainstay for majority of cases and conditions.

## REFERENCES

1  Jiang F, Deng L, Zhang L, Cai Y, Cheung CW, Xia Z — Review of the clinical characteristics of coronavirus disease 2019 (COVID-19). *J Gen Intern Med* 2020; 1-5.

2  Chinazzi M, Davis JT, Ajelli M, Gioannini C, Litvinova M, Merler S, *et al* — The effect of travel restrictions on the spread of the 2019 novel coronavirus (COVID-19) outbreak. *Science* 2020. doi: 10.1126/science.aba9757

3  Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, *et al* — Clinical characteristics of  coronavirus disease 2019 in China. *N Engl J Med* 2020.

4  Lau JT, Kim JH, Tsui H, Griffiths S — Perceptions related to human avian influenza and their associations with anticipated psychological and behavioral responses at the onset of outbreak in the Hong Kong Chinese general population. *American Journal of Infection Control* 2007; **35:** 38-49. doi: 10.1016/j.ajic.2006.07.010. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

5  Brug J, Aro AR, Richardus JH — Risk perceptions and behavior: Towards pandemic control of emerging infectious diseases. *International Journal Behavioral Medicine* 2009; 16: 3-6. doi: 10.1007/s12529-008-9000-x. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

6  Janz Nancy K, Marshall H Becker —  The Health Belief Model: A Decade Later. *Health Education & Behavior* 1984; **11(1):** 47. doi:10.1177/109019818401100101. hdl:2027.42/66877. PMID 6392204

7  Rosenstock Irwin — Historical Origins of the Health Belief Model". *Health Education  &  Behavior*  1974; **2 (4):**  328-35. doi:10.1177/109019817400200403.

8  Siddiqui Taranum Ruba, Ghazal Saima, Bibi Safia, Ahmed Waquaruddin, Sajjad Shaimuna Fareeha — (2016-11-10). "Use of the Health Belief Model for the Assessment of Public Knowledge and Household Preventive Practices in Karachi, Pakistan, a Dengue-Endemic City". *PLOS Neglected  Tropical  Diseases*. 10 (11):  e0005129. doi:10.1371/journal.pntd.0005129. ISSN 1935-2735. PMC 5104346. PMID 27832074.

9  Carpenter Christopher J — A meta-analysis of the effectiveness of health belief model variables in predicting behavior". *Health Communication*  2010; **25(8):**  661-9. doi:10.1080/10410236.2010.521906. PMID 21153982.

10  Glanz Karen, Barbara K Rimer, K Viswanath — *Health behavior and health education: theory, research, and practice* (PDF) (4th ed.). 2008; San Francisco, CA: Jossey-Bass. pp. 45–51. ISBN 978-0787996147

11  Zhao S, Lin Q, Ran J — Preliminary estimation of the basic reproduction number of the novel  Coronavirus(2019 n-CoV) in China from 2019 to 2020: a data-driven analysis in the early phase of outbreak. *International Journal of Infectious disease* 2020; **92:** 214-7.

12  Zaka A, Shamloo SE, Fiorente P — CoOVID-19 pandemic as a watershed moment: A call for systematic psychological healthcare for frontline medical staff. Journal of Health Psychology 2020 Epub ahead of print 30 March

13  Biscayart C, Angeleri P, Lloveras S — The next big threat to global health ? 2019 novel corena virus (2019-n CoV) :: What advise can we give to travellers ?- Interim recommendations January 2020 from Latin American Society for Travel Medicine (SLAM VI) Travel Medicine Infectious Disease 2020; 101567

14  Najimi A — Knowledge, beliefs and preventive behaviors regarding Influenza A in students: a test of the health belief model. *J Educ Health Promot* 2013; **2:** 23

15  Chan JF-W, Yuan S, Kok K-H, To KK-W, Chu H, Yang J, *et al* — A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *The Lancet* 2020; **395(10223):** 514-23.

16  Rosenstock IM, Strecher VJ, Becker MH — Social learning theory and the health belief model. *Health education quarterly* 1988; **15(2):** 175-83

17  Zhang L-L, Dalal K, Wang S-M — Injury Related Risk Behaviour: A Health Belief Model-Based Study of Primary School Students in a Safe Community in Shanghai. 2013; PLoS ONE 8(8): e70563. https://doi.org/10.1371/journal.pone.007056.