**Supply chain actors’ willingness to switch the business of smokeless tobacco: a mixed-methods study on Naswar business in Pakistan**

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1. Dr. Fayaz Ahmad (**Corresponding author**)

PhD Scholar (public health) Senior Lecturer,

Institute of Public Health & Social Sciences (IPH&SS)

Khyber Medical University, Peshawar, Pakistan

Drfayaz1980@gmail.com

1. Dr. Zohaib Khan

Director, office of research innovation and commercialization (ORIC)

Khyber Medical University, Peshawar, Pakistan

dr.zohaibkhan@kmu.edu.pk

1. Dr. Melanie Boeckmann

Assistant professor, School of Public Health, Department of Environment and Health, University of Bielefeld, Germany

melanie.boeckmann@uni-bielefeld.de

1. Dr. Muhammad Naseem Khan

Professor of Public Health

Health Services Academy, Islamabad

Honorary Fellow, Department of Psychological Medicine, University of Liverpool, United Kingdom

drnasim@msn.com

1. Dr. Kamran Siddiqi

Professor in Global Public Health, Department of Health Sciences

Hull York Medical School, University of York

kamran.siddiqi@york.ac.uk

1. Dr. Safat Ullah

Research assistant, office of research innovation and commercialization (ORIC)

Khyber Medical University, Peshawar, Pakistan

safatullah027@gmail.com

1. Dr. Hajo Zeeb

Professor, Leibniz Institute for Prevention Research and Epidemiology - BIPS,

Bremen, Germany

Health Sciences Bremen, University of Bremen, Germany

zeeb@leibniz-bips.de

1. Dr. Sarah Forberger

Leibniz Institute for Prevention Research and Epidemiology - BIPS,

Bremen, Germany

Sarah.Forberger@leibniz-bips.de

**Abstract (250 words)**

**Introduction:** Provision of alternate livelihoods to smokeless tobacco (SLT) supply chain (SC) actors can help in curtailing SLT business and its consumption. We explored the reasons for SC actors’ engagement in Naswar (SLT used in South Asia) business and their willingness to switch to other alternatives.

**Methods:** We conducted an equal-status concurrent mixed-methods study in four districts of Khyber Pakhtunkhwa province of Pakistan. We surveyed 286 general points of sale (GPOS) and exclusive Naswar (EN) vendors through multistage cluster sampling. Additionally, we interviewed 15 tobacco farmers interpretively, being distinct from other SC actors. We assessed the association between vendors’ willingness to switch and their awareness about tobacco-harms, profit margin, Naswar as a family business, length of business, education-level and shop-type using logistic regression. Qualitative data assessed the farmer’s viable alternatives to switch and was analyzed using deductive-inductive thematic analysis.

**Results:** Product demand-77% and profit margins-75% were the main drivers for selling SLT by EN vendors. Half of the GPOS and 25% EN vendors expressed willingness to stop Naswar’s sale. Vendors aware of tobacco-harms were more willing to switch, but less likely to switch if Naswar was perceived to bring “good-profit”. Farmers were mainly cultivating tobacco because of profitability, family-run farm, and perceived land-suitability for tobacco. Lack of government support was main constraint for farmers looking to switch.

**Conclusion:** A considerable portion of Naswar SC actors in Pakistan are willing to switch to viable alternatives, with profitability of alternatives, support from authorities, and social obligations as key considerations in doing so.

**Implications**

This study highlights that good profit margins in the Naswar business, lack of awareness of tobacco-related health harms, and absence of the Government’s support are key detriments to switching to alternative businesses among Naswar supply chain actors in Pakistan. These findings are the first to come out in the context of both Pakistan and Naswar product, making a case for policy interventions focusing on tax increases, awareness campaigns about tobacco-harms, and a pro-active role by the government to provide support for the security of livelihoods to those tobacco supply chain actors who want to switch to other alternatives.

**Introduction**

The World Health Organization (WHO) estimated that in 2018, a staggering 23.6% of the global population (15 years and older) were current users of tobacco in some form.1 In the Eastern Mediterranean region, the corresponding estimate was 19.3%.1 The 2014 global adult tobacco survey (GATS) estimates that overall, 19.1% of adults in Pakistan use tobacco, of which 12.4% smoked tobacco, and 7.7% used smokeless tobacco (SLT).2 From estimated 300 million people that use SLT around the globe, approximately 17 million live in Pakistan. SLT is associated with head and neck cancers and mortality from cardiovascular diseases; in fact, it results in a 7% loss of DALYs in Pakistan.3 Tobacco is consumed in several forms in Pakistan such as manufactured Cigarettes, Bidi, Paan, Gutkha, and Naswar.4 The most common forms of SLT used in Pakistan are Paan which is mainly betel quid with tobacco (7.4%), Naswar (7.2%), and Gutkha (6.4%).5 Naswar is the predominant (60%) form of tobacco consumed in Peshawar, the capital city of the ethnically Pashtun dominant province of Khyber Pakhtunkhwa (KP), and is considered a social norm in the province.6 Naswar is a combination of sun-dried crushed tobacco, ash, water, and lime, with the optional addition of condiments like green cardamom, menthol, and indigo.7

The Naswar supply chain (figure 1) in Pakistan involves point of sale (POS) vendors, exclusive Naswar vendors -including wholesalers, suppliers, and manufacturers- and farmers of the tobacco plant *nicotiana rustica* used in the preparation of Naswar.8 Tobacco is an important cash crop of Pakistan, particularly in the province of KP.9 In the year 2009, Pakistan generated 46.47 billion PKR (289.4 million USD) revenue from tobacco products.9

The WHO Framework Convention on Tobacco Control (FCTC) is an evidence-based policy response to the global epidemic of tobacco use.10 Among the supply reduction-related articles of FCTC, article 17 emphasizes the provision of viable economic alternatives for tobacco workers, farmers, and individual sellers.10 Implementation of such policies can profit from first understanding SLT supply chain (SC) actors’ perspectives on selling, manufacturing, and growing tobacco.11, 12 The drivers of engaging in tobacco sales may differ for different types of tobacco products in different contexts. For example, SLT products in South Asia have strong socio-cultural significance;13 often unbranded, these are produced in the informal sector and not by the big tobacco companies.8, 14 It is, therefore, possible that those involved in SLT business may be driven by different factors and likewise have different barriers/facilitators to switch to other businesses. No previous study has investigated the reasons for SC actors’ engagement in Naswar business and their willingness to switch to other alternatives in Pakistan, a country where more than 500,000 people are directly or indirectly employed in the tobacco industry.15 To this end, we aim to explore the reasons of Naswar SC actors for being involved in Naswar business or for growing tobacco for Naswar production. We also assess the willingness of Naswar SC actors to switch their business and the factors that may facilitate or hinder this switch. Further up the supply chain, we explore the farmers’ perspectives on viable alternatives to tobacco cultivation and their willingness to switch.

**Study Design and settings**

We conducted an equal-status concurrent mixed-methods study in the KP province of Pakistan.16 We combined the quantitative and qualitative approaches to strengthen the conclusions of the study and to increase the utility of findings for policymakers and other relevant quarters.17 Our study included a cross-sectional survey among Naswar vendors in three districts: Peshawar, Mardan, and Bannu, and a focus group discussion and in-depth interviews with tobacco farmers in districts Swabi and Mardan where the major portion of KP’s *nicotiana rustica* is grown. These districts, with a population of approximately 10 million,18 were purposively selected based on the extent of consumption, production, and business of Naswar and tobacco cultivation.19, 20 We used a qualitative research approach to interview farmers because Naswar’s supply chain follows the classical supply chain structure, with progressively fewer actors as one moves towards the production source i.e. higher number of POS vendors compared to exclusive Naswar vendors, who in turn are higher in number compared to farmers.21 Moreover, farmers are not shop-holders like Naswar vendors who have different business dynamics, hence preferred for qualitative inquiry. Additionally, to assess perceptions on viable alternatives was an aspect of inquiry in farmers’ case which was different than vendors.

**Survey**

The detailed descriptions of the sample size, sampling strategy, and data collection tools have been reported elsewhere22. In brief, we calculated a sample size of 273 through OpenEpi software (version 3.01)23 and employed a multi-stage cluster sampling strategy. We recruited 50 vendors in Bannu (1750 shops-17%), 90 (3090 shops-30%) in Mardan, and 160 (5460 shops-53%) in Peshawar proportionate to the total number of shops (10,300 shops). We recruited two types of Naswar vendors, a) exclusive Naswar (EN) vendors including wholesale dealers and manufacturers of Naswar who also sell Naswar directly to both customers and retailers, and b) general point of sale (GPOS) vendors, mostly grocery and convenience stores. The survey was paper-based and took approximately 25–30 minutes to complete.

**Survey data collection**

The data collectors explained the purpose of the study and addressed shop staff’s queries and concerns before obtaining written consent. We asked the reasons of Naswar vendors for selling Naswar and their willingness to stop its sale or switch to another business. The dependant variable of the study was a willingness to switch away from Naswar business (willing vs not willing) among vendors. Independent variables included: shop type (GPOS/EN), participants’ duration of business (less than 5 years and 5 or more years), level of education (less than 5 years and 5 or more years), awareness of tobacco-related health harms (yes/no), perceived good profit margin of Naswar (yes/no), Naswar as a family business (yes/no).

**Statistical analysis of survey data**

We calculated frequencies and percentages for reasons of selling Naswar and willingness to stop the Naswar sales. We conducted logistic regression analysis and calculated crude and adjusted odds ratios with 95% confidence intervals (CI) to examine the association between willingness to switch Naswar’s business and the potential determinants (all independent variables). Analyses were conducted using STATA version-14.24

**Focus group and in-depth interviews with tobacco farmers**

We used a purposive sampling technique guided by Malterud et al.’s concept of “information power” to include farmers in the study.25 We planned to conduct one focus group discussion each at district Swabi and Mardan and conducted one group discussion at Swabi as planned. At district Mardan, we learned that farmers of *nicotiana rustica* are scattered in distantly located smaller villages with very little feasibility to organize group discussions, hence in-depth interviews were preferred there. The data got saturated after five interviews yet one more interview was conducted to ensure the saturation26 (total six in-depth interviews).

An English language topic guide was developed and was later on translated into Pashtu and pilot-tested. The guide was based on open-ended questions about reasons for tobacco cultivation among farmers and willingness to switch from tobacco growing, drawn from the survey with vendors. For perceptions on viable alternatives, questions were based on FCTC article 17 (support for economically viable alternative activities).10 A cash compensation equivalent to 17 € was given to each participant for giving us time away from work and traveling to a specified place. The Group discussion and in-depth interviews were conducted in Pashtu, audio-recorded, and transcribed directly into English. Each interview lasted up to 30 minutes while the group discussion took approximately 70 minutes. Two researchers transcribed all the interviews and cross-checked them. The team discussed notes and compared them with the audio recordings.

Transcripts were coded using MAXQDA 2018 software.27 We analyzed the data using a combined deductive-inductive thematic analysis approach.28 Two authors independently coded the transcripts. Different codes expressing similar concepts were grouped into explicit themes. During a second coding round, we added inductively identified categories and synthesized them into themes, where appropriate.

**Synthesis**

We brought quantitative (survey data) and qualitative (coded interview data) findings together to explore the reasons of Naswar supply chain actors for continuing this business, their willingness for switching away from Naswar business, and determinants of willingness. Perceptions on viable alternatives to the tobacco business were distinctly explored for tobacco farmers.

**Results**

A total of 286 Naswar vendors for the quantitative survey, nine farmers for the focus group discussion, and six farmers for in-depth interviews were recruited in the study.

**Overview of survey findings**

We approached 300 eligible vendors and among them, 286 vendors agreed to participate (95.3% response rate). Survey data were collected between 10th November and 30th December 2019. Among the 286 vendors, 229 were GPOS and 57 were EN vendors. Table 1 describes the characteristics of Naswar vendors, their reasons for selling Naswar, awareness about tobacco-related health harms, and willingness to stop Naswar’s sale. Duration of business was more than five years in 35% GPOS and 67% EN vendors. Seventy-five percent of vendors had an education level of five or more years (table 1). Around 70% of vendors were aware of tobacco-related health harm. Product demand (77%) and good profit margin (75%) were the main drivers of Naswar sale among EN vendors (Table 1). The main reason (82%) for selling Naswar among the GPOS vendors was that it brought people into the shop for buying other things. Around 45% of vendors (50% GPOS and 25%EN vendors) were willing to stop the sale of Naswar.

Table 2 presents the results of the logistic regression analyses. Awareness about tobacco-related health harms was positively associated with willingness to switch Naswar business while good profit margin as the perceived reason for selling Naswar, was negatively associated. Vendors who were aware of tobacco-related health harms were significantly more likely to switch Naswar business (aOR:4.21; 95%CI: 2.09-8.47) compared to those who were unaware of health harms. However, vendors with perceived good profit margin were significantly less likely to switch Naswar business (aOR:0.06; 95%CI: 0.03-0.12) compared to those with less profit margin (table 2). Shop type, length of business, level of education, and being part of a family business, were not associated.

**Qualitative findings**

Data were collected between 5th and 23rd January 2020. The demographic characteristics of participants are described in table 3. From the information elicited by the focus group discussion and in-depth interviews with the farmers, we identified three central themes addressing our research questions. These include “rationalizing tobacco cultivation,” what drives them to stick to tobacco cultivation, “willingness to switch and its determinants”, and “viability of alternatives,” the negative notions of farmers regarding the viability of alternatives to tobacco cultivation.

**Rationalizing tobacco cultivation**

Participants stated that tobacco is a cash crop and its profit is much higher compared to other crops. Tobacco farming helped them meet all their daily needs, which is not the case with other crops. Another reason for preferring the tobacco crop is its quick and swift market dealing (table 4). Most farmers worked on lands owned by a landlord, who gives a share of the profit from the crop sale to the farmers. As such farmers had little say in what crop was cultivated in the land. Even if the farmers wanted to switch to another crop, they assumed the owner of the land would never give up tobacco cultivation (table 4).

Besides the profitability of tobacco crop, farmers highlighted tobacco cultivation as a family occupation inherited to them from forefathers, which made it easy for them to continue the same. This notion of inheritance was specifically related to *nicotiana rustica* and they claimed its cultivation for hundreds of years in this area. Some farmers believed that the lands of this area are suitable for tobacco cultivation and some of them pronounced it the best option for cultivation in the area (table 4).

**Willingness to switch and its determinants**

*Social obligation*

Regarding willingness to switch the business of Naswar’s tobacco, some of the farmers were readily willing to switch, considered this business a social and moral liability, and pronounced it a useless crop for humans. Moreover, all farmers unanimously declined Naswar business as an option for their children to continue, when asked about its prospects for their children (table 4).

*Financial independence*

Participants from the Mardan district stated that farmers who own their land can easily switch to any other business. Furthermore, the cultivation of Naswar tobacco is on decline as many farmers are already switching this business for different reasons. These reasons included: seasonal effects on tobacco leaves pertaining to its inbuilt tenderness, the tedious nature of tobacco cultivation, less profit for the hard work as compared to the commercial market, gradual reduction in profit with increasing inflation, and perception of a reduction in profit in case of tax raise and implementation of health warning labels on Naswar (table 4). Conversely, some participants were not ready to consider switching this business but rather advocated for Naswar business by stating that people won’t quit its use as it is strongly addictive. Others agreed to switch if they had a viable alternative or any other skill. Two farmers argued that back in the 1960ies cultivation of opium was legal in the country and it had remained their family business, but after the ban on opium cultivation they switched to tobacco cultivation, implying that their farming was primarily motivated by profit (table 4).

*Government support*

Farmers emphasized the role of government to support them in switching their businesses. They highlighted that switching to another crop or business is only possible if the Government were to provide them other opportunities, as authorities know about the harms of tobacco. Moreover, they vowed to utilize their abilities in other areas of opportunities. Participants mentioned different alternatives that government can support, such as farming, livestock, and dairy farming (table 4).

**Viability of alternatives**

Although some participants stated a few positive notions about viable alternatives to tobacco cultivation, the same options were negated in later stages of the discussion. Tobacco farmers said that *nicotiana rustica* can be replaced with alternatives like sugarcane, cotton, wheat, some seasonal vegetables, and Virginia tobacco. They believed that the demand for vegetables is increasing with the growing population and vegetables have already largely replaced tobacco in the area (table 4).

On the other hand, the farmers highlighted issues with potential alternatives. Regarding vegetables, they believed that it is a more laborious job with complex calculations of expenses. Vegetables have a short shelf life as compared to tobacco and due to the lack of large storage facilities for vegetables, the farmers are compelled to sell them at cheap prices at times resulting in a substantial loss for them. The participants also narrated some bitter experiences of losses with experimentations of different vegetables and crops like cabbage, potatoes, tomatoes, sugarcane, maize, and wheat (Table 4). Regarding sugarcane, one of the cash crops in Pakistan, farmers believed that sugarcane needs more water for cultivation as compared to tobacco and occupies the fields for a whole year.

**Discussion**

The main aim of the study was to explore the reasons for SC actors’ engagement in the Pakistani Naswar business and their willingness to switch to other alternatives in KP Pakistan. The findings of the study suggest that good profit margin, family business, and lack of a viable alternative are the predominant drivers of engaging in Naswar business for EN vendors, compared to GPOS. The EN vendors were also less willing to stop the sale of Naswar compared to GPOS vendors. Vendors, aware of tobacco-related health harms were more likely to switch while vendors with perceived good profit margin from Naswar sales were less likely to switch. The main reasons for farmers to grow tobacco were profitability of tobacco crop, an inheritance of its cultivation from forefathers, and assumed suitability of their land only for tobacco crop. Lack of a viable alternative to tobacco farming and lack of government support in this regard were the main constraints to switch away from tobacco farming. The farmers proposed growing some vegetables as viable alternatives but simultaneously mentioned related bottlenecks like; intricate calculations of overheads, shorter shelf life of vegetables, and lack of storage facilities.

Tobacco vendors are an important link between the tobacco industry and consumers of tobacco29 and article 17 of the FCTC advocates for “economically viable alternatives for tobacco workers, growers and, as the case may be, individual sellers”.10 A striking reason for exclusive Naswar vendors for selling Naswar in this study was the expected profit margin because a regular SLT vendor in Asian countries needs little initial investment, and in return, enjoys sustainable and high-profit margins.30 Family business and lack of other viable options were other reasons of exclusive vendors for selling Naswar, validating previous qualitative findings.8 Moreover, tobacco production as a family business is considered advantageous because of owning one’s own business, flexible timings, job security for family members, and prospects of increasing family wealth.31 More than three-quarters of GPOS vendors specified that Naswar helps in the sale of other commodities as the profit of non-exclusive vendors from Naswar is negligible but for the retention of customers they keep Naswar at their shops.8 Half of the GPOS vendors in this study were willing to stop Naswar sale, which is in contrast to the findings from comparable POS in rural north Carolina32 and New Zealand,33 where 2% and 7% respectively were willing to stop tobacco sale. Only a quarter of exclusive Naswar vendors were willing to switch their business as Naswar was the only source of their income. In line with our findings, tobacco retailers in a study, who reported profitability from tobacco products were less likely to support tobacco control laws.34 Naswar vendors who were aware of tobacco-related harms were more likely to stop tobacco sales or switch from Naswar business. Mass media campaigns to influence the decision of switching Naswar business among vendors can be helpful as evidence shows the success of such campaigns in influencing decision of stopping SLT use in general population.35 Moreover, the phenomenon needs further exploration in the context of a developing country.36

Among the reasons for tobacco cultivation, farmers of *nicotiana rustica* stated profitability from the crop and suitability of land, echoing the perspective of farmers in Indonesia, Kenya, and the Philippines in previous studies.12, 37 Although the *nicotiana rustica* market lacks the operational setup of the Virginia tobacco market operated by Big Tobacco, easy market disposal of the crop was another reason of cultivation for farmers. This phenomenon of “ready market” has been reported in different African countries as one of the most important reasons for tobacco cultivation.38, 39 A unique settlement of farming was reported in this study. Poor farmers work in the lands owned by a landlord where farmers are compelled to grow whatever the landlord wants, with tobacco among the top preferences. This issue needs further exploration in terms of research on viable alternatives for farmers and consequently policy implications. Most of the labor in tobacco farming is normally borne by family members and it doesn’t add to the overall input expenses of the farmers.39 Thus, it renders tobacco farming a family venture with due inheritance, a reason for continuing tobacco farming, reported in this study.

We report a willingness to switch tobacco cultivation among farmers because of the health hazards of tobacco to the community, a finding also reported from Uganda.40 Children working in tobacco fields to help their families are at continuous risk of green tobacco sickness, injury, and missing days of school due to illness or workload41, and farmers consistently vowed to educate their children instead of continuing the same business. The tobacco industry generally opposes anti-tobacco laws by building very close ties with the farmers, but tobacco production has substantially decreased in tobacco-growing states following the implementation of tobacco control laws and the weakening of industry-farmer relations42. Farmers of *nicotiana rustica* also feared a loss in profits resulting from the implementation of policies like taxation and health warnings on Naswar packets and subsequently switching their business. Some of the farmers were willing to switch because of less profit for the hard work and inflation, voicing the same notion of smallholder farmers in Malawi and Kenya43, 44 but opposing the usual view of profitability as a reason for growing tobacco among other farmers.12, 39 Evidence shows that farmers, consistent with our findings, perceive an absence of a viable alternative to tobacco farming.12, 45 However, alternatives do exist and can be more beneficial to the environment, the health of people, and society in general,46 with success stories of governments’ support in providing viable alternative livelihood and crops.47, 48 Most farmers of this study also believe that switching from *nicotiana rustica* is not possible for them without the government’s support which is presently not available.

Different economically sustainable alternatives to tobacco cultivation have been identified in literature including; sugar cane, bamboo, maize, soya beans, bananas, chili, French beans, and rice.49, 50 However, some frequently reported hindrances to the adoption of alternatives include; huge net investments, low initial cash flow, transportation problems, unclear cost-benefit ratio, lack of proper extension services, environmental sustainability, absence of a ready market, and lack of credit.38, 51 Farmers of *nicotiana rustica* mentioned a few options as alternatives to tobacco farming but coupled with more or less the same obstacles mentioned above, especially; lack of ready market, difficulty in calculations of expenses, and lack of agricultural extension services. Virginia tobacco was also among the alternative options of farmers, apparently because of the availability of a structured and established system for its cultivation and overall business in Pakistan.15 Regarding alternative crops, farmers had limited ideas which were mostly revolving around vegetables and associated issues like lack of storage facilities and market access. These are such issues that need due interventions and support from the government. Moreover, holistic research–with the involvement of policymakers and farmers–is needed, which revolves around the development of alternatives to tobacco farming and crop substitution.

Limitations of the survey include the fact that it was conducted in only three districts of the Khyber Pakhtunkhwa province in Pakistan and addressed only Naswar. Although, these cities are the largest centers of Naswar business in Pakistan and products from here are sent to all parts of the country and even abroad, findings of the study might not be generalizable to other provinces of the country and other SLT products. For the qualitative inquiry, although participants were recruited from geographically varied sites in both districts, findings may be distinctive to the study sample only. We only addressed *nicotiana rustica*, so these perceptions may have limited generalizability to other tobacco species. Although the sample size was small due to geographical constraints and low numbers of farmers among the supply chain members, in-depth interviews were conducted until data saturation was reached. Although we explored the willingness of Naswar vendors to switch away from this business, their potential viable alternatives need to be explored in future research. The study sample included no women due to cultural restrictions. Despite these limitations, this mixed-method study provides unique insights about different levels of SC actors’ perceptions that can be useful for further policy development.

**Conclusion**

The exploration of the reasons for Naswar vendors to sell Naswar and farmers of *nicotiana rustica* to grow is important for understanding their willingness to switch to an economically viable alternative. This study suggests that most exclusive Naswar vendors are happy with the business because of Naswar’s profitability, which seems logical as there is no taxation system for Naswar in Pakistan. However, there is a surprisingly high overall willingness to switch businesses under certain conditions. Smallholder farmers, many of them illiterate, need proper and regular support from governmental authorities about their decisions concerning on-farm and off-farm diversifications. Such support is not available to the farmers of *nicotiana rustica* in Pakistan. Further research is warranted among tobacco farmers to inform the policymakers for robust policy options regarding the provision of guidance to farmers, crop replacement or mixing of crops, and better marketing of substitute crops.

**Ethics approval**

Ethical approval for the study was obtained from the Research Ethics Board of Khyber Medical University (No. DIR/KMU-EB/ST/000554).

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**Authors’ contributions:**

All authors contributed to the planning of the study. FA, ZK, MNK, SU: contributed to the conduct of study and data collection. FA, KS, SF, ZK, MNK, MB: worked on the analysis of data and the first draft of the manuscript. HZ, SF, KS, MNK: provided technical input throughout the study. All authors contributed to all versions of the manuscript including the final version.

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