

Knowledge and attitude regarding NCDs among adolescents: A comparative study between government and private schools students

S.N. Ghosh and Nilanshi Bhatnagar

H.P. University, Summer Hill, Shimla

NCDs are a huge silent killer accounting for approximately 74% global deaths. A huge young population, of above 1.3 billion, 1 in 4 individual possesses a risk of dying from an NCD before they reach the age of 70. Most of the chronic disease risk factors being unhealthy lifestyle behaviours are acquired during adolescent age groups. In this study we have compared knowledge and attitude of adolescents in private and government schools in Himachal Pradesh towards NCDs using t-test. It also investigates the differential pattern of relationship among variables of knowledge and attitude towards NCDs in terms of nature and magnitude among these students. NCDs Knowledge Measure and NCDs Attitude Measure tests have been used to assess the knowledge and attitudes prevalent among school going adolescents. Results depicted that though private school students displayed a higher knowledge of NCDs than government school students ($t=2.57, p<.05$), government school students reported a significant relationship between knowledge and attitude about NCDs ($r=.401, p<.05$). This indicates that higher knowledge may not necessarily reason or trigger attitudinal change among the students of private schools, however among government school students, level of knowledge becomes a source of attitudinal change towards NCDs. Combined efforts of parents, teachers and school management may encourage children to seek more and proper knowledge about health and health risk factors. Furthermore, bringing these issues in to the public domain by organizing health talks and discussions can lower the risk of developing NCDs at this young stage. Imparting knowledge and strengthening positive attitudes toward prevention of NCDs among young people would prepare the young adults with a pro-active and positive approach towards NCDs.

Keywords: NCDs, Knowledge, and Attitude.

Non-communicable diseases or chronic diseases are a combination of genetic, physiological, environmental and behavioural factors making them non-transmissible and of long duration. Commonly, NCDs include hypertension, cardiovascular disorder (CVD), diabetes, chronic respiratory disease and Cancer. NCDs occur due to many factors like rapid unplanned urbanization, globalization of unhealthy lifestyles diets and a lack of physical activity. Major risk factors, namely, tobacco use, harmful use of alcohol, unhealthy diet, and physical inactivity, lead to metabolic/physiological changes like raised blood pressure, overweight/obesity, raised blood glucose, and higher cholesterol levels (WHO, 2014). Escalating NCDs has been a major cause of concern in Public health research.

The seriousness of these can be seen in the fact that at a global level, 7 out of 10 leading causes of deaths in 2019 were due to NCDs. Also, in 2019, 74% of deaths globally were accounted for due to NCDs. An estimated 32% of all global deaths (17.9 million deaths) were accounted by CVDs in 2019, of which 85% were due to heart attack and stroke. Chronic Obstructive Pulmonary Disease (COPD) has now become the third leading cause of death worldwide, causing 3.23 million deaths in 2019 (WHO Global Health Estimates, 2020). Moreover, the prevalence of global diabetes was estimated to be 9.3% (463 million people), rising to 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045. (IDF Diabetes Atlas Committee, 2019). Cancer, accounting for nearly 10 million deaths in 2020, is steadily becoming one of the leading

causes of death worldwide (Ferlay, Ervik et al., 2020). Eighty-two percent of premature NCD deaths occur within low- and lower middle-income countries (Williams, Allen, et al., 2018).

Rapid increase in disease burden due to Non-communicable disease in India point to a fact that India is going through an epidemiological transition. With huge population, of above 1.3 billion, India contributes to around 5.87 million NCD related deaths (Nethan, Sinha, et al., 2017). WHO NCDs Progress Monitor (2017) attributed an alarming 61 per- cent deaths in India to NCDs. Usually, NCD is prevalent among individuals in the age category of 55 years and above however in India its onset occurs a decade early that is ≥ 45 years. Researches on disease burden reveal that there are three leading causes of mortality i.e., cardiovascular diseases, respiratory disease and diabetes that account for maximum number of death in India due to NCD (Indrayan, 2005; Siegel, Patel, Ali, 2014). Most of these deaths are premature and occur in the age range of 30-70 years. Bloom et al. (2010) reported if these major NCDs including cancer is not addressed it may incur huge economic loss of approximately US \$ 3.55 trillion to the exchequer of India by 2030. In this context, the Government of India's commitment to meeting the NCD-related Sustainable Development Goal target states that, "by 2030, reduce by one third premature mortality from NCDs through prevention and treatment and promote mental health and well being" (WHO, 2018).

Knowledge is a key factor in improving health behaviour. People with higher knowledge understood their illness better, perceive it as less threatening, and underwent greater personal and treatment control (Asnani, Gooden, Grindley, Madden, 2017). Better knowledge has been found to have a positive impact on adherence to a treatment regime and prevention and control of chronic disease (Al-Qazaz, Sulaiman, Hassali, Shafie, Sundram et al. 2011, Wright-Nunes, Luther, Ikizler, Cavanaugh 2012 and Karaeren, Yokuşoğlu, Uzun, Baysan, Köz C et al. 2009)

In the context of NCDs, knowledge means awareness concerned with diseases, their symptoms, signs, risk factors, preventions and treatment (Jain, Gupta, Gupta, Jain, Jain,

2018). People possessing a higher level of knowledge of risk factor tend to take fewer risks. (Waśniowska, Kopeć, Szafraniec, Kozela, Sarnecka, Knap, Pająk, Podolec, 2018). Educational interventions show improvement in patients' knowledge about diseases, quality of life, self-care activities and overall health (Molsted, Tribler, Poulsen, Snorgaard, 2012). Therefore, increasing knowledge among high risk population is an effective means to not only prevent chronic disease but also can delay their onset (Bergsten, Bergman, Fridlund, Arvidsson, 2011; Rukstalis, Blosky, Steinberg, Anglade, Anderer, Bloom, 2011). It can then be applied to shift population distribution of these NCDs risk factors (Jain, Gupta, Gupta, Jain, Jain, 2018). In a recent study investigators reported a strong association between knowledge, attitude and practice regarding COVID-19 (Erfani, Shahriariarad, Ranjbar, Miramadizadeh and Moghadami, 2020). The authors observed that increase in general populations' knowledge regarding COVID-19 has a strong influence on their attitude and practice about the pandemic.

Attitude plays a vital role in adopting a healthy life style to prevent illness and promote health (Mäntyselkä, Kautiainen, Miettola, 2019). Attitude refers to inclination to react in certain way in certain situation. A negative attitude is also associated with lack of acknowledgement, misconception about the illness and delay in seeking help (Mahajan, Naik, Jain, Patira, Prasad, Mogri, Muwonge, Lucas, Faruq, Sankaranarayanan, Iyer, and Basu, 2019). Though there was sufficient knowledge regarding NCDs, yet the attitude and practices towards NCDs remained low. The attitude regarding NCDs behavioural risks, disease management, lifestyle change and support network was unsatisfactory. (Ithnin, et al., 2020).

Adolescent age is vulnerable to form habits and develop lifestyle that becomes risk factor for NCD. Focusing prevention through spreading knowledge and awareness among them can prove effective in bringing down the disease burden due to NCDs. Adolescents (10-19 years old) comprise a fifth of the Indian population (253.2 million), there is very little published information about the burden of disease for this age group. Moreover, NCDs

and injuries are responsible for a greater number of deaths and disability-adjusted life-years (DALYs) than communicable diseases (Joshi, Alim, Maulik, Norton, 2017). Children and adolescents in low and middle income countries suffering from NCDs die prematurely because of late diagnosis or lack of access to medications or to lack of adequate treatment, or suffer long term disabilities from chronic conditions which are not adequately managed (WHO, 2014). Awareness among the school children regarding lifestyle risk factors of NCDs is quite unsatisfactory (Divakaran, Muttapillymyalil, Sreedharan and Shalini, 2010). Imparting adequate awareness, inculcating positive attitude about NCDs and their risk factors in young high school students would be of great assistance in preventing NCDs at primordial level only.

The present study intends to explore and compare level of knowledge and attitude related to NCDs among government and private school students in Himachal Pradesh. The study further aims to investigate the differential pattern of relationships among the variables of knowledge and attitude in terms of its nature and magnitude in the government and private school students, related to the four main chronic diseases (cardiovascular diseases, chronic obstructive pulmonary disorder, diabetes mellitus, cancer). We are unaware of published information on knowledge and attitude among high school students related to these NCDs in Himachal Pradesh. . This study will also provide vital information to develop educational strategies to enhance knowledge levels and instill positive attitudes in young adults so as to take a step forward towards a disease free healthy society.

Method

The present study was conducted in the city of Shimla, Himachal Pradesh, India. A list of schools in Shimla was referred to and schools were stratified into government and private senior secondary schools. A purposive random sample of 100 senior secondary students, 50 from government school and 50 from private school were selected using probability proportion to size (PPS) method. The participation of all the students was voluntary and for this both oral as well as written consent was obtained from the

participants. The age range was between 16 to 18 years. The mean \pm SD age of government and private school students was 17.74 ± 1.034 and 16.84 ± 1.098 years respectively.

Tools

NCD Knowledge Measure: It is a cross-cultural test, designed to assess the knowledge about various NCDs. This questionnaire was constructed with the help of various standardized questionnaires pertaining to specific diseases of NCDs which consists of 40 items, divided into 5 sections assessing knowledge about various NCDs (cardiovascular diseases, diabetes, respiratory diseases, cancer and substance abuse) (Bergman, Reeve, Moser, Scholl, Klein, 2011; Swift, Glazebrook, Macdonald, 2006; Michigan Diabetes Research and Training Center's Revised Diabetes Knowledge Test, 2015; Uzel, Karadağ, Önür, Turan, Yentürk, Tuncay, 2017; Cancer Research UK, University College London, Kings College London, and University of Oxford (2008); Salim, Siddiqui 2015).

NCD Attitude Measure: It is a cross-cultural test, designed to assess the attitude about various NCDs. This questionnaire was constructed with the help of several other standardized questionnaires pertaining to specific diseases of NCDs which consists of 40 items, divided into 5 sections assessing attitude about various NCDs (cardiovascular diseases, diabetes, respiratory diseases, cancer and substance abuse) (Mirza, Aslam, Perrin, Curtis, Stenback, Gipson, Alrabaa, 2016; Michigan Diabetes Research and Training Center, University of Michigan, 2015; Sayiner, Alzaabi, Obeidat, Nejjari, Beji, Uzaslan, Naft, Khan, Tageldin, Idrees, Rashid, Hasnaoui, 2012; Marlow, Wardle, 2014; Salim, Siddiqui 2015).

Statistical Analyses

The t-test was used to find out the differences between government and private senior secondary school students with regard knowledge and attitude about NCD. Correlation analysis was applied to determine the inter-relationship among all the variables i.e. knowledge about NCD, attitude about NCD.

Results

Table 1. Comparative Study Of Government And Private School Students With Regard To Knowledge and Attitude

Variables	Government Schools	Private Schools	t-value
NCD Knowledge	M=20.48 SD=3.209	M=22.14 SD=3.239	2.575*
NCD Attitude	M=138.00 SD=9.363	M=136.38 SD=12.868	0.720

*p<0.01

Private school students (M=22.14) reported significantly higher knowledge (t=2.575, p< .01) from government school students (M=20.48) in terms of NCD (Table 1).

Table 2. Relationship between Knowledge and Attitude about Non-Communicable Disease among the students of Government and Private Schools

Type of School	Coefficient of Correlation
Government	.401*
Private	.201

*p<0.01

Knowledge and attitude about NCD was significantly correlated in government school students (r=. 401, p<. 01) (Table2). This means more these students have knowledge about NCDs more will be their positive attitude towards these diseases.

Discussion

The results clearly reveal that private school students reported significantly higher level of knowledge of non-communicable diseases than government school students. This means that knowledge possessed by the students studying in private schools regarding the causal factors, risk factors and the steps to be taken to prevent NCDs is more as compared to their counterparts studying in government schools. More private school students had heard about NCDs as compared to their government school comparables. While significant difference was observed between private and government school students however the level of knowledge about NCD was nearly at average level. Several

studies have reported a low level of knowledge among adolescents about NCD, NCD prevention and risk behavior (Ade, Chethena, Mane and Hiremath 2014, Chaudhari, Rami and Thakor, 2016).

Gupta, Kumari, Hussain, et al. (2018) reported higher level of knowledge about NCDs among adolescents. The authors suggested it could be due to maternal literacy. Study on cardiovascular risk factors found despite moderate levels of knowledge in participants they had very low knowledge in vital areas contributing to these disorders. Researches need to focus on not only the overall knowledge about NCDs but also the contributory factors of NCD to narrow the gap between knowledge, attitude and consequent behaviour.

Higher knowledge about NCD among the private school students in the present study may be due to the fact that, these schools organize talks by medical professionals on general health issues, occasionally, that may trigger students' curiosity to acquire more information about health and illness including NCDs. Government schools do have regular health checkup camps; however, there are hardly any public talks or discussions on health issues.

Studies have reported low knowledge on NCD among adult population. Jain, Gupta, Gupta, Jain and Jain (2018) reported poor knowledge on NCD among 29.9% population and 62% population had average and barely 8.1% had high knowledge. Authors recommended that there is a need to enhance effort to raise the knowledge in the community regarding NCD, as knowledge and awareness concerning NCD are crucial factor in population to ascertain a formidable preventive strategy.

Another reason for low knowledge among government school students could be the difference in backgrounds between private school students and government schools students. Parents of private school students belong to higher socio economic status generally are well versed with technology, are well aware of their surroundings, well informed about various NCDs, their risk factors, how they spread and ways to prevent them and hence are able to pass this information to their children. This

albeit is generally not true in case of government schools where majority parents come from a low socio-economic status. These factors are corroborated by researches worldwide (Lago-Peñas, Rivera, et al. 2021; Niessen, Mohan, et al., 2018). Gupta, Kumari, Hussain, et al (2018) also argued that the reasons for higher knowledge among private school students could be their institutional background, maternal literacy, high socio economic status and also proximity to urban centre.

Awareness signifies that the person has come across the term at least once. Private school teachers are mostly younger than government schoolteachers. Having been educated later have more chances of coming across the recent health awareness programmes that have become a part of the curriculum (Allensworth, Lawson, et al., 1997). Earlier, a study in Northwestern Himlayas reported private school teachers to have higher knowledge on HIV/AIDS than the government school teachers. These teachers having higher knowledge were younger in age (Ghosh, Chhabra, Springer and Sharma, 2008). The discrepancy of age might effect in higher knowledge among the private school teachers than their government school counterparts. Investigators in this context observed that teachers' knowledge coupled with attitude and emotion have a strong influence on students' conceptual understanding of content (Mansor, Halim, Osman, 2010).

More knowledge among teachers results in them imparting the knowledge in an adaptive, analytical and easier manner to their students enlightening them about the various ill effects of unhealthy lifestyle practices and benefits of healthy lifestyle practices. This further develops a healthy positive attitude towards adopting these healthy practices (Uluga, Ozdenb, Eryilmazc, 2011 and Vaz, Wilson, Falkmer, Sim, Scott, Cordier, 2015). A study aimed to examine effects of teacher characteristics on student knowledge in a health course showed with greater student knowledge gains was associated with teacher characteristics like being certified to teach health, having a dedicated classroom versus having attended professional development sessions. (Murray Sheremenko, Rose, et.al, 2019).

Keeping in view the low level of awareness among the schoolteachers about these chronic diseases there is an urgent need to create the awareness. It is important in order to further impart accurate knowledge to the school children about this dreaded menace. An evidence-based education sector response to NCDs risk factors targeting the critical transition periods of early life, including adolescence, is essential with participation from families and cross-sector collaboration with providers of social and community services, including youth clubs and sports centers so that these become an integral part of the daily routine of adolescents thereby reducing the spread of chronic diseases and risk factors at grass root levels (Gamage and Jayawardhana, 2017).

This study, provides inputs to identify the level of knowledge and interrelationship among the variables to find whether these variables move together in these two specific groups or there is a differential pattern which can further be used to provide inputs regarding various strategies to improve the already existing preventive measures at individual level and community level. Knowledge among young people could provide for a better and more proactive behaviour to prevent such diseases within a community in the long term by developing a healthy positive attitude towards NCDs (Tudor, Locke, Ainsworth, et.al 2002)

The overall result indicates that although private school students had higher knowledge about NCD than government school students, latter students however report a significant relationship between knowledge and attitude about NCD. Private school students did not report such association. This suggests that higher levels of knowledge do not reflect on their attitude about NCD. Despite lower knowledge of the government school students about NCD they have a more favorable attitude towards NCD. Though the relationship is moderately significant yet it denotes that knowledge and attitude move together amid government school students. This may have important implications while developing intervention strategies for preventive interventions for school students. These finding points to the fact that it is crucial to identify specific components that

need to be strengthened to have a stronger relationship among the variables of knowledge and attitude that in turn could lead to positive health behaviour.

References

- Ade, A., Chethana, K.V., Mane, A., Hiremath, S.G. (2014) Non-communicable diseases: awareness of risk factors and lifestyle among rural adolescents. *International Journal of Biological and Medical Research*, 5(1): 3769-3771.
- Allensworth, D., Lawson, E., Nicholson, L., et al., (1997) Institute of Medicine (US) Committee on Comprehensive School Health Programs in Grades K-12, *Schools & Health: Our Nation's Investment*. Washington (DC): *National Academies Press (US)*, 2, Evolution of School Health Programs.
- Al-Qazaz HKh, Sulaiman SA, Hassali MA, Shafie AA, Sundram S, Al-Nuri R, Saleem F. (2011) Diabetes knowledge, medication adherence and glycemic control among patients with type 2 diabetes. *International Journal of Clinical Pharmacy*; 33(6):1028-35. doi: 10.1007/s11096-011-9582-2.
- Asnani, M.R., Barton-Gooden, A., Grindley, M., Knight-Madden, J. (2017) Disease Knowledge, Illness Perceptions, and Quality of Life in Adolescents With Sickle Cell Disease: Is There a Link? *Global Pediatric Health*. 7;4:2333794X17739194. doi: 10.1177/2333794X17739194.
- Bergman, H.E., Reeve, B.B., Moser, R.P., Scholl, S., Klein, W.M. (2011) Development of a Comprehensive Heart Disease Knowledge Questionnaire. *Am J Health Educ.*;42(2):74-87. doi: 10.1080/19325037.2011.10599175. PMID: 21720571; PMCID: PMC3124098.
- Bergsten, U., Bergman, S., Fridlund, B., Arvidsson, B. (2011) Striving for a good life - the management of rheumatoid arthritis as experienced by patients. *The Open Nursing Journal*, 5:95-101. doi: 10.2174/1874434601105010095.
- Bloom, B., Cohen, R.A., Freeman, G. (2010). Summary health statistics for U.S. children: National Health Interview Survey, 2009. National Centre for Health Statistics. *Vital and Health Statistics*, 10 (247): 1-80.
- Cancer Awareness Measure toolkit - version 2.1(2007-2008.) Cancer Research UK, University College London, Kings College London, and University of Oxford.
- Chaudhari, A., Rami, K.C., Thakor, N.C. (2016), Assessment of knowledge regarding noncommunicable diseases and their risk factors among students of higher secondary school: an interventional study. *International Journal of Medical Science and Public Health*; 5:15-118.
- Diabetes Attitude Scale (DAS-3) (2015) Michigan Diabetes Research And Training Center(MDRC). Elizabeth Weiser Caswell Diabetes Institute, University of Michigan.
- Divakaran, B., Muttapillymalil, J., Sreedharan, J., Shalini, K. (2010) Lifestyle riskfactors of non-communicable diseases: Awareness among school children. *Indian Journal of Cancer.*, 47 (5):9-13.
- Erfani, A., Shahriarirad, R., Ranjbar, K., Mirahmadizadeh, A., Moghadami, M. (2020) Knowledge, Attitude and Practice toward the Novel Coronavirus (COVID-19) Outbreak: A Population- Based Survey in Iran. *Bull World Health Organ*. doi: <http://dx.doi.org/10.2471/BLT.20.256651>
- Ferlay, J., Ervik, M., Lam, F., Colombet, M., Mery, L., Piñeros, M., et al. (2020) *Global Cancer Observatory: Cancer Today*. Lyon: International Agency for Research on Cancer.
- Gamage, A.U., Jayawardhana, P.L. (2017) Knowledge of non-communicable diseases and practices related to healthy lifestyles among adolescents, in state schools of a selected educational division in Sri Lanka. *BioMed Central Public Health*, 18(1): 64.
- Ghosh, S., Chhabra, R., Springer, C., Kumar Sharma, S. (2008). A study of knowledge, attitude and sensitivity about HIV/AIDS among schoolteachers in north-western Himalayas. *Ethnicity and disease*. 18, S2:172-174.
- Global Status Report on Noncommunicable Diseases 2014: Attaining the Nine Global Noncommunicable Diseases Targets; A Shared Responsibility (2014). World Health Organisation.
- Gupta, R.K., Kumari, R., Hussain, S., Raina, S.K., Langer, B., Parveen, Z. (2018) A cross sectional study to evaluate awareness about non-communicable diseases among rural adolescents in North West India. *Journal of Dental and Allied Sciences*;7:60-4.
- Indrayan A. (2005) Forecasting vascular disease cases and associated mortality in India. *Burden of Disease in India: Background Papers*:197-218. International Diabetes Federation Diabetes Atlas, 9th edition, 2019.
- Ithnin, M., Nadeeya A.U.M., Juliana, N., Effendy, N.M.,

- Sahar, M.A., Abdullah, K.H.A, Aris, M.S.M., Rani, M.D.M. (2020) Knowledge, attitudes and practices on risk factors of non-communicable diseases (NCDs): a cross-sectional survey among urban and rural adults in Negeri Sembilan, Malaysia. *International Journal of Health Promotion and Education*.
- Jain, S., Gupta, S.K., Gupta, S., Jain, V., Jain, S. (2018) Knowledge of Modifiable Risk Factors of Non Communicable Diseases (NCDs): A Cross Sectional Study from Urban Slum Bhopal. *National Journal of Community Medicine*, 9(6):443-447.
- Joshi, R., Alim, M., Maulik, P.K., Norton, R. (2017) A contemporary picture of the burden of death and disability in Indian adolescents: data from the Global Burden of Disease. *International Journal of Epidemiology*, 46(6):2036-2043.
- Karaeren, H., Yokuşoğlu, M., Uzun, S., Baysan, O., Köz, C., Kara, B., Kirilmaz, A., Naharci, I., Pinar, M., Yilmaz, M.B., Uzun, M. (2009) The effect of the content of the knowledge on adherence to medication in hypertensive patients. *Anadolu Kardiyol Derg.*;9(3):183-8.
- Kurian, B., Qurieshi, M.A., Ganesh, R., Leelamoni, K. (2016) A community-based study on knowledge of diabetes mellitus among adults in a rural population of Kerala. *International Journal of Non-Communicable Diseases*, 1:59-64.
- Lago-Peñas, S., Rivera, B., Cantarero, D., Casal, B., Pascual, M., Blázquez-Fernández, C., Reyes, F. (2021) The impact of socioeconomic position on non-communicable diseases: what do we know about it? *Perspectives in Public Health*;141(3):158-17.
- Mahajan, M., Naik, N., Jain, K., Patira, N., Prasad, S., Mogri, S., Muwonge, R., Lucas, E., Faruq, F., Sankaranarayanan, R., Iyer, S., Basu, P. (2019) Study of Knowledge, Attitudes, and Practices Toward Risk Factors and Early Detection of Noncommunicable Diseases Among Rural Women in India. *Journal of Global Oncology*;5:1-10. doi: 10.1200/JGO.18.00181.
- Mansor, R., Halim, L., & Osman, K. (2010). Teachers' knowledge that promote students' conceptual understanding, *Procedia-Social and Behavioral Sciences* 9:1835–1839.
- Mäntyselkä, P., Kautiainen, H., Miettola, J. (2019) Beliefs and attitudes towards lifestyle change and risks in primary care - a community-based study. *BMC Public Health*. 5;19(1):1049. doi: 10.1186/s12889-019-7377-x.
- Marlow, L.A.V., Wardle, J., (2014) Development of a scale to assess cancer stigma in non-patient population. *BMC Cancer*, 14: 285. <http://www.biomedcentral.com/1471-2407/14/285>.
- Mirza, A., Aslam, S., Perrin, K., Curtis, T., Stenback, J., Gipson, J., Alrabaa S. (2016). Knowledge, attitudes and practices among patients with coronary artery disease in Dhaka, Bangladesh. *Int J Community Med Public Health*;3(10):2740-2748.
- Molsted, S., Tribler, J., Poulsen, P.B., Snorgaard, O. (2012). The effects and costs of a group-based education programme for self-management of patients with Type 2 diabetes. A community-based study. *Health Education and Research*, 27(5): 804–813.
- Murray, Colleen C., Ganna Sheremenko, India D. Rose, Thearis A. Osuji, Catherine N Rasberry, Catherine A Lesesne, J. T. Parker, Georgi Roberts (2019) The Influence of Health Education Teacher Characteristics on Students' Health-Related Knowledge Gains. *Journal of School Health* 89(2), doi:10.1111/josh.12780.
- Nethan S, Sinha D, Mehrotra R. (2017) Non Communicable Disease Risk Factors and their Trends in India. *Asian Pacific Journal of Cancer Prevention*. 2017;18(7):2005-2010.
- Niessen, L.W., Mohan, D., Akuoku, J.K., Mirelman, A.J., Ahmed, S., Koehlmoos, T.P., Trujillo, A., Khan, J., Peters, D.H. (2018) Tackling socioeconomic inequalities and non-communicable diseases in low-income and middle-income countries under the Sustainable Development agenda. *Lancet*;391(10134):2036-2046. doi: 10.1016/S0140-6736(18)30482-3.
- Noncommunicable Diseases Progress Monitor (2017). Geneva: World Health Organization; 2017.
- Revised Diabetes Knowledge Test (2015) Michigan Diabetes Research And Training Center (MDRC). Elizabeth Weiser Caswell Diabetes Institute, University Of Michigan.
- Rukstalis, M., Blosky, M. A., Steinberg, H., Anglade, M., Anderer, T., & Bloom, F., Jr. (2011). C-C2-05: Primary Care Web-Based Lifestyle Intervention for Type 2 Diabetes: Randomized Controlled Trial to Improve Knowledge and Self-Care. *Clinical Medicine & Research*, 9(3-4), 164. doi:10.3121/cmr.2011.1020.c-c2-05.
- Salim, A.M., Siddiqui, A.F., & Arabia, S. (2015). Substance Abuse, A Public Health Challenge: Study From Jizan City, Saudi Arabia.
- Sayiner, A., Alzaabi, A., Obeidat, N.M., Nejari, C., Beji, M., Uzaslan, E., Nafti, S., Khan, J.A.,

- Tageldin, M.A., Idrees, M., Rashid, N., E.I. Hasnaoui, A.; BREATHE Study Group (2012) Attitudes and beliefs about COPD: data from the BREATHE study. *Respir Med.*;106 Suppl 2:S60-74. doi: 10.1016/S0954-6111(12)70015-X. PMID: 23290705.
- Seigel, K.R., Patel, S.A., Ali, M.K. (2014) Non-communicable diseases in South Asia: contemporary perspectives. *British Medical Bulletin*;111:31-44.
- Swift, J.A., Glazebrook, C., Macdonald, I. (2006) Validation of a brief, reliable scale to measure knowledge about the health risks associated with obesity. *International Journal of Obesity* 30(4):661-8. doi:10.1038/sj.ijo.0803165.
- The Global Health Observatory (2020) Global Health Estimates-Leading causes of death. World Health Organisation.
- Tudor-Locke, C., Ainsworth, B.E., Thompson, R.W., Matthews, C.E. (2002) Comparison of pedometer and accelerometer measures of free-living physical activity. *Medicine and Science in Sports and Exercise* ;34(12):2045-51. doi: 10.1097/00005768-200212000-00027.
- Uluga, M., Ozdenb ,M.S., Eryilmaz, A. (2011) The effects of teachers' attitudes on students' personality and performance. *Procedia - Social and Behavioral Sciences* 30: 738 – 742.
- Uzel, F.I., Karadağ, P., Önur, S.T., Turan, D., Yentürk, E., Tuncay, E. (2017) A Basic Question: Are Patients with Chronic Obstructive Pulmonary Disease Aware of Their Disease? *Turk Thorac J.*;18(4):114-118. doi:10.5152/TurkThoracJ.2017.16048. PMID: 29404174; PMCID: PMC5783070.
- Vaz, S., Wilson, N., Falkmer, M., Sim, A., Scott, M., Cordier, R., Falkmer, T. (2015) Factors Associated with Primary School Teachers' Attitudes Towards the Inclusion of Students with Disabilities. *PLoS One.*;10(8):e0137002. doi: 10.1371/journal.pone.0137002.
- Waśniowska, A., Kopeć, G., Szafranec, K., Kozela, M., Sarnecka, A., Knap, K., Pająk, A., Podolec, P. (2018) Knowledge of cardiovascular disease (CVD) risk factors in population of Małopolska voivodeship in two independent cross-sectional studies. *Przegląd Epidemiologiczny*,72(1):75-85.
- WHO (2018). United Nations Agency Briefs, Responding To The Challenge Of Non-Communicable Diseases, World Health Organisation.
- Williams, J., Allen, L., Wickramasinghe, K., Mikkelsen, B., Roberts, N., and Townsend, N. (2018) A systematic review of associations between non-communicable diseases and socioeconomic status within low- and lower-middle-income countries. *Journal of Global Health* ; 8(2): 020409. doi: 10.7189/jogh.08.020409
- World Health Organisation (2014) Global status report on Non-Communicable Disease. Geneva: World Health Organization.
- Wright-Nunes, J.A., Luther, J.M., Ikizler, T.A., Cavanaugh, K.L. (2012) Patient knowledge of blood pressure target is associated with improved blood pressure control in chronic kidney disease. *Patient Education and Counselling*;88(2):184-8. doi: 10.1016/j.pec.2012.02.015.

S.N. Ghosh, Professor, Department of Psychology, H.P. University, Summer Hill, Shimla-171005 (H.P.), India. Email: sngphu@gmail.com

Neelanshi Bhatnagar, Research Scholar, Department of Psychology, H.P. University, Summer Hill, Shimla-171005 (H.P.), India. Email: neelanshi.bhatnagar.nb@gmail.com