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Comparison of Yield and Cost Data of Cotton Crop Production During 2019 and 2020 in Baluchistan

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Chronicle	Abstract
Article history Received: Aug 2, 2024 Received in the revised format: Sep 19, 2024 Accepted: sept 26, 2024 Available online: Sept 30, 2024	The study was carried out through a primary as well as secondary data collection from several stakeholders to examine the average position of cotton production, average per acre cost of production, physical and income productivity, economic profit, input output ratio, problems and constraints,
Jumo Khan Bajkani is currently affiliated with Social Sciences Research Institute Pakistan Agricultural Research Council Tandojam, Sindh Pakistan. Email: jumokhanbajkani@gmail.com Zaheer ud Din Mirani is currently affiliated with Department of Agricultural Extension, Sindh Agriculture University Sindh Pakistan. Email: zamirani@sau.edu.pk Hakimzadi Wagan is currently affiliated with Department of Agricultural Economics, Sindh Agriculture University Tandojam, Sindh Pakistan. Email: hakimzadi@gmail.com	faced by cotton farmers and to recommend policy measures for maintainable cotton production and marketing in study area. Statistics examines were performed by retaining the descriptive figures as well as standard economic methods. A mixture of qualitative and measurable methodical procedures such as cost of production, market limits, regression analysis, cross tabulation analysis were carried out. The study was carry out in Lasbella, Sibi, Noshki, Turbat, Dera Bugti and Khuzdar districts in Balochistan. The data were gathered from 77 farmers of cotton growers and collected material was related to cotton production in Kharif 2019 and 2020. Majority of cotton growers were small land holders and age was 48.33 years. The average seed rate was 10.50kgs/acre and purchasing price was Rs.344.33/kg during 2019 & 2020 correspondingly. The budget of production was Rs.91762.50 and total revenue was Rs. 192297.5 per acre in 2020 respectively. The average profit/net income of cotton growers received was Rs. 100535 and Rs.95225.77 per acre in 2020 and 2019 respectively.
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INTRODUCTION

Cotton is the main cash crop in Pakistan with 5th largest producer of cotton in the world and export account for 55% of totally foreign exchange incomes of the country. Cotton crop often referred to as the "white gold" of the country. Cotton remains a key source of employment/livelihood for lots of farmers, laborers as well as backbone for national economy of Pakistan and it is a key raw material for the country's textile industry. The many researchers of national and international had become the keen interest of topic (Ashraf et al. (2018). Researcher reported the cotton and its textile products are main source of million farmers of the livelihood as well as earn foreign exchange and 1.6 million farmers about 15 percent cotton cultivated from the total

cropped area in Pakistan (USDA, 2019). The 70 countries of the world has been cotton cultivated and among them Pakistan, China & India are main cotton producing countries in the Asia. The China, USA, India & Pakistan are 1st, 2nd, 3rd & 4th respectively of the topmost cotton creators in the world (Sabir et al., 2011). Cotton remains challenging crop to survive over the long-term. In several parts of the world, excluding. Brazil & U.S, cotton has left through times of yield inactivity reasons by a variety of issues, as well as pests, soil degradation, and poor institutional arrangements. The many reasons of the cotton production has been always lost due to the lack of ability of producers to sustain yield over extended periods of time. Cotton was primarily grown in association with food crops where it always held a main role in farming. On domestic side, cotton is an important crop which generates a long chain of employment beginning from engaging women folk for its picking at farm to ginning; thread making, cloth manufacturing, cloth processing, manufacturing of a range of items and export of raw cotton and its semi-finished and finished products.

Cottonseed is also an important byproduct of this crop, which has significant role in ghee industry by contributing more than one-third to total edible oil demands along with producing significant amount of cotton seed cakes, an important concentrate livestock feed. It is also a fact that this crop consumes largest proportion of pesticides as heavy insecticide doses are now required for its production, costing significant amount of valuable foreign exchange for the import of pesticides. The farmers grow 26 percent, devoted 15 percent of total cultivated area of cotton crop, largely production in Punjab & Sindh provinces, with insignificant area below cotton in KPK and Balochistan (R.Wajid et al 2022). The further researcher reported the current status of cotton crop varieties of BT cotton varieties cultivated fast with 65 & 80 percent respectively in Punjab & Sindh provinces. Cotton arowers received high net benefit from the Bt. cotton varieties than the other cotton varieties Ashfag et al., (2012). The several reports indicated the scarce water turning in the Pakistan which may initiate the preparation of land & sowing of cotton delay which further dropped the quality of fiber, yield of cotton seed, quantity of bolls & dry matter (Arshad et al., 2021; Wang, Deng, et al., 2017; Wang et al., 2014).

The cotton production was 7064 thousand bales with growth of 22.8 percent decreased the production of 9148 thousand bales during same period last year and its share in GDP and agriculture value addition of 0.6 & 3.1 percent respectively in Pakistan during 2020-21. The area was 2079 thousand hectares cultivated followed by 2517 thousand hectares, showing decrease of 17.4 percent of cotton crop (GOP, 2020-21). The acreage of cotton crop is decrease due to non-profitability crop as compared to other crops and other factors as attack the insects, diseases, climate change, heat stress, non-availability of pure seed, high rainfall, poor management practices and high cost of inputs. The area, production and yield of cotton crop of Pakistan during last five years are shown in Fig 1. Abbas (2020) reported the cotton production has been not increasing due to high temperature in Pakistan. The temperature inversely connected the growing of cotton, appearance, flowering and maturity stages and the yield of cotton was not promising of the increase in temperature this implies. As far more indication that has reported climate change impact an adverse on cotton crops, the following plainly corroborate additional evidence. Igbal et al. (2017) and Amin et al. (2018,) stated that production of cotton declined due to climate change and though management for production of crop exist but could not act effectively in the presence of climate change (Zulfigar and Thapa, 2018.; Zulfigar et al., 2017; US EPA, 2018). The main cotton growing districts that are most involved are Nasirabad, Jafferabad, Jhal Magsi, Bolan, Sibi, Dera Bugti,

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Kohlu, Musakhail, Loralai, Kharan, Killa Saifullah, Zhob, Lasbella, Khuzdar, Kharan, and Chagai, Panjgur. Turbat and Awaran for the analysis of their soil characteristics for cotton



Figure 1.

Area, Production and Yield of Cotton in Pakistan (Pakistan Economic Survey 2020-21)

Thus Baluchistan contribute less than five percent share in the production of the cotton crop in the country (DAWN May, 2014). For the year 2020-21 Balochistan was 57.7 thousand hectares and 157.8 thousand bales respectively with average yield was 465.1 kgs/hectare and suffers from hatching process are included in the agricultural statistic of Pakistan for the year 2021-22. The Balochistan province has given the area & production ratio of 2.78 % and 2.23% in Pakistan. The potential area, production and yield of cotton is less in province, the area farmers were using poor traditional cultural practices, constraint of irrigation, high electricity load shedding, not available certified seeds and pesticides. The area, production and cotton yield during 2020-21 was high as compared to last year as shown in Fig 2.



Figure 2.

Area, Production and Yield of Cotton in Balochistan Source (Agriculture Statistics of Pakistan 2021-22)

Balochistan is blessed with a variety of environmental conditions, so a large number of crops are grown. Unfortunately rains and great warm weather in the areas of cotton crop was attacked by different types of germs, viruses, White Fly and pink ball worm had damaged the standing crops as compared 2019 to current study year. In this connection of cotton crop suffers permanent loss. Cotton growers use poor seeds and pesticides and face to huge loss after they cut their crops before time. The some farmers reported they will not sow cotton next year due huge loss. The major cotton

growing districts of Balochistan are Lasbella, Sibi, Khuzdar, Noshki, Turbat and Dera Bugti. Among them, Lasbella, Sibi and Khuzdar have the largest tube well irrigated areas are cotton producing districts. In Lasbella, Sibi, Turbat and Dera Bugti areas, cotton is sowing at the mid April and Khuzdar, Noshki area cotton is sowing May end was found in the study area. The farmers are not aware that how much they are spending and getting revenue from their very important crop. The main goals of this study were:

- 1. To evaluation the present status of cotton production system during 2019 and 2020
- 2. To estimate cost of production of cotton crop
- 3. To review the cotton yield losses and its reasons

SURVEY OF RESEARCH METHODOLOGY

The investigation was made both primordial and secundary data collected from several respondents in order to identify the overall status of cotton production, overall cost of production per unit area, physical and income yield, economic profit, input output relationship, issues and challenges faced by cotton growers and to suggest policies required to achieve sustainable cotton production and marketing in study area. This sort of approach can be utilized in the investigation of a large number of difficulties (Gall.Size, Borg & Gall, 1996). Secondary data that may be gathered inclusive of data from the records section of several departments and other institutions. A cross-section primary data was gathered by survey method. In the case of primary data collection, a selected number of cotton growers, district research station officers and any other person associated with cotton farming were Statistics examinations were conducted by preserving interviewed. the characterization digits in addition to regular economic analyses. In Moderate level attempt of analytics including aualitative and Measurable Methodical procedures like Cost of Production analysis, Market Limits analysis, Rearession Analysis, Cross tabulation analysis were conducted. This cross-sectional study was conduct in Lasbella, Sibi, Noshki, Turbat, Dera Bugti and Khuzdar districts in Balochistan. to examine the average position of cotton production, average per acre cost of production, physical and income productivity, economic profit, input output ratio, problems and constraints, faced by cotton farmers and to recommend policy measures for maintainable cotton production and marketing in study area.

A wide range of problems can be investigated by using this approach (Gall, Borg, Gall, 1996). Relevant secondary information collected from the archives of various departments and organizations. Cross-section primary data was collected through, a survey method. For primary data, cotton growers, district research station officers and other users involved in the cotton arowing chain were interviewed. Statistics analyses were carried out in a way of maintaining the descriptive number figures together with standard economic methodologies. Qualitative and measurable methodical procedures were employed including cost of production, market limits, regression analysis and cross tabulation analysis. This research was conducted in Lasbella, Sibi, Noshki, Turbat, Dera Bugti and Khuzdar districts of Balochistan province.of cotton growers, district research station officers and other stakeholders was selected for interviews. Statistics examines were performed by retaining the descriptive figures as well as standard economic methods. A mixture of qualitative and measurable methodical procedures such as cost of production, market limits, regression analysis, cross tabulation analysis were carried out. The study was carry out in Lasbella, Sibi, Noshki, Turbat, Dera Bugti and Khuzdar districts in Balochistan. The data were from 77

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growers of cotton selected from between 10-15 respondents from each district in the study area. It was about the production of cotton during the Kharif season of 2019 and 2020 only. The actual questionnaire was administered only after having devised and pretested it during the actual survey. The punches also contained information of the respondent's socioeconomic status like land status, size of farm, source of irrigation and others related attribute. But it also had questions on total cultivated area of cotton in the year 2019 and 2020, total area, inputs used, production practices and physical yield. To this, the farmers were also asked for what reasons has there been change in production on the part of cotton in the year 2019 and in the year 2020. In this study the farmers were met by chance at the time of survey through chance sampling technique. The scientists introduced themselves and the nature and aim of the research prior to engaging the discussion and externally informed the respondents on how their information was only going to be used for research purpose and would not in any way reveal the identity of the respondents. Each of the interviews about 40-50 minutes were conducted.

DATA ANALYSIS

When the survey was complete, the data has been moved & formatted into worksheet and variable labels within the database file refers to the number of each question in the questionnaire. Analyses were made through the use of these evocative statistics in addition to other economic analyses. Qualitative and quantitative methods of analysis common with cost of production and net returns Cobb-Douglas Production Function, market margins, regression analysis, and cross tabulation analysis. The nature of costs, which makes production cost analysis possible, is explained under.

Farm Budgets Analysis

With consideration to the cotton crop the farm cost analysis is arrived at. The results derived from this research will aid the comparison of the total cost and returns on a cotton crop. Total budgets subsequently include the income and loss account variable and fixed costs and rental costs of owned inputs for the farm. These opportunity costs need to be estimated likely because the income that farm owned factors of production could earn in other sectors is quite hard to establish. In this regard, since a family farm borrows its production factors, flexibility is to increase in the short run for when the family can decide to forgone returns especially when they are low. However, opportunity costs have to be taken into account in the long run because potential successors of the farmer, or whoever might take over the farm will, in most cases, make the decision for the alternative use of own production factors, especially own labor input, before they actually take up farming. To show the effects of opportunity costs, it is necessary to distinguish between opportunity costs and the other costs. In order to estimate and calculate their performance, the following procedure is used to analyze the performance of cotton in Baluchistan.

Total revenue: Total revenue is a total dollar received from the sale of any assumed number of output. Formula: Total quantity = Price x Quantity (Biz 2002).

Total costs: Total Cost is calculated by adding the fixed, variable and the opportunity costs for any level of production meaning fixed cost plus total variable cost. The cost concepts which are commonly called as some used cost are as follows.

Total fixed costs: Total fixed costs are known as costs that a business person bears irrespective of the production rate of goods.

Total variable costs: Total variable costs are variable costs that are directly proportional to the volume of activity. These costs change in relation to the degree of output and more importantly they can be prevented by not manufacturing.

Opportunity costs: Opportunity costs refers to the cost of resource usage are based on what could have been generated if the resource was devoted to the next fittest use (Hofstrand 2005).

Profit: Profit determines through the gross income of the business subtracted by the expenses.

Accounting profit: Accounting profit is calculated where gross income has been less by all other expenses apart from the opportunity cost. It is the same thing as "net farm income".

Economic profit: Economic profit can therefore be defined as the gross income less all sorts of costs, including the cost of operator's labor, capital etc. Actually it is same to "return to management" (Hofstrand 2005).

Gross margin: A gross margin is arrived at after deducting the variable cost or the total cost of producing an enterprise's gross income. In contrast, Gross Margin = Returns – Variable Costs

RESULTS OF THE STUDY

Socioeconomic Characteristics of the Sample Respondents

Farm Size

As a result of this, it is observed how the resources are being utilised and the consequent implications on the amount of production and sustainability. The collected works established that, comparatively, small growers have an advantage in the labor management as compared to large farmers and there are more quantities of labor inputs in small farms. Second, small farmers are often equipped with a restricted set of modern inputs and third, large & small farmers may shift their attitudinal response from threat to uncertainty. Large farmers may be able or willing to bring more of a threat. Table 1 revealed that 67.63 percent of cotton growers were categorized as small land holder with 48.33 percent of them having 12.5 or lower acres of land size.

Districts	Farm size groups				
	Small (< 12.5 acre)	Medium (>12.5-25 acre)	Large (>25 acre)		
Lasbella	42	38	20		
Sibi	35	40	25		
khuzdar	48	28	24		
Noshki	50	45	5		
Tutbat	56	24	20		
Dera Buguti	59	37	4		
Total Average	48.33	35.33	16.33		

Table1.

Operational Land Holding of Selected Growers (Percent)

Source: Survey data, 2020

Socio-economic profile

The literature reviewed that the socio-economic profile of the selected cotton farmers is presented in Table 2. The average age was 40.17 years and they comparatively senior members of farm families were working the agricultural business. The formal education of schooling, family size, farming and cotton growing experience years an

average was 8.32, 9.36, 20.30 and 13.30 years respectively of cotton growers found in the study area.

Table 2.

				Dist	ricts		
Characteristics	Lasbella	Khuzda r	Sibi	Noshk i	Dera Bugti	Turbat	All average
Age (years)	40	41	44	42	36	38	40.17
Formal education (years)	4.3	6.5	14.2	6.59	5.78	12.56	8.32
Family size (Nos.)	8.2	12.02	7.5	11	9.12	8.3	9.36
Farming experience (years)	23.1	21.45	22.6	22.39	16.3	15.96	20.30
Cotton experience (years)	15	17.8	16.75	16.52	5.42	8.33	13.30

Socio-economic profile of the sample cotton growers

Source: Survey data, 2020

Knowledge of cotton seed varieties

Out of agricultural knowledge, majority of cotton growers are unaware of improved and hybrid seed varieties due to lack of agriculture teaching institutions for the cotton growers in the study area. The cotton growers required the agriculture trainings in relation to the pure seed varieties of the cotton crop.

Seed Rate and Purchasing Price

Mostly growers have used high or low recommended seed rate at their farm and some growers used recommended seed rate in farm. Mostly farmers not used recommended seed rate in our field. N.M. Malik (2015), reported the seed rate depends upon the purpose for which planting is done distance and intended between rows. Through ridges seed is sown at of about 4-10 kgs per hectare and for drilling sowing about 12-15 kgs per acre of seed are used. The result shows that seed rate average was nearly same in the both years and purchasing price was high (Rs.344.33/kg) during 2020. The seed rate and purchasing price was high as compared to last year in table 3:

Table 3.

Seed Rate and Purchase Price/Kg in the Study Area

	Kh	arif – 2019	Kharif - 2020		
Districts	Seed rate	Purchase Prices	Seed rate	Purchase Prices	
	(Kgs/ac)	(Rs/kg)	(Kgs/ac)	(Rs/kg)	
Lasbella	12	250	10	316	
Sibi	15	225	12	250	
khuzdar	10	300	10	387	
Noshki	12	300	10	350	
Tutbat	6	400	10	525	
Dera Buguti	8	210	8	238	
Total Average	10.50	280.83	10.00	344.33	

Source: Survey data, 2020

Yield and Price

The yield described in terms of physical volume is known as physical return and can probably be described in terms of unit weight of production achieved. It has been found negative that the yield of cotton crop in Balochistan is also comparatively low than other province of Pakistan in this year than last year. The low yield could also be attributed to low yield potential of existing cultivars. The best practices employed in

Bajkani, J,K, et al., (2024)

crop horticulture and better genotypes assume the enormous impact in enhancing yield of the cotton crop. The whereas use of improved seeds, fertilizers of recommended doses etc can be achieved high yield by adopting scientific technologies as reported by Khushk, et al (2001). Overall, during the survey cotton growers got poor yield compared to potential yield and potential as well as average yield was nearly same in the both years. A. Globally, Dilshad et al, (2016), observed that average productivity of cotton per acre was relatively high and estimated 32.52 mds because of efficient management of cotton growing techniques in black soil. The no variation was found of sale price in the study area in table 4. The low yield losses due to heavy rain, yala bari, Jassid attack, not certified seed, curl leaf, insect and diseases attack in the cotton crop. During the cotton season was found the wide variation and many reasons of supply & demand in the market is one of the major factor in cotton prices. The early & late harvest session of cotton price was higher than the mid harvest session. The result indicates that the cotton producer's average sale price received was Rs.7966.67, Rs.7520/40 kgs during Kharif 2020 and 2019 respectively in the study area.

Districts	Khc	ırif - 2019	Kharif - 2020		
DISILICIS	Yield (mds/ac)	Sale Prices (Rs/md)	Yield (mds/ac)	Sale Prices (Rs/md)	
Lasbella	20.66	7000	23	8000	
Sibi	26	8000	28.03	8500	
khuzdar	28.33	7800	31	8000	
Noshki	19.28	7320	20.55	7600	
Tutbat	21.55	7000	18.5	7500	
Dera Buguti	24	8000	23	8200	
Total average	23.30	7520.00	24.01	7966.67	

Table 4. Yield and Price of Cotton Crop

Source: Survey data, 2020

Cost of production and Revenue Productivity of Cotton Crop

B.A.Rameez, et al (2014), they were stated that the cost of production means all types of cost, fixed cost cost, variable cost as well as marketing cost etc. The costs incurred on production of cotton were estimated from the values of land preparation, seedling, farm yard manure (FYM), urea, pesticide, di ammonium phosphate (DAP) irrigation charges, labors and other expenses. Overhead costs were presented in variable cost, fixed cost and opportunity cost or the depreciation and opportunity cost of all production factors owned by cotton growers. (A. Similarly, Dilshad et al, (2016) established the total cost of cotton production was Rs 67576.2/acre and the research emerged average cost of production was Rs.91762.50/acre in Kharif 2020 followed by last year, that was 26.36 percent over the reported study because of higher price of inputs in the table 5. Likewise API (2022-23), estimating the cotton policy analysis for cost of production of cotton crop in Punjab & Sindh was Rs. 97,280 & Rs 101,645 per acre expected during the Kharif 2022-23 for the cotton cultivation. Survey result shows that average total revenue of cotton crop was Rs. 192297.5 and Rs.176262.27 per acre in 2020 and 2019 respectively in the study area. Total gross revenue was Rs.99996/acre of cotton production including cotton straws was found in the study area (A. Dilshad et al, 2016), Further cotton growers they were reported the sale price of cotton yield was low and high price of inputs due to monopoly of cotton beopari, commission agents and cotton ginning factory they purchase our cotton yield in low price due to non-availability of cotton market in Balochistan province.

Table 5.

The Asian Bulletin of Big Data Management Cost of production and Revenue Productivity of Cotton Crop

Districts -	Cost of p	roduction	Revenue Productivity	
	Kharif - 2019	Kharif - 2020	Kharif - 2019	Kharif - 2020
Lasbella	72320	86560	144620	184000
Sibi	89650	96315	208000	238255
khuzdar	92620	102410	220974	248000
Noshki	78145	87620	141129.6	156180
Tutbat	74230	81215	150850	138750
Dera Buguti	79254	96455	192000	188600
Total Average	81036.50	91762.50	176262.267	192297.5

Source: Survey data, 2020

Economic Profit/Net Return and Input-Output Ratio of Cotton Crop

Economic profit

Economic profit is the value that remains after all costs, including the opportunity costs of the operator's labor and capital, have been subtracted from gross income. It is as same as "return to management" (Hofstrand 2005). The cotton growers received average economic profit was Rs. 100535 and Rs.95225.77 per acre during the 2020 and 2019 respectively. A. Dilshad et al, (2016), they explain the economic profit of cotton production average was Rs 32420/acre during 2016 which is lower from our study. The input-output ratio was 1:2.16 and 1:2.08 in 2019 & 2020 respectively found during the research work in table 6.

Table 6.

Profit/Net Return of Cotton Crop

Districts	Profit/Ne	et Return	Input-Output Ratio		
	Kharif - 2019	Kharif - 2020	Kharif - 2019	Kharif - 2020	
Lasbella	72300	97440	1:2.00	1:2.13	
Sibi	118350	141940	1:2.32	1:2.47	
khuzdar	128354	145590	1:2.39	1:2.42	
Noshki	62984.6	68560	1:1.81	1:1.78	
Tutbat	76620	57535	1:2.03	1:1.71	
Dera Buguti	112746	92145	1:2.42	1:1.96	
Total Average	95225.77	100535	1: 2.16	1:2.08	

Source: Survey data, 2020

CONCLUSION AND RECOMMENDATIONS

The cotton growers used the traditional technology in the farm and they obtained fewer yields due to lack of knowledge of improved seed variety, timely sowing, insufficient use of fertilizer and pesticide application. Area increasing of cotton crop due to the research making need the developing better-yield varieties by adopting modern techniques and growers obtained high cotton production. Presently, cotton crop is facing a number of constraints, including low per acre yield, high price of inputs, attack the high insects and pests, unavailability of pure seed varieties, scare of irrigation water, lack of modern technologies, lack of awareness and agroprofessionalism and adulterations in pesticides, fertilizers and seeds. During the survey cotton growers reported the regarding low yield obtained at the time of sowing the weather situations was unfavorable in this connection affect germination, attack more pest at the time of flowering, decrease the number of boll formation, weight and more weeds in the cotton crop. The reported the large quantity of common thrips, white fly and mealy bug and cotton thrips are small, yellowish sucking insects, which feed on the foliage of cotton plants causing whitish blotches and dashes on the leaves. Thrips & pest are most injurious during dry weather as well as at the time of

flowering respectively, thrips attack of time of high rain & warm temperature. The modern technology practices and recommendations from the research stations, progressive growers and extension agents' sources adopt the cotton growers for the obtained high production from to this crop. Principally, timely planting, recommended doses of fertilizer and pesticide require for the cotton growers. The main constraint in the large scale of non-availability of high yielding cotton seed varieties in Balochistan and highly recommended of the involvement of privates sector to provide improved certified seed to the cotton growers. The electricity load shedding is the main problem and period of load shedding ranges from 10-15 hours in 24 hours. The duration of load shedding may be reduced in the Balochistan province.

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Consent to Participate: Yes

• **Consent for publication and Ethical approval:** Because this study does not include human or animal data, ethical approval is not required for publication. All authors have given their consent.

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