ORIGINAL ARTICLE

Health and well-being of Hutterite farmers in Alberta: Results from the Sustainable Farm Families Alberta program

Henrietha Chibuzor Adandom, MSc, Samuel Mantey Ofori-Dei, PhD, Lars K. Hallstrom, PhD

Faculty of Health Science, Prentice Institute for Global Population and Economy, University of Lethbridge, Lethbridge, Alberta, Canada

Correspondence to: Henrietha Chibuzor Adandom, hc.nwankwo@uleth.ca

This article has been peer reviewed.

Abstract

Introduction: This article describes the health and lifestyle profile of Hutterite farmers in Alberta who participated in a health literacy education program.

Methods: Longitudinal quantitative and qualitative data from the sustainable farm families (SFF) Alberta program (2014–2017) were used to describe the health and lifestyle profile of Hutterites. Data were analysed using descriptive statistics and conventional and summative content analysis.

Results: Four hundred and twenty-seven Hutterite men and women aged 18–75 years participated in a health literacy education program. About 50%–80% of Hutterites reported good health status, no hearing or sleeping problems, little to no body pain, fewer breathing and bladder difficulties and no constipation/diarrhoea. On average, the risk of diabetes was low (mean = 3.4) with total glucose (mean = 5.2) and cholesterol (mean = 3.5) within normal levels. Mental health outcomes such as anxiety (mean = 4.1), stress (mean = 6.7) and depression (mean = 3.1) were also within normal to mild ranges. Qualitative data showed that Hutterite farmers are committed to maintaining physical health and adopting strategies to improve mental health and lifestyle behaviours.

Conclusion: Hutterites have recognisable health challenges like other rural farming communities but are aware of their physical and mental health challenges and engage in healthy lifestyle behaviours. The Hutterite tenets of living present a perfect ecological setting for sustainable health promotion intervention.

Keywords: Health promotion, Hutterites, mental health, physical health, sustainable farm families

Résumé

Introduction: Cet article décrit le profil de santé et de style de vie des agriculteurs huttériens de l'Alberta qui ont participé à un programme d'éducation en littératie en santé.

Méthodes: Des données quantitatives et qualitatives longitudinales du programme SFF Alberta (2014 à 2017) ont été utilisées pour décrire le profil de santé et de

Access this article online

Quick Response Code:

Website: www.cjrm.ca

DOI: 10.4103/cjrm.cjrm_96_22

Received: 24-12-2022 **Revised:** 18-03-2023 **Accepted:** 20-03-2023 **Published:** 29-06-2023

How to cite this article: Adandom HC, Ofori-Dei SM, Hallstrom LK. Health and well-being of Hutterite farmers in Alberta: Results from the Sustainable Farm Families Alberta program. Can J Rural Med 2023;28:123-30.

mode de vie des Huttérites. Les données ont été analysées à l'aide de statistiques descriptives et d'une analyse de contenu conventionnelle et sommative.
Résultats: Quatre cent vingt-sept hommes et femmes huttériens âgés de 18 à 75 ans ont participé à un programme d'éducation à la santé. Environ 50 à 80% des Huttériens ont signalé un bon état de santé, aucun problème d'audition ou de sommeil, peu ou pas de douleurs corporelles, moins de difficultés respiratoires et vésicales et pas de constipation/diarrhée. En moyenne, le risque de diabète était faible (moyenne = 3,4) avec une glycémie totale (moyenne = 5,2) et un taux de cholestérol (moyenne = 3,5) à des niveaux normaux. Les résultats en matière de santé mentale tels que l'anxiété (moyenne = 4,1), le stress (moyenne = 6,7) et la dépression (moyenne = 3,1) SE situaient également dans des plages normales à légères. Les données qualitatives ont montré que les agriculteurs huttérites sont déterminés à maintenir leur santé physique et à adopter des stratégies pour améliorer leur santé mentale et leurs habitudes de vie.
Conclusion: Les Huttérites ont des problèmes de santé reconnaissables comme les autres communautés agricoles rurales, mais sont conscients de leurs problèmes de santé physique et mentale et adoptent des modes de vie sains. Les principes de vie huttériens présentent un cadre écologique parfait pour une intervention durable de promotion de la santé.

Mots-clés: Familles d'agriculteurs durables, santé physique, santé mentale, Huttérites, promotion de la santé

INTRODUCTION

Rural farmers' well-being is essential due to the protective and risk factors farming have on their health.[1] However, several socio-political and economic factors, such as globalisation, pricing and climate change, affect farming and farmers' well-being.[2-4] Farmers face multiple individual and socio-environmental challenges, including exposure to pesticides,[5] injuries,[6,7] anxiety,[8] stress,[9] depression[10] and limited access to health care.[11] These challenges affect not only farmers but also their families, particularly those who live on the farms.[12-14] Hutterite farmers are an example of a farming community facing such challenges.

Hutterites are a religious group that originated in the 16th century in Europe and are known for their communal way of life based on sharing, cooperation, and mutual support.[15] They believe in living a simple and communal life, rejecting personal possessions and accumulation of wealth, and emphasize the importance of community ownership and shared resources.[15] Hutterites have a strong tradition of education, and their communities are organised into self-sufficient farming colonies.[16] They practise egalitarianism, endogamy, patriarchy and gender-based division of labour.[15] Hutterites in Canada, particularly in Alberta, produce a significant amount of agricultural produce despite owning only a small percentage of farmland. For instance, Hutterites own about 4% of Alberta's farmlands yet produce at least 80% of the province's eggs, 33% of its hogs, and 10% of its milk.[17] Due to the blending of farm work and family duties, Hutterites may be more vulnerable to several socioeconomic and environmental factors influencing well-being.[18] Thus, examining the well-being of Hutterites in an agricultural context is important because farming can both improve and threaten their health.[19]

Health promotion efforts among farmers have traditionally focused on injury prevention through educational programs on safe agricultural practices.[20] However, there is a growing emphasis on health literacy programs that address mental and physiological health and healthy living.[21-23] The Farm Safety Centre has provided workshop-based literacy education to farmers across Alberta since 2014 through the Sustainable Farm Families (SFF) program.[24] This program educates and empowers rural farmers, including Hutterites, on ways to manage their health, safety and well-being.[20,24] The program's effectiveness in changing Hutterite lifestyles is uncertain, given their aversion to anything contrary to their beliefs.[21] More importantly, the effects of farming on the well-being of Hutterite colonies, which are exclusively farming communities and significant contributors to farming and food production in Alberta,[16] are not well known. This paper uses longitudinal data from the SFF Alberta program to describe the health characteristics and risk factors of Hutterite farmers in Alberta.

METHODS

Study design, population and data sources

The SFF Alberta program involved workshops held during the off-farming season to prioritise the health, well-being and safety needs of Hutterite farmers in Alberta.[24] The program used a multistage mixed-method approach through a participatory framework[25] and included questionnaires, medical health assessments and interviews. Participants over 18-years-old, living in rural areas, comfortable communicating in English, and committed to attending the workshops were included in the study. Only active farmers were included to improve health literacy and promote safe work practices. Respondent-driven sampling was used to optimize participation, and most participants belonged to the Dariusleut sect, which is the dominant sect in Alberta. All colonies involved in the study were in southern Alberta, known for its large and fertile lands.

Annual physical assessments were collected using standardised instruments and questionnaires[26,27] to gather the data on various health factors including information on overall health status, physical activity, medical history and mental health. Qualitative data were collected through an action plan, and participants were encouraged to reflect on and act on their health goals. This paper only includes the written component of the interview.

Data analysis

A mixed-method approach was used to analyse the data and increase the credibility and validity of the results.[28] Quantitative data analysis was conducted using descriptive statistics,[29] while qualitative data analysis used content analysis based on grounded theory principles.[30] The coding process involved the immersion of data, sorting, coding and comparisons of components, resulting in three categories and six codes. To ensure validity, rules for the translation of codes into text were developed.[30] The analysis was augmented with summative content analysis techniques to identify the patterns related to health and well-being [Table 1].[31]

Ethics approval

This study adhered to the Declaration of Helsinki and these analyses were approved by the Alberta Research Information Services system in February 2022 through the University of Alberta.

RESULTS

Quantitative results

The baseline workshop (held in 2014-2015), was attended by 1,342 Hutterite farmers. Only 64.3% (N = 863) and 39.9% (N = 535) of baseline workshop participants attended the second (2015-2016) and third (2016-2017) workshops, respectively. Attrition rates from baseline to follow-up workshops were higher since participants had to spend their entire day (12-hours) at the workshop. A total of 427 participants attended all three workshops, with 49.9% females and 50.1% males. Participants' average age was 42.5 years, with 76.2% aged 25-64 years. The Dariusleut sect

Table 1: Qualitative themes by colony

Category/codes	All colonies (n=124), n (%)	Individual colonies					
		Winfield (n=12), n (%)	Debolt (n=14), n (%)	Grand Prairie (n=9), n (%)	Cleardale school (n=28), n (%)	Raymond (n=22), n (%)	Shady Lane (n=39), n (%)
Maintaining physical health							
Weight gain/loss	65 (52)	9 (75)	8 (57)	3 (33)	14 (50)	9 (41)	22 (56)
Physical activity engagement	59 (48)	11 (92)	9 (64)	3 (33)	16 (57)	10 (45)	10 (26)
Physician visit/medication use	5 (4)	1 (8)	1 (7)	1 (11)	0	2 (9)	0
Strategies for mental health							
Reducing anxiety/stress/depression	30 (24)	2 (17)	4 (29)	4 (44)	6 (21)	3 (14)	11 (28)
Lifestyle modifications							
Dietary habits	46 (37)	6 (50)	5 (36)	4 (44)	9 (32)	11 (50)	11 (28)
Leisure activities	29 (23)	2 (17)	6 (43)	2 (22)	4 (14)	6 (27)	9 (23)

Only Hutterite colonies with available qualitative data are reported here. n: The total number of individuals per colony

comprised approximately 86.7% of participants [Table 2].

Physical health status, mental health outcome and lifestyle behaviours of Hutterite farmers

A significant proportion (50%–80%) of participants had good overall health and few physiological issues, with normal ranges for metabolic age, body mass index (BMI), glucose and cholesterol levels. However, a few participants had some at-risk or abnormal physiological indicators [Tables 3 and 4]. Based on the Depression, Anxiety and Stress Scale assessment instrument, participants had normal-mild mean symptom scores for anxiety, depression and stress, with few having severe scores. In addition, most participants engaged in moderate physical activity for at least 30 min and did not drink alcohol or smoke [Table 5].

Qualitative results

A connection between the quantitative and qualitative results was found, with physical and mental health concerns being similar across the interview transcripts [Table 1]. The findings supported the theory of reasoned action and planned behaviour,[32] indicating that Hutterite farmers were aware of their physical and mental health challenges and were intentional about improving their health.

Table 2: Demographic information for participants with data across workshops 1, 2, and 3 of the intervention year (*n*=427)

Demographic characteristics	All 3 workshops, *n* (%)
Age (years), mean (SD)	42.5 (15.4)
Age groups (years)	
Youth (18–24)	57 (11.2)
Adults (25–64)	383 (75.5)
Seniors (65+)	67 (13.2)
Gender	
Female	213 (49.9)
Male	214 (50.1)
Sects of Hutterites	
Dariusleut	332 (86.7)
Lehrerleut	51 (13.3)
Locations of Albertan Hutterite colonies	
South zone	98 (25.6)
Calgary zone	8 (2.1)
Central zone	255 (66.6)
Edmonton zone	0
North zone	22 (5.7)

SD: Standard deviation

Maintaining physical health

Hutterite farmers were commonly interested in improving their physical health, with weight loss/gain, physical activity engagement, and compliance with medications being frequent concerns. Hutterite engagement in physical activity was motivated by various factors, including weight reduction and controlling blood pressure and cholesterol levels for older adults with recognized health challenges such as hypertension and diabetes.

> 'Walking every morning 5 times per week for 20 min and taking a weekly Zumba class' (Shady Lane Colony).

Strategies for mental health

Stress and anxiety attributed to farm work were common among Hutterite farmers and colonies. They had diverse ways, stratified by individual and religious beliefs, of relieving stress and anxiety. Some farmers used breathing exercises, recreational activities and discussing stressors with other people, while others relied on their religious beliefs and faith, positive thinking or critically evaluating and tackling the issue causing the stress via meditation.

> 'Differentiate between a mountain and a molehill, meditate at least weekly and try to cross bridges, as they come not 3 days prior' (Debolt Colony).

Lifestyle modifications

Hutterite farmers had different goals when it came to lifestyle choices, with some focused on dietary habits for health reasons while others were interested in recreational activities. However, all modifications were related to either staying or becoming healthy. Farmers had various beliefs about how to improve their habits, such as eating smaller portions, avoiding late-night snacks, increasing fibre intake, and cutting back on sweets, sugars and fatty foods to improve their metabolic age and reduce cholesterol levels.

Farmers and their families associated different meanings with leisure activities. Some engaged

Table 3: Descriptive information for physical health measures (*n*=427)

Measures	*n* (%)
General health status	
Very poor	71 (22.0)
Poor	7 (2.2)
Fair	83 (25.9)
Good	145 (45.3)
Excellent	14 (4.4)
Body pain	
None	84 (26.3)
Very mild	133 (41.6)
Moderate	91 (28.4)
Severe	11 (3.4)
Very severe	1 (0.3)
Health interference	
Never	127 (40.3)
A few	139 (44.1)
Monthly	21 (6.7)
Weekly	13 (4.1)
Daily	15 (4.8)
Hearing quality	
Both ears are good	188 (59.1)
Little difference in 1 ear	26 (8.2)
Little difference in both ears	89 (28.0)
Lots of difference in both ears	12 (3.8)
Deaf in 1 ear	1 (0.3)
Deaf in both ears	2 (0.6)
Breathing difficulties	
Never	178 (45.2)
Rarely	77 (19.5)
Sometimes	119 (30.2)
Always	20 (5.1)
Constipation/diarrhoea	
Yes	53 (19.1)
No	225 (80.9)
Bladder control difficulties	
Yes	68 (16.4)
No	346 (83.6)
Sleep quality	
Very poor	68 (22.7)
Poor	13 (4.3)
Fair	60 (20.1)
Good	111 (37.1)
Excellent	47 (15.7)
Diabetes risk	
Mean score (SD)	3.4 (2.1)

Diabetes risk score: 0–14 points indicates a low-to-moderate risk of diabetes, 15–20 points indicates a high risk of diabetes, >20 points indicate a very high risk of diabetes.[32] SD: Standard deviation

Table 4: Descriptive information for mental health measures and clinical indicators (*n*=427)

Measures	Mean (SD)	
	Baseline	Workshop 3
Mental health outcomes		
Anxiety	2.6 (2.9)	4.1 (4.8)
Depression	2.2 (2.8)	3.1 (4.4)
Stress	4.7 (4.2)	6.7 (5.8)
Clinical indicators		
Metabolic age (years)	49.4 (18.7)	50.1 (19.1)
BMI (kg)	28.9 (5.9)	28.9 (5.9)
Pulse rate (bpm)	76.1 (12.9)	75.4 (10.8)
Forced expiratory (L)	0.9 (0.3)	0.9 (0.3)
Oxygen saturation (%)	97.1 (1.9)	97.4 (1.7)
Total glucose (mmol/L)	5.4 (1.7)	5.2 (1.0)
Total cholesterol (mmol/L)	3.6 (1.1)	3.5 (1.0)
Body fat (kg), *n* (%)		
Obese	188 (47)	164 (40.9)
Healthy	90 (22.5)	107 (26.7)
Overfat	111 (27.8)	119 (29.7)
Under fat	11 (2.8)	11 (2.7)

DASS-21 scoring guide: Normal (DASS-D: 0–4, DASS-A: 0–3, DASS-S: 0–7), mild (DASS-D: 5–6, DASS-A: 4–5, DASS-S: 8–9), moderate (DASS-D: 7–10, DASS-A: 6–7, DASS-S: 10–12), severe (DASS-D: 11–13, DASS-A: 8–9, DASS-S: 13–16), extremely severe (DASS-D: 14+, DASS-A: 10+, DASS-S. : 17+), total cholesterol level: <5.2 is desirable, 5.2–6.2 is borderline, >6.5 is high. Total glucose levels: <5.7 is normal, 5.7–6.4 is pre-diabetes, and>6.5 is diabetes. BMI: Body mass index, SD: Standard deviation, DASS: Depression Anxiety Stress Scale

in recreational activities like dancing, watching television and outdoor activities, while others engaged in manual labour or self-development activities as a form of recreation. For instance, most farm families engaged in dancing, yoga, outdoor activities, camping and regular get-togethers with friends and families as a way of engaging in pleasurable activities.

> 'Assess if boards are salvageable, purchase them if needed …. Trees on the fence are cut and split before winter' (Shady Lane Colony).

DISCUSSION

Hutterite farmers in rural Alberta are at risk of physical health issues due to their overweight and/or obese BMI scores and unhealthy body fat percentage, which increase their risk of cardiovascular and metabolic diseases such as heart disease, stroke, hypertension, obesity, and diabetes.[33,34] Their use of highly mechanised farming techniques may also contribute to their increased risk of obesity.[35]

Hutterites have normal total cholesterol and glucose levels, indicating a low risk of diabetes. However, a 2014 Health Trends Alberta report revealed that a higher proportion of Hutterites than non-Hutterites had diabetes.[36] Although our results may not be generalisable to the wider farming population, it provides important insight into the

Table 5: Descriptive information for lifestyle behaviours	
Measures	*n* (%)
Moderate physical activity (30+ min)	
Yes	243 (59.7)
No	164 (40.3)
Smoking	
Never	363 (87.9)
Quit	48 (11.6)
Currently	2 (0.5)
Drinking of alcohol	
Never	102 (24.7)
Monthly	73 (17.7)
Once a week	103 (24.9)
2–4 times per week	97 (23.5)
5+ times per week	38 (9.2)

health and lifestyle of Hutterites. Hutterites' healthy behaviours such as physical activity and dietary modifications could reduce the risk of diabetes.[37,38]

Male Hutterites had poorer psychological health compared to females, especially in the age group of 25–64 years, although symptoms of depression, anxiety and stress were in normal-mild ranges. Perhaps, the patriarchal system practised by Hutterites and rural farmers in general may be a contributing factor to the poor mental health status of men in these communities.[39] There were inter-sect differences in psychological health. Members of the Lehrerleut sect had poorer psychological outcomes compared to members of the Dariusleut sect. The Lehrerleut sect is more conservative and less receptive to modern technology, and rarely interacts with the Dariusleut sect.[16] Perhaps, personality differences and social isolation may be the reasons for the differences in mental health outcomes.[40,41] However, our study was unable to identify the internal factors that influence psychological health outcomes in the Lehrerleut sect, and further research is needed in this area.

Qualitative data from our study showed that Hutterites were less concerned about their mental health and less likely to seek medical care, which is consistent with research that suggests strong belief systems may discourage visible minority populations from seeking treatment.[11,42,43] Our study also found that Hutterites viewed their lifestyle as a coping strategy for mental health and had diverse individual and collective strategies based on their religious and cultural beliefs to improve their well-being. This may explain why the mental health of Hutterites and other Old Order Anabaptist groups is often better than the general farming population, as they share similar religious and cultural beliefs.[44-46]

Limitations

Our study used standardized questionnaires to measure clinical indicators and collect self-reported health measures for the secular Hutterite population in Canada, which has limited literature on health and well-being. However, there are some methodological issues, such as potential overburdening of participants leading to high attrition rates, self-reported physical health and lifestyle data collected only at baseline and potential exaggeration of responses due to the close-knit nature of the Hutterite community.[47-49]

CONCLUSION

Our study found that despite methodological issues, Hutterite farmers are aware of their health challenges and engage in healthy lifestyle behaviours, which could potentially mitigate the risk of metabolic health impairment. The Hutterian culture and religious beliefs also helped mitigate the impact of physical and mental health challenges on their well-being, making it a good ecological setting for health promotion interventions.[21,22] However, health screening revealed the need for referral to address priority health issues among this unique population.

Acknowledgment: We acknowledge the Farm Safety Centre at Raymond in Alberta, Canada, for providing data for this study. Our sincere appreciation also goes out to the participants of the Farm Safety Centre's ongoing health literacy intervention.

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest.

REFERENCES

1. Bondy M, Cole D. Farmers' health and wellbeing in the context of changing farming practice: A qualitative study. Eur J Public Health 2019;29 (Supplement_4):605. Available from: https://academic.oup.com/eurpub/article/doi/10.1093/eurpub/ckz186.597/5623610. [Last cited on 2022 Sep 19].
2. Archer DW, Dawson J, Kreuter UP, Hendrickson M, Halloran JM. Social and political influences on agricultural systems. Renew Agric Food Syst 2008;23:272-84.
3. Gilliam JM, Jones PJ, Field WE, Kraybill DB, Scott SE. Farm-related injuries among Old Order Anabaptist children:

Developing a baseline from which to formulate and assess future prevention strategies. J Agromedicine 2007;12:11-23.
4. Thurston WE, Blundell-Gosselin HJ. The farm as a setting for health promotion: Results of a needs assessment in South Central Alberta. Health Place 2005;11:31-43.
5. Macfarlane E, Chapman A, Benke G, Meaklim J, Sim M, McNeil J. Training and other predictors of personal protective equipment use in Australian grain farmers using pesticides. Occup Environ Med 2008;65:141-6.
6. Narasimhan G, Crowe TG, Peng Y, Hagel L, Dosman J, Pickett W. A task-based analysis of machinery entanglement injuries among Western Canadian farmers. J Agromedicine 2011;16:261-70.
7. Pickett W, Day AG, Hagel L, Sun X, Day L, Marlenga B, *et al.* Socioeconomic status and injury in a cohort of Saskatchewan farmers. J Rural Health 2011;27:245-54.
8. Hagen BN, Sawatzky A, Harper SL, O'Sullivan TL, Jones-Bitton A. What impacts perceived stress among Canadian farmers? A mixed-methods analysis. Int J Environ Res Public Health 2021;18:7366.
9. Jones-Bitton A, Best C, MacTavish J, Fleming S, Hoy S. Stress, anxiety, depression, and resilience in Canadian farmers. Soc Psychiatry Psychiatr Epidemiol 2020;55:229-36.
10. Wilton B. Exploring the Connection between Mental Health and farm Management. Farm Management Canada. Environmental Scan; 2019. Available from: https://fmc-gac.com/wp-content/uploads/2020/06/Environmental-Scan.pdf. [Last cited on 2022 Sep 20].
11. Brew B, Inder K, Allen J, Thomas M, Kelly B. The health and wellbeing of Australian farmers: A longitudinal cohort study. BMC Public Health 2016;16:988.
12. Thurston WE, Blundell-Gosselin HJ, Ardene RV. Health concerns of male and female farmers: Implications for health promotion planning. Can J Rural Med 2003;8:239-46.
13. Jones-Bitton A, Hagen B, Fleming SJ, Hoy S. Farmer burnout in Canada. Int J Environ Res Public Health 2019;16:5074.
14. Wister A, Kendig H, Mitchell B, Fyffe I, Loh V. Multimorbidity, health and aging in Canada and Australia: A tale of two countries. BMC Geriatr 2016;16:163.
15. Ryan J. Hutterites in Canada; The Canadian Encyclopedia. 2019. Available from: https://www.thecanadianencyclopedia.ca/en/article/hutterites. [Last cited on 2022 Sep 23].
16. Hutterian Brethren. The Leut; 2022. Available from: https://hutterites.org/the-leut/distribution/. [Last cited on 2022 Sep 26].
17. Evans SM. Hutterite agriculture in Alberta: The Contribution of an Ethnic Isolate. Agric Hist 2019;93:656-81.
18. Hawkes C, Ruel M. The links between agriculture and health: An intersectoral opportunity to improve the health and livelihoods of the poor. Bull World Health Organ 2006;84:984-90.
19. Brumby S, Chandrasekara A, McCoombe S, Kremer P, Lewandowski P. Cardiovascular risk factors and psychological distress in Australian farming communities. Aust J Rural Health 2012;20:131-7.
20. Brumby SA, Willder SJ, Martin J. The sustainable farm Families project: Changing attitudes to health. Rural Remote Health 2009;9:1012.
21. Philips DL. Ecological Approach in Health Promotion with a Distinct Cultural Group: The Dariusleut Hutterites Dissertation. Calgary, AB: University of Calgary; 1992.
22. Brunt JH, Lindsey E, Hopkinson J. Health promotion in the Hutterite community and the ethnocentricity of empowerment. Can J Nurs Res 1997;29:17-28.
23. Coman MA, Marcu A, Chereches RM, Leppälä J, Van Den Broucke S. Educational interventions to improve safety and health literacy among agricultural workers: A systematic review. Int J Environ Res Public Health 2020;17:1114.
24. Farm Safety Centre. Sustainable Farm Families. Farm Safety Centre. Available from: https://www.abfarmsafety.com/sustainable-farm-families/. [Last cited on 2022 Sep 30].
25. Nastasi BK, Hitchcock J, Sarkar S, Burkholder G, Varjas K, Jayasena A. Mixed methods in intervention research: Theory to adaptation. J Mix Methods Res 2007;1:164-82.
26. Lovibond SH, Lovibond PF. Manual for the Depression Anxiety Stress Scales. Sydney Psychology Foundation Australia; 2011. Available from: http://doi.apa.org/getdoi.cfm?doi=10.1037/t01004-000. [Last cited on 2022 Oct 03].
27. Tanita. SC-240 Total Body Composition Analyzer; 2020. Available from: https://www.tanita.com/en/sc-240/. [Last cited on 2022 Oct 03].
28. Creswell JW, Plano Clark VL. Designing and Conducting Mixed Methods Research. 3rd ed. Thousand Oaks, CA: SAGE Publications; 2017.
29. Greasley P. Quantitative Data Analysis Using SPSS: An Introduction for Health and Social Sciences. Berkshire, England: Open University Press; 2008. Available from: http://www.journals.cambridge.org/abstract_S1463423608000790 [Last cited on 2022 Oct 04].
30. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. Qual Health Res 2005;15:1277-88.
31. Corbin J, Strauss A, Strategies for qualitative data analysis. In: Basics of Qualitative Research. 3rd ed. Thousand Oaks: SAGE; 2008. p. 65-87.
32. Ajzen I, Fishbein M. Understanding attitudes and predicting social behaviour. Englewood Cliff, NJ: Prentice Hall; 1980.
33. Sekhotha MM, Monyeki KD, Sibuyi ME. Exposure to agrochemicals and cardiovascular disease: A review. Int J Environ Res Public Health 2016;13:229.
34. Rinsky JL, Hoppin JA, Blair A, He K, Beane Freeman LE, Chen H. Agricultural exposures and stroke mortality in the Agricultural Health Study. J Toxicol Environ Health A 2013;76:798-814.
35. Pickett W, King N, Lawson J, Dosman JA, Trask C, Brison RJ, *et al.* Farmers, mechanized work, and links to obesity. Prev Med 2015;70:59-63.
36. Government of Alberta. Diabetes Prevalence among Alberta Hutterites. Health Trends Alberta. Edmonton; 2014. Available from: https://open.alberta.ca/dataset/6ddc7d67-0747-441c-8c92-fb46a879f683/resource/4ecfa441-8859-48d1-baa0-bf40fe280762/download/hta-2014-08-19-diabetes-in-alberta-hutterites.pdf [Last cited on 2022 Nov 08].
37. Enkhmaa B, Surampudi P, Anuurad E, Berglund L. Lifestyle changes: Effect of diet, exercise, functional food, and obesity treatment on lipids and lipoproteins. In: Feingold KR, Anawalt B, Blackman MR, Boyce A, Chrousos G, Corpas E, *et al.*, editors. Endotext. South Dartmouth (MA): MDText.com, Inc.; 2018. Available from: http://www.ncbi.nlm.nih.gov/books/NBK326737/. [Last accessed on 2022 Dec 20].
38. Lindström J, Absetz P, Hemiö K, Peltomäki P, Peltonen M. Reducing the risk of type 2 diabetes with nutrition and physical activity – Efficacy and implementation of lifestyle interventions in Finland. Public Health Nutr 2010;13:993-9.
39. Roy P, Duplessis-Brochu E, Tremblay G. Responses to adversity faced by farming men: A gender-transformative analysis. Int J Child Youth Fam Stud 2019;10:49-69.
40. Wheeler R, Lobley M, McCann J, Phillimore A. 'It's a lonely old world': Developing a multidimensional understanding of loneliness in farming. J Eur Soc Rur Soc 2023;63(S1):11-36. Available from: https://onlinelibrary.wiley.com/doi/10.1111/soru.12399 [Last cited on 2022 Dec 21].
41. Yazd SD, Wheeler SA, Zuo A. Key risk factors affecting farmers' mental health: A systematic review. Int J Environ Res Public Health 2019;16:4849.
42. Vayro C, Brownlow C, Ireland M, March S. 'Don't … Break down on Tuesday because the mental health services are only in town on Thursday': A qualitative study of service provision related barriers to, and facilitators of farmers' mental health help-seeking. Adm Policy Ment Health 2021;48:514-27.
43. Mitchell BD, Lee WJ, Tolea MI, Shields K, Ashktorab Z, Magder LS, *et al.* Living the good life? Mortality and hospital utilization patterns in the Old Order Amish. PLoS One 2012;7:e51560.

44. Gill KE, Cardenas SA, Kassem L, Schulze TG, McMahon FJ. Symptom profiles and illness course among Anabaptist and Non-Anabaptist adults with major mood disorders. Int J Bipolar Disord 2016;4:21.
45. Furman R, Bender K. The social problem of depression: A multi-theoretical analysis. J Sociol Soc Welf 2003:30:123-37.
46. Raheja UK, Stephens SH, Mitchell BD, Rohan KJ, Vaswani D, Balis TG, *et al.* Seasonality of mood and behavior in the Old Order Amish. J Affect Disord 2013;147:112-7.
47. Van Ness PH, Fried TR, Gill TM. Mixed methods for the interpretation of longitudinal gerontologic data: Insights from philosophical hermeneutics. J Mix Methods Res 2011;5:293-308.
48. Plano-Clark V, Anderson N, Wertz JA, Zhou Y, Schumacher K, Miaskowski C. Conceptualizing longitudinal mixed methods designs: A methodological review of health sciences research. J Mix Methods Res 2014;9:297-319. Available from: http://journals.sagepub.com/doi/10.1177/1558689814543563. [Last cited on 2022 Dec 21].
49. Dawadi S, Shrestha S, Giri RA. Mixed-methods research: A discussion on its types, challenges, and criticisms. JPSE 2021;2:25-36. Available from: https://www.jpse.gta.org.uk/index.php/home/article/view/20. [Last accessed on 2022 Oct 14].