ORIGINAL ARTICLE

Received: 11/16/2017
Accepted: 04/03/2018
Funding: none

Lumbar extensor muscle profile of rural milk production workers

Perfil da musculatura extensora lombar de trabalhadores rurais na atividade leiteira

Niltiane da Veiga Leonardi[1], Leandro de Moraes Kohl[1], Lincoln da Silva[2], Emanueli Broch Orsolin[1], Giovani Sturmer[1], Noé Gomes Borges Júnior[3], Themis Goretti Moreira Leal de Carvalho[1]

ABSTRACT | Background: Milk production is a work system that comprises several tasks from cattle handling, feeding and milking to product consumption. Isometric lumbar extension dynamometry is considered a satisfactory instrument for occupational evaluation and monitoring, especially for populations of workers whose activities demand high levels of strength. **Objective:** To investigate isometric lumbar extension strength among rural milk production workers. **Methods:** The sample comprised 47 rural milk production workers affiliated with the Technical Assistance and Rural Outreach Company/Southern Credit and Rural Assistance Company (Empresa de Assistência Técnica e Extensão Rural/Associação Sulina de Crédito e Assistência Rural — EMATER/ASCAR), Rio Grande do Sul, Brazil. The participants were analyzed based on a sociodemographic questionnaire and lumbar extensor muscle strength testing by means of an isometric dynamometry system. **Results:** Participants were 20 men with average age 50.45±9.44 years old and 27 women with average age 46.15±7.56 years old. The isometric lumbar extension strength was 1,169±289.96 N for the men and 571.34±190.36 N for the women. **Conclusion:** The lumbar extensor muscle profile of rural milk production workers was characterized by higher values for the men, which might be attributed to the fact that men exhibit higher body mass levels, and consequently produce greater force.

Keywords | rural workers; muscle strength dynamometer; back muscles.

RESUMO | Introdução: A atividade leiteira é um sistema de trabalho que envolve diversas tarefas, que vão desde o manejo com o gado, alimentação, ordenha, até o consumo do produto final. A dinamometria isométrica de extensão lombar tem sido descrita como um bom instrumento de avaliação e acompanhamento laboral, sobretudo de populações que exercem muita força para desempenhar suas atividades. **Objetivo:** Avaliar a força isométrica de extensão lombar de produtores rurais na atividade leiteira. **Métodos:** A amostra contou com 47 trabalhadores rurais que exercem atividade leiteira cadastrados na Empresa de Assistência Técnica e Extensão Rural/Associação Sulina de Crédito e Assistência Rural do Rio Grande do Sul, que foram avaliados por meio de questionário sociodemográfico e testaram a força muscular de extensão lombar por meio de um sistema de dinamometria isométrica. **Resultados:** Participaram do estudo 20 homens com idade média de 50,45±9,44 anos e 27 mulheres com idade média de 46,15±7,56 anos. Quanto à força isométrica de extensão lombar, o grupo masculino alcançou 1169±289,96 N e o grupo feminino 571,34±190,36 N. **Conclusão:** Podemos concluir que o perfil da musculatura extensora lombar de trabalhadores rurais na atividade leiteira alcança valores superiores em indivíduos do gênero masculino, o que pode ser atribuído ao fato de homens apresentarem maiores níveis de massa corporal e consequentemente gerarem maior força.

Palavras-chave | trabalhadores rurais; dinamômetro de força muscular; músculos do dorso.

[1]Undergraduate Physical Therapy Course, Center of Health and Agricultural Sciences (Centro de Ciências da Saúde e Agrárias — CCSA), Cruz Alta University (UNICRUZ) – Cruz Alta (RS), Brazil.

[2]Universidade Federal de Santa Catarina (UFSC) – Florianópolis (SC), Brazil.

[3]Center of Health and Sport Sciences (Centro de Ciência da Saúde e do Esporte — CEDIF/LABIN), State University of Santa Catarina (Universidade do Estado de Santa Catarina — UDESC) – Florianópolis (SC), Brazil.

DOI: 10.5327/Z1679443520180166

INTRODUCTION

Brazil earned an outstanding place among the main milk producing countries in recent years, ranking fifth globally. Brazil produced 35 billion liters of milk in 2015, 35.2% corresponding to the Southern area. There are 5 million rural establishments in the country, 1.3 millions of which are milk producers[1]. While the beef trade business is characterized by a predominance of large livestock producers, milk cattle is most often tended by small and medium-sized producers to become a source of family income as main or secondary activity[2].

The work of milk producers comprises several tasks, from the handling, feeding and milking of animals to environment and tool cleaning, milk storage and final product consumption. Some such tasks demand considerable physical effort from workers[3]. According to Santos Filho[4], many workers also perform parallel activities in farms to make profit of resources and spaces and increase their income. As a function of the large number of tasks they perform, such workers do not have time for non-occupational activities, which causes physical exhaustion and consequent impairment of their quality of life[5].

Agricultural work, milking more in particular, involves lifting and transporting loads, repeated movements and adoption of inadequate body postures. For this reason it is an occupation that poses considerable risk to postural health, including spinal and limb deviations, repeated strain injury and low back pain[4-6].

In the daily work of rural workers, the low back extensor muscles participate in a large number of actions. When the strength of the abdominal muscles is reduced and there is imbalance between the trunk flexor and extensor muscles, low back pain, dysfunction and muscle fatigue might ensue. These conditions might threaten the motor function of the lumbar spine and are a risk factor for chronic low back pain and other disorders with direct impact on the quality of life and work life of rural milk production workers[7-9].

Muscle strength is intimately related to functional capacity. Muscle strength is the ability of muscles to develop or resist isometric, isokinetic or isotonic force. Dynamometry is a method used to measure muscle strength and investigate the characteristics of a given muscle over time[10-12].

Among the varieties of dynamometry, isometric lumbar extension dynamometry (ILED) is considered a satisfactory instrument for occupational evaluation and monitoring especially of populations of workers whose activities demand high levels of strength[13]. In addition, there is also a need to quantify physical factors associated with the activities performed to improve diagnosis and preventive actions[14].

Given the relevance of milk production and the high physical demands to which rural workers are exposed, the aim of the present study was to investigate the isometric lumbar extension strength of rural milk production workers engaged.

METHODS

The study population included rural workers in the area covered by Alto Jacuí and Northwest Colonial Regional Development Council (Conselho Regional de Desenvolvimento — COREDE) selected by means of convenience sampling and without previous sample size calculation. Participants were 47 rural workers affiliated with the Technical Assistance and Rural Outreach Company/Southern Credit and Rural Assistance Company (Empresa de Assistência Técnica e Extensão Rural/Associação Sulina de Crédito e Assistência Rural — EMATER/ASCAR), Rio Grande do Sul, Brazil. Participants came from the following municipalities: Cruz Alta, Boa Vista do Cadeado, Boa Vista do Incra, Salto do Jacuí, Fortaleza dos Valos, Condor, Joia, Panambi, Coronel Barros and Pejuçara.

In compliance with Resolution no. 466/2012, which establishes Guidelines and Regulatory Standards for Research Involving Human Beings, the study was approved by the research ethics committee of Cruz Alta University (Universidade de Cruz Alta — UNICRUZ) ruling no. 1,100,982. The participants signed an informed consent form.

Data collection was performed with the support of EMATER/ASCAR (RS), State University of Santa Catarina (Universidade do Estado de Santa Catarina — UDESC)

and UNICRUZ; the latter also made its physical therapy laboratory available.

The following procedures were used for data collection:

- Application of the Worker's Questionnaire adapted from Moraes[15], which comprises open- and closed-ended questions to collect specific, personal and work conditions data;
- ILED, which was performed by means of a isometric lumbar extension measurement system developed by Laboratory of Instruments (LABIN), UDESC[16]. This system is based on the one used by Eichinger et al.[14] with an additional support to evaluate subjects at 140º of trunk anterior flexion. The goal of this modification is to avoid interferences with the strength momentum derived from anthropometric factors.

The device comprises a MioTool® system and a plank coupled to a hip posterior support. This support is adjustable and serves to place subjects in a way to achieve a 140º angle between the trunk and the thighs by adjusting the length of the chain that connects the load cell to the pull handle. Three measurements are previously made with subjects in straight position and the arms relaxed along the trunk, to wit, distance from shoulder to ground, trochanter to ground and fifth metacarpophalangeal joint axis to ground. These measurements are used to calculate the length of the chain needed to achieve a 140º angle. The isometric strength measurement system used is depicted in Figure 1. The dynamometer component that measures strength is a S-beam load cell with four strain gauges configured as a Wheatstone bridge circuit. Deformation of the load cell generates an electrical signal proportional to the strength applied. The dynamometer was calibrated before data collection. The four-channel data acquisition system comprises signal conditioners and a 14-bit analog-to-digital converter. In addition, it includes data acquisition and exploration software specifically designed for system management, which allows adjusting parameters (acquisition frequency, data collection time and visual feedback of curves), real-time acquisition monitoring and recording files, which are easily exported to data analysis software.

The load cell was connected to the MioTool® system, which allowed measuring the variation of lumbar strength as a function of time.

Descriptive analysis included calculation of the mean and standard deviation of the following parameters: peak force, total work, mean power and conventional ratio. Means were analyzed through the t-test (independent samples).

Source: photography collection, Collective Health Research Unit, UNICRUZ.

Figure 1. Data acquisition system.

All the analyses included calculation of the 95% confidence interval ($p<0.05$).

RESULTS

Most participants were women (57.45%) whose average age was lower compared to the men (women, 46.15±7.56 years old; men, 50.45±9.44 years old). Married participants predominated among both men and women, 95% and 96.30%, respectively (Table 1).

Most participants had attended incomplete elementary education; women, 44.44%; men, 50%. About 14.81% of the women and 10% of the men had completed higher education courses (Table 1).

Table 2 shows that the body mass and height were higher among the men compared to the women, however the difference in height was not considerable. Most participants from both sexes — 48.15% of the women and 65% of the men — had worked in milk production for more than 20 years. The smallest proportion of participants were away from work or on sick leave — women, 3.70%; men, 5%.

Fifty percent of the men worked 40 hours per week and the other 50% more hours. Among the women, 51.88% worked 40 hours and 44.44% more hours. Only 25.93% of the women and 20% of the men performed physical activity (Table 2).

Table 3 describes the mean peak and mean force values and their comparison per sex; statistically significant difference was detected for both variables ($p<0.05$).

Tables 4 and 5 describes correlations between ILED peak force and mean force measurements; no statistically significant difference was detected.

DISCUSSION

The spinal extensor muscles seem to be one of the main agents involved in the early manifestation of low back pain. Training protocols targeting these muscles were effective to reduce low back pain and prevent new cases. Thus being, methods to assess the lumbar extensor muscle strength and function are relevant[17].

Muscle strength is the ability of muscles to generate or resist force, and is considered the most relevant physical asset of human beings, being related to both health and physical performance at various age intervals[12,14].

Muscle strength might be influenced by intrinsic or extrinsic factors. Among the former, the following stand

Table 1. Sociodemographic data relative to the study participants, Rio Grande do Sul, 2017 (n=47).

Characteristics	Category (measurement unit)	Female	Male
		(Percentage)	
Sex		57.45	42.55
Marital status	Single	3.70	0
	Married	96.30	95
	Divorced or separated	0	5
Educational level	Incomplete elementary school	44.44	50
	Complete elementary school	11.11	10
	Incomplete secondary school	7.40	0
	Complete secondary school	11.11	25
	Incomplete higher education	3.70	0
	Complete higher education	14.81	10
	Complete specialization	7.40	5

Table 2. Clinical characteristics of participants, Rio Grande do Sul, 2017 (n=47).

Characteristics	Category (measurement unit)	SEX	
		Female	Male
		(Mean/SD)	
Age	Years	46.15±7.56	50.45±9.44
Body mass	Kg	70.07.2±15.60	81.11±10.06
Height	M	1.60±0.03	1.72±0.07
Length of work in milk production	Less than 1 year	*(Percentage)*	
		7.41	0
	2 to 5 years	3.70	5
	6 to 10 years	22.22	15
	11 to 15 years	7.41	15
	16 to 20 years	11.11	0
	More than 20 years	48.15	65
Occupational status	Active	96.30	95
	Away from work/sick leave	3.70	5
Weekly working hours	30 hours/week	3.70	0
	40 hours/week	51.85	50
	More than 40 hours/week	44.44	50
Physical activity	Yes	25.93	20
	No	74.07	80

SD: standard deviation; Kg: kilogram; M: meter.

Table 3. Mean, standard deviation and correlation per gender of isometric lumbar extension dynamometry results, Rio Grande do Sul, 2017 (n=47).

	SEX		
	Female (mean±SD)	Male (mean±SD)	Female vs. male (p value)
Peak force (N)	571.34±190.36	1.169.35±289.96	0.000
Mean force (N)	441.04±153.23	921.28±250.71	0.000

SD: standard deviation; N: Newton.

Table 4. Correlation of peak force (N) between isometric lumbar extension dynamometry measurements, Rio Grande do Sul, 2017 (n=47).

Lumbar extension isometric dynamometry time-points	p<0.05	
	Women	Men
T1-T2	0.674819754	0.476478378
T1-T3	0.701436321	0.211700150
T2-T3	0.967686614	0.560524485

N: Newton; T1: first lumbar isometric strength test; T2: second lumbar isometric strength test; T3: third lumbar isometric strength test.

Table 5. Correlation of mean force (N) between isometric lumbar extension dynamometry measurements, Rio Grande do Sul, 2017 (n=47).

Lumbar extension isometric dynamometry time-points	p<0.05	
	Women	Men
T1-T2	0.897137927	0.774839874
T1-T3	0.670471592	0.412160859
T2-T3	0.773740508	0.581788949

N: Newton; T1: first lumbar isometric strength test; T2: second lumbar isometric strength test; T3: third lumbar isometric strength test.

out: muscle fiber cross-sectional area, number, contraction velocity and type, coordination, sex and age. In turn, the extrinsic factors include: time of the day, training method, motivation and nutrition[18].

Dynamometry has been recently used for assessment of muscle strength for being a non-invasive, easy-to-apply and low-cost method, in addition to providing reliable muscle strength parameters[12,14]. Some authors asserted that lumbar dynamometry for assessment of the trunk muscle strength has paramount importance in the evaluation of the global physical capacity, particularly in regard to individuals who perform activities involving physical overload[19,20].

In the present study, we found that the lumbar strength levels were higher among the men compared to women, indeed, 204.67% superior, thus agreeing with the results of the studies by Eichinger et al.[14] and Cardozo et al.[21]. This difference might be attributed to the fact that men exhibit larger muscle mass, and thus produce greater force in general compared to women[21].

In a study with 50 women aged 30 to 50 years old, Guedes et al.[22] compared the effect of different strength training frequencies on the isometric lumbar muscle strength. The average strength was 611.52±167.68 N in the group that trained 2 to 3 times per week and 700.11±149.06 N in the group that trained 4 to 5 times per week. In the present study, the lumbar muscle strength was lower among the women, 571.34±190.36 N. However, this difference might be due to differences in the profile of samples, as the population of the present study included participants who performed or not physical activity, while Guedes et al.[22] exclusively analyzed women who performed strength training.

The maximum isometric lumbar extension strength (N) found in the present study, 1,169.35±289.96 N for men and 571.34±190.36 N for women, were both superior to the ones reported by Soares et al.[12], 1,048.6±235.2 N and 548.8±156.8 N, respectively; Soares et al.[23], 1,117.2±240.1 N and 475.3±184.24 N, respectively; and Silva[16], 695±229 N and 360±85 N, respectively. These findings suggest that the isometric lumbar traction strength might be higher among individuals who live and work in rural areas compared to the ones who work in urban environments, such as offices, for instance, for performing activities involving greater overload.

CONCLUSION

Milk production depends on individuals who perform tasks involving considerable physical overload and inadequate body posture. According to Kirkhorn et al.[24] and Fathallah et al.[25], musculoskeletal diseases are the most frequent and high-cost conditions in rural areas. In the present study, we found that the lumbar extensor muscle profile of rural milk production workers was characterized by higher values for the men compared to the women, 1,169.35±289.96 N and 571.34±190.36 N, respectively. This difference might be attributed to the fact that men exhibit higher body mass levels, and consequently produce greater force.

By comparison to other studies, we found that rural workers develop higher levels of strength, which might be due to the fact they perform activities that involve greater physical overload compared to urban workers. We collected quantitative data on the isometric lumbar extension strength of individuals engaged in milk production, which represents a contribution to the literature, since it comprises few studies on this population of workers. For this reason, our results might serve as ground for future studies.

The measurement method used proved to be adequate, and thus might be applied to the monitoring of the trunk function of rural workers. In addition, for being a practical and low-cost method, it might be used in practice since the time of hiring employees for a same job, for the purpose of monitoring and characterizing the return-to-work criteria following sick leaves and layoffs.

However, further studies with larger samples and including variation in anthropometric measurements, occupation, sex and age should be performed with instruments similar to the one we used in the present study to corroborate the scientific understanding on the subject of interest and to contribute to decision-making by occupational professionals.

ACKNOWLEDGEMENTS

The present was a participative and planned study that involved the Center of Health and Agricultural Sciences (Centro de Ciências da Saúde e Agrárias — CCSA),

undergraduate physical therapy course, UNICRUZ, LABIN, Center of Health and Sport Sciences (Centro de Ciências da Saúde e do Esporte — CEFID), UDESC Foundation and EMATER and ASCAR. It further had the support of Social Thematic Group, Milk Network Program (Milk Cattle Production System in Northwestern Rio Grande do Sul Research-Development Network Program). Participants were rural milk production workers from ten municipalities covered by Alto Jacuí and Northwest Colonial Regional (COREDE), Rio Grande do Sul. The study had support from Institutional Program of Undergraduate Research Grants (Programa Institucional de Bolsas de Iniciação Científica da UNICRUZ–PIBIC) and National Council of Scientific and Technological Development (Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq). Our thanks to everybody.

REFERENCES

1. Instituto Brasileiro de Geografia e Estatística. Produção da Pecuária Municipal [Internet]. Rio de Janeiro: IBGE; 2015 [cited 23 Oct 2017]. v.43. 49p. Available at: https://biblioteca.ibge.gov.br/visualizacao/periodicos/84/ppm_2015_v43_br.pdf
2. Federação da Agricultura e Pecuária do Estado de São Paulo. Bovinos de leite [Internet]. 2010 [cited 23 Oct 2017]. Available at: http://www.faespsenar.com.br/faesp/pagina/exibe/faesp/produtos/bovinos-de-leite/697
3. Oliveira CC. A ergonomia na atividade leiteira: avaliação das condições de trabalho nos ordenhadores na região de Campo Mourão - PR [MA dissertation]. Ponta Grossa: Universidade Tecnológica Federal do Paraná; 2011.
4. Santos Filho JC. Estratégias de organização do trabalho na atividade leiteira em propriedades de agricultura familiar [MA dissertation]. Maringá: Universidade Estadual de Maringá; 2009.
5. Tonial A. Avaliação da prevalência, perfil e sintomatologia dos distúrbios osteomusculares relacionados ao trabalho em membros superiores nos ordenhadores da Grande Florianópolis [MA dissertation]. Florianópolis: Universidade Federal de Santa Catarina; 2004.
6. Haeffner R, Sarquis LMM, Haas GFS, Heck RM, Jardim VMR. Prevalência de lombalgia e fatores associados em trabalhadores de uma empresa agropecuária do sul do Brasil. Rev Bras Med Trab. 2015;13(1):35-42.
7. Barros SS, Ângelo RCO, Uchóa EPBL. Lombalgia ocupacional e a postura sentada. Rev Dor. 2011;12(3):226-30. http://dx.doi.org/10.1590/S1806-00132011000300006
8. Tahara N, Gatti AC, Rafachino ECB, Walsh IAP. Efeitos de um programa educacional e de exercícios fisioterapêuticos na avaliação da dor e da capacidade funcional em indivíduo com lombalgia: relato de caso. Arq Ciênc Saúde Unipar. 2008;12(1):61-6. https://doi.org/10.25110/arqsaude.v12i1.2008.2230
9. Instituto Brasileiro de Geografia e Estatística. Pesquisa Nacional de Saúde 2013: percepção do estado de saúde, estilos de vida e doenças crônicas [Internet]. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística; 2014 [cited 20 Oct 2017]. Available at: ftp://ftp.ibge.gov.br/PNS/2013/pns2013.pdf
10. Arab AM, Salavati M, Ebrahimi, I, Ebrahim MM. Sensitivity, specificity and predictive value of the clinical trunk muscle endurance tests in low back pain. Clin Rehabil. 2007;21(7):640-7. https://doi.org/10.1177/0269215507076353
11. Borges Junior NG, Domenech SC, da Silva ACK, Dias JA, Sagawa Junior Y. Estudo comparativo da força de preensão isométrica máxima em diferentes modalidades esportivas. Rev Bras Cineantopom Desempenho Hum. 2009;11(3):292-8.
12. Soares AV, Carvalho Júnior JM, Fachini J, Domenech SC, Borges Júnior NG. Correlação entre os testes de dinamometria de preensão manual, escapular e lombar. Rev Acta Bras Movimento Humano. 2012;2(1):65-72.
13. Demoulin C, Grosdent S, Smeets R, Verbunt J, Jidovtseff B, Mahieu G, et al. Muscular performance assessment of trunk extensors: A critical appraisal of the literature. In: Sakai Y (Ed.). Low Back Pain. Londres: InTech; 2012.
14. Eichinger FLF, Soares AV, de Carvalho Júnior JM, Gevaerd MS, Domenech SC, Borges Júnior NG. Dinamometria lombar: Um teste funcional para o tronco. Rev Bras Med Trab. 2016;14(2):120-6. https://doi.org/10.5327/Z1679-443520162415
15. Moraes LFS. Os princípios das cadeias musculares na avaliação dos desconfortos corporais e constrangimentos posturais em motoristas do transporte coletivo [MA dissertation]. Florianópolis: Universidade Federal de Santa Catarina; 2002.
16. Silva L. Proposta de método de avaliação da força de extensão lombar por meio da dinamometria [MA dissertation]. Florianópolis: Universidade do Estado de Santa Catarina; 2015.
17. Smith D, Bissell G, Bruce-Low S, Wakefield C. The effect of lumbar extension training with and without pelvic stabilization on lumbar strength and low back pain. J Back Musculoskelet Rehabil. 2011;24(4):241-9. https://doi.org/10.3233/BMR-2011-0301
18. Fernandes AA, Marins JCB. Teste de força de preensão manual: análise metodológica e dados normativos em atletas. Fisioter Mov. 2011;24(3):567-78. http://dx.doi.org/10.1590/S0103-51502011000300021
19. Udermann B, Mayer JM, Murray SR. Quantification of Isometric Lumbar Extension Strength Using a BackUP Lumbar Extension Dynamometer. Res Quarterly Exercise Sport. 2004;75(4):434-9. https://doi.org/10.1080/02701367.2004.10609177
20. Santos LJM. Dinamometria isocinética lombar. EFDeportes [Internet]. 2002 Jun [cited 10 Nov 2017];8(49). Available at: http://www.efdeportes.com/efd49/dinam.htm
21. Cardozo DC, Alves H, Simão R, Polito MD. Avaliação da força muscular extensora do tronco: influência do gênero e do estado de treinamento. ConScientiae Saúde. 2016;15(3):401-6. https://doi.org/10.5585/ConsSaude.v15n3.6246
22. Guedes WA, Farias DL, Tibana RA, Nascimento DC, Vieira, DCL, Tajra V, et al. Efeito de diferentes frequências de treinamento sobre a força muscular isométrica da coluna lombar em mulheres praticantes de treinamento de força. Educ Física Rev. 2013;7(1):1-10.

23. Soares AV, Carvalho-Júnior JM, da Silva L, Domenech SC, Borges-Júnior NG. Valores normativos da dinamometria lombar: um teste funcional para o tronco. In: Anais do IV Simpósio em Neuromecânica Aplicada; 2013 Nov 26-28; Florianópolis. Florianópolis; 2013. p. 55-6.
24. Kirkhorn SR, Earle-Richardson G, Banks RJ. Ergonomic risks and musculoskeletal disorders in production agriculture: recommendations for effective research to practice. J Agromedicine. 2010;15(3):281-99. https://doi.org/10.1080/1059924X.2010.488618
25. Fathallah FA, Miller BJ, Miles JA. Low back disorders in agriculture and the role of stooped work: Scope, potential interventions, and research needs. J Agric Saf Health. 2008;14(2):221-45. https://doi.org/10.13031/2013.24352

Correspondence address: Themis Goretti Moreira Leal de Carvalho – Rua Coronel Luiz Azevedo, 509 – Centro – CEP: 98170-000 – Tupanciretã (RS), Brazil – E-mail: carvalhothemis@gmail.com