
COMMENTARY

Homogeneity in Case/Control Numbers and North Indian Caste Criteria in Cervical Cancer/Female Urology Genetic-Studies at a Premier Medical Research Institute in Lucknow, India

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Abstract

Cervical cancer has emerged as a major public health problem in Lucknow and New York in the 21st century. Cancer genetic studies are essential to identify/stratify disease-susceptible individuals in a population-based cohort. Sample size homogeneity and North Indian caste in female urology genetic-studies are significant issues in meaningful interpretation of data. A review of scientific literature using Pubmed database was conducted, including an assessment of cervical cancer genetic studies conducted as part of the author's doctoral dissertation at a premier Lucknow-based medical research Institute. Sample size numbers and caste criteria in the North Indian cohort (N≤400 subjects) were evaluated with homogeneity in the sample cohort data set(s). Subgroup caste-stratification of North Indian cohort is equally essential, for instance, Brahmin (e.g. Pandey), Vaishya (e.g. Mittal), Rajput (e.g. Singh) and Kshudra (e.g. Yadav) during the conception and design of genetics-based studies. Sample size homogeneity in histopathologically confirmed case and control numbers and caste-based stratification in a North Indian cohort is essential in single nucleotide polymorphism (SNP) studies in cervical cancer susceptible populations to draw more definitive conclusions.

Keywords: Case-control studies - caste - female urology - homogeneity - North Indian

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Introduction

Cervical cancer is a major public health problem in Lucknow as well as New York; human papillomavirus (HPV) is the major etiological agent of cervical carcinoma in women worldwide, including North India (Pandey and Chandravati, 2012). Cancer genetic studies using a case-only or case-control approach are emerging as clinically significant population-based cancer detection and/or prevention model(s) in disease susceptible individuals of diverse castes and ethnicities, including North Indian (de Oliveira and Silva, 2012). Sample size homogeneity in histopathologically confirmed case and control numbers is essential in single nucleotide polymorphism (SNP) studies in cancer susceptible populations to draw more definitive conclusions and meaningful data interpretation (Yu et al., 2011).

As an elegant example in female urology genetic studies, cervical cancer research studies conducted as part of the author's doctoral dissertation at a premier medical research Institute based in Lucknow, India (Sanjay Gandhi Post Graduate Institute of Medical Sciences), maintained homogeneity in cervical cancer patients numbers and

healthy, disease-free controls; the sample size numbers were 150 cases/150 controls and 200 cases/200 controls (Pandey et al., 2009; 2010; 2011). However, apart from sample size homogeneity, one of the major study weaknesses in SNP-studies include non-consideration of North Indian caste criteria; for instance, Brahmin (e.g. surname Pandey), Vaishya (e.g. Mittal), Rajput (e.g. Singh) and Kshudra (e.g. Yadav) while designing the genetics-based research study and/or enrolling eligible subjects for participation in the study (Gangwar et al., 2009).

Furthermore, to precisely dissect the molecular genetic intricacies involved in cervical cancer/female urology studies, a strategic collaborative approach using clinically confirmed cervical cancer cases and age- as well as caste-matched disease-free healthy controls is required; such research approaches may be clinically relevant not only in cervical cancer research but also prostate cancer genetic studies in pre and/or post-robotic surgery patient(s)-derived blood and tissue specimens at federal/state funded premier medical research institutes in Lucknow as well as New York, primarily Weill Medical College of Cornell University (Pandey and Chandravati, 2013).

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Literature Review

A review of medical research and scientific literature using Pubmed database was conducted during the timeline 2009-2013; the comprehensive search criteria included the most relevant cervical cancer SNP-studies in an ethnic North Indian population. The abstracts as well as full-text articles were carefully reviewed, including SNP-data sets with histopathologically confirmed, de novo, pre-operative cervical cancer cases and age-matched, healthy, disease-free controls.

An assessment of cervical cancer genetic studies conducted as part of the author's 3-year original, independent doctoral dissertation at a premier Lucknow-based medical research Institute was also conducted. Sample size numbers and caste criteria in the North Indian cohort ($N \leq 400$ subjects) were evaluated. The number of cervical cancer cases and controls in each clinically-relevant SNP-data set were assessed, and the inclusion and/or exclusion of North Indian caste(s) such as Brahmin, Kshatriya, Rajput and Kshudra were evaluated in each published cervical cancer gene polymorphism study.

Cervical cancer data from the most relevant published articles and the doctoral dissertation original research conducted by the author at a premier medical research Institute (Sanjay Gandhi Post Graduate Institute of Medical Sciences) in Lucknow, India demonstrated that sample size numbers were 150 cases/150 controls (Pandey et al., 2009), 200 cases/200 controls (Pandey et al., 2010), 200 cases/200 controls (Pandey et al., 2011), thereby highlighting homogeneity in the sample cohort data set(s). The total number of clinical samples, including patients and normal healthy study subjects were ≤ 400 in most of the studies, thus demonstrating the adequacy in sample size and the quality time invested in initial questionnaire-based face to face patient interviews and subsequent clinical specimen collection in collaboration with and/or supervision of the clinical experts/radiation oncologists. Written informed consent was taken from the study participants in the form of signature(s), thumb impression(s) and/or initials of full name.

A careful and detailed assessment of the cervical cancer SNP-data set(s) suggested that subgroup caste-stratification of North Indian cohort is equally essential in female urology genetics-based medical research studies, for instance, Brahmin (e.g. Pandey), Vaishya (e.g. Mittal), Rajput (e.g. Singh) and Kshudra (e.g. Yadav) during the conception and design of the gene polymorphism study in an ethnically disparate disease-susceptible population (Gangwar, Pandey and Mittal, 2009). The published research studies did not reveal any subgroup stratification on the basis of caste and/or sub-caste of the North Indian cohort.

Conclusions

Sample size homogeneity in histopathologically confirmed case and control numbers and caste-based stratification in a North Indian cohort is essential in single nucleotide polymorphism (SNP) studies in cervical cancer susceptible populations to draw more

definitive conclusions. The abstracts as well as full-text articles on cervical cancer data-set evaluation for sample size homogeneity, and inclusion and/or exclusion of caste-based sample size subgroup analysis were carefully reviewed. The results section of the author's doctoral dissertation titled "Role of Toll-like Receptors and Cyclooxygenase-2 Gene Polymorphisms in Cervical Cancer Susceptibility" were also studied and comprehensively reviewed. Sample size numbers and caste criteria in the North Indian cohort ($N \leq 400$ subjects) were thereby evaluated and the observations suggested that cervical cancer genetics research was well-conducted and the number of histopathologically confirmed cases of cervical cancer and healthy, disease-free controls were equal in each published data set.

I wish to clearly specify that only North Indian ethnicity patients and controls were included in the cervical cancer/female urology-SNP based studies. The human subject/patient-based studies were approved by the Institutional Review Board(s) and written informed consent was taken from all the study participants. The study strengths included homogeneity in sample size numbers, such as 150 cases/150 controls (Pandey et al., 2009), 200 cases/200 controls (Pandey et al., 2010), 200 cases/200 controls (Pandey et al., 2011), thereby highlighting the authenticity of the clinical data set(s). Moreover, quality time was invested in initial questionnaire-based face to face patient interviews and subsequent clinical specimen collection in collaboration with and/or supervision of the clinical experts/radiation oncologists. In order to draw more meaningful interpretation of the complex data, subgroup caste-stratification of North Indian cohort is equally essential in female urology genetics-based medical research studies, for instance, Brahmin (e.g. Pandey), Vaishya (e.g. Mittal), Rajput (e.g. Singh) and Kshudra (e.g. Yadav) during the initial conception and design of the gene polymorphism study in an ethnically disparate population (Gangwar, Pandey and Mittal, 2009). The published research studies and original 3 year doctoral dissertation research work did not reveal any subgroup stratification on the basis of caste and/or sub-caste of the North Indian cohort.

Overall, future cervical cancer/female urology genetics-studies are warranted to provide a more comprehensive understanding of the etiopathogenesis of disease in ethnically disparate populations. Moreover, similar research studies are required in human carcinomas including breast cancers (Leong et al., 2010; Lee et al., 2010; Shavers et al., 2003). Cohort-based collaborative studies using a case-control approach and/or a case-only approach may be designed in prostate cancer wherein pre- as well as post-operative robotic prostatectomy cases of an American cohort may be incorporated in the SNP-based as well as pilot gene and protein expression studies by targeting specific biochemical cell signaling pathways.

As an elegant example, the autophagy signal transduction pathway may be exploited to fully decipher the cellular and molecular complexities associated with human cancers in patient cohort(s) from premier medical research Institutes in Lucknow, India as well as New York City, USA.

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