ORIGINAL ARTICLE

EFFECT OF RURAL AND MARGINAL URBAN HEALTH SERVICE ON THE PHYSICIANS' PERCEPTION OF PRIMARY HEALTH CARE IN PERU

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ABSTRACT

Objective: To determine the effect of the Rural and Marginal Urban Health Service (SERUMS) on the physicians' perception of work in the primary health care (PHC) setting and its associated factors. **Materials and methods:** A secondary data analysis of a sample of physicians who performed the SERUMS in 2016 was carried out. To evaluate the variable of interest, the scale "Perception of work in the PHC setting" was used, higher scores indicated a negative perception of work in the PHC setting. A baseline survey (before the SERUMS) and a follow-up survey (8-12 months after starting the SERUMS) were applied and differences in both scores were evaluated. **Results:** Of the 780 respondents, 215 (27.6%) completed the baseline and follow-up survey. The average score increased considerably (from 3.4 to 6.7; $p < 0.001$), which shows a negative perception of work in the PHC setting after participating in the SERUMS. Of the three parts of the survey, the one regarding perceptions by the physicians working in the PHC and the one about perceptions of medical work in the PHC setting increased the perception scores. No sociodemographic variables were found to be associated with the change in scores. **Conclusions:** Physicians' perception about work in the PHC setting deteriorated after participating in the SERUMS. Therefore, strategies to encourage physicians' interest in working at this level of healthcare should be promoted.

Keywords: Primary Health Care; Physicians; Primary Care; Rural Health; Rural Health Services; Rural settlements; Suburban Health Services; Health Personnel; Peru (Source: MeSH NLM).

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INTRODUCTION

Meeting the population's health needs requires qualified, available, and equitably distributed professionals. In recent years, the number of health professionals has increased worldwide; however, in 40% of countries there are still fewer than 10 physicians per 10,000 people, a situation that occurs in 90% of low-income countries [(1)]. In 2017, Peru had 12.8 physicians for every 10,000 inhabitants, and it was estimated that only 7,641 physicians (a third of the total) were working in primary health care (PHC) [(2)], a low percentage, considering that the PHC should solve 80% of the population's health problems [(3)].

In 1972, the Civil Service of Graduates (SECIGRA) was created in Peru and is currently called Rural and Marginal Urban Health Service (SERUMS), a community program carried out by health professionals during a year in the PHC system. It is aimed at improving the distribution of health

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professionals throughout the country, in order to provide access to comprehensive health care to vulnerable populations in rural and marginal urban areas of Peru [4,5]. Although the number of health professionals in PHC has increased in recent years [5], including serumists (those working in the SERUMS) [6], there has been a reported low interest among physicians to work at this level of care [7-10].

The SERUMS represents the first experience of work on PHC for many health professionals, this could significantly influence the perception and the intention to work on PHC in the future. Understanding this situation would be useful to improve policies to attract work at this level of healthcare. Therefore, the aim of this study was to determine the perception of physicians who carry out the SERUMS in Peru about work in the primary health care system and its associated factors.

KEY MESSAGES

Motivation for the study: The Rural and Marginal Urban Health Service (SERUMS) is usually the first experience of work in Primary Health Care (PHC) for recently graduated doctors in Peru.

Main findings: Physicians' perception of work in the PHC setting deteriorates after 8 to 10 months in the SERUMS. Basic level of Quechua and Aymara, and having a dependent family are associated with a better perception of work in PHC.

Implications: The strategies to promote the interest of the physician in PHC should include new mixed-type incentives (economic and non-economic).

MATERIALS AND METHODS

Study population and design

A secondary analysis was done with data from the surveys of the Colegio Médico del Peru (CMP) to a group of doctors before starting the SERUMS and in the eighth month of service.

Sources of information

The Young Physician Committee of the CMP conducted two surveys in 2016 to obtain information on the professional perspectives towards work in PHC.

Baseline Survey

In April 2016, during the "Induction Course SERUMS Lima, 2016" organized by the Young Physician Committee of the National Board of the CMP and the Regional Board III-Lima, the doctors who were about to carry out the SERUMS were surveyed. The purpose of this event was to provide the tools and knowledge to carry out the necessary functions during the SERUMS, with emphasis on the work in PHC.

Follow-up survey

From the eighth to the twelfth month, after starting the SERUMS, a second survey was applied to the physicians who had completed the baseline survey. It was created in Google Forms® and sent by email. Participants were called by phone to be reminded to fill out the questionnaire. Emails and phone numbers were obtained from the database provided by the CMP.

Dependent variable

Se consideró como variable dependiente a la percepción sobre el trabajo en el PNA, la cual se midió con una escala validada [11]. Este instrumento tiene 11 ítems, cuyas respuestas se encuentran en escala Likert, de uno a cinco puntos. El estudio que ha validado esta escala reporta una consistencia interna global alta (alfa = 0,78; puntaje para cada ítem mayor a 0,7), y una correlación entre los dominios superior a 0,3, en todos los casos [11].

The overall score of the scale ranges from 11 to 55 points (11 being the value for highest positive perception of work in PHC and 55 the value for highest negative perception of work in PHC). In addition, it has three domains: "Perceptions about the physician working in PHC" (range from 5 to 25); "Perceptions about working in PHC" (range from 4 to 20); and "Perceptions about the economic consequences of working in PHC" (range from 2 to 10). The higher scores indicate the worse perception of work in the PHC setting [11].

Independent variables

In the baseline survey, we included: sex, age, university, place of birth, having studied a previous career, having a basic level of Quechua or Aymara, having a dependent family (the participant being the main source of family income), having a physician as a family member, and having participated in activities in the PHC setting during the medical undergraduate program. In the follow-up survey, we consulted about the type of health facility where they carried out the SERUMS, the category of the health facility, and whether they would consider the possibility of being the head of the health facility.

Analysis plan

The baseline survey database was processed and analyzed with Stata v14.0 (Stata Corporation, College Station, Texas, USA). The general characteristics of the physicians were summarized in absolute and relative frequencies for the categorical variables, as well as measures of central tendency and dispersion for the numerical variables. For all analyses, a value of $p < 0.05$ was considered statistically significant. To compare scores between the baseline and follow-up surveys, the t-test for paired samples was used.

To evaluate factors associated with the perception of work in the PHC system and factors associated with the change in score between the baseline and follow-up surveys, we used crude and adjusted linear regressions by calculating the β coefficients and the 95% confidence intervals (95% CI). In the adjusted model, variables that presented a value of $p < 0.20$ in the raw model were included. In order to perform the linear regressions, we previously evaluated compliance with the criteria of residual normality (visual evaluation of the histograms of the studentized residuals) and equal variances (visual evaluation of the scatter plot between the residuals and the predicted outcome values). Since the independent variable was categorical, we determined that the regressions met the assumption of linearity. In all cases the assumptions of the multiple linear regression were met. Likewise, in the adjusted model, inflation factors of the non-centered variance were used; no collinearity was found among the independent variables.

Ethical considerations

Participation of Physicians was voluntary. This study was approved by The Institutional Ethics Committee of the Hospital Nacional Docente Madre Niño San Bartolomé (Exp. No.: 09400-19).

RESULTS

A total of 780 physicians answered the baseline survey. Of these, 723 completed the scale about perception of work in the PHC setting, and 215 (29.7%) completed the follow-up survey (Figure 1).

A total of 723 doctors completed the scale in the baseline survey, in which we found that the median age was 25 years, 389 (53.8%) were women, 627 (86.8%) studied in a medical school in Lima, 84 (12.8%) had families that depended on them (Table 1).

Table 2 shows the comparison between the scores of the scale of perception about work in the PHC system, for the baseline survey (n = 723) and the follow-up survey (n = 215). The 11 items evaluated showed statistically significant differences ($p < 0.05$). Overall, the scores increased, which means that the perception of work in PHC worsened after eight months of starting the SERUMS, except for the score of item 4 (do you consider that a physician who works in the PHC system has a lower economic income than a physician who works in a hospital?). The highest scores were observed in items 1, 2, 7 and 9. Likewise, statistically significant differences were found ($p < 0.005$) in two of the three domains, except for the domain "Perceptions about the economic consequences of working in PHC".

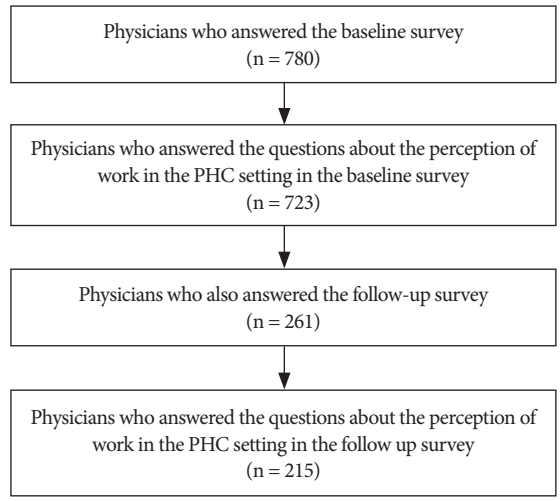

Figure 1. Flow chart of the physicians included in the study.

The following items presented the highest scores: "do you consider that the academic training you have received at the university is more oriented to a hospital job than to PHC?" (11 points), "do you consider that the work in the PHC setting is very limited, in relation to hospital activity?" (10 points), "do you consider that if you worked in the PHC setting in your country, you would not be able to meet your economic needs?" (6 points) and "do you consider that a physician who works in the PHC setting has a lower economic income than a physician who works in a hospital?" (4 points).

In the adjusted model of the baseline survey, we found that physician with a basic level of Quechua or Aymara had an average of 2.67 (95% CI: -4.29 to -1.06) points less than those who did not have knowledge of Quechua or Aymara; and those who had a dependent family had an average of 1.75 (95% CI: -3.48 to -0.01) points less than those who did not have a dependent family; these data were adjusted by age, university, place of birth, other careers, and partici-

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Table 1. Characteristics of the physicians participating in the study.

Variables	Total (n = 723)
Age (years) [a]	25 (24-27)
Sex	
Male	334 (46.2)
Female	389 (53.8)
Location of the university of origin	
City of Lima	627 (86.8)
Other cities from Peru	80 (11.1)
Abroad	15 (2.1)
Place of birth	
City of Lima	429 (59.3)
Other cities from Peru	286 (39.6)
Abroad	8 (1.1)
Studied another career before Medicine	
No	659 (91.9)
Yes	58 (8.1)
Basic level of Quechua or Aymara	
No	500 (85.6)
Yes	84 (14.4)
Dependent family	
No	620 (87.6)
Yes	88 (12.4)
Medical relatives	
No	372 (51.7)
Yes	348 (48.3)
Participation in PHC activities while being undergraduate students	
No	40 (5.5)
Yes	683 (94.5)
SERUMS variables [b]	
Type of healthcare facility	
Ministerio de Salud (MINSA)	232 (89.2)
Others	28 (10.8)
Healthcare facility category	
I-1	44 (16.9)
I-2	148 (56.7)
I-3 or I-4	69 (26.4)
Head of the health facility	
No	168 (64.4)
Yes	93 (35.6)

[a] Median (interquartile range).
[b] Only for those physicians who responded the follow-up survey.
PHC: Primary Health Care.

pation in PHC activities during undergraduate studies. The adjusted model had an R2 value of 0.034, that is, the addition of all the variables of this model explains 3.4% of the variability of the perception of working in PHC (Table 3).

The multiple linear regression model was not carried out because no variable presented a statistically significant association to the change in score between the perception in the baseline and follow-up surveys (Table 4).

DISCUSSION

The results of this study indicate that serumists' perception of work in the PHC setting worsens after a period of 8-12 months. This finding was observed in the overall score and in the domains "Perceptions about the physician working in the PHC setting" and "Perceptions about work in the PHC setting". The only item that showed an improved perception was: ¿Do you consider that a physician working in PHC has a lower economic income than a physician working in a hospital? Likewise, sociodemographic factors were not associated with the change in the score of perception of work in the PHC setting.

Our results indicate that the perception of work in PHC deteriorates as months go by, which indicates the need for improvements in the work experience of the participants of this program. Peruvian physicians have little interest in working in PHC [10,12], due to the lack of economic and non-financial incentives as well as the fact that they show greater interest in hospital work [7-10].

Physicians who stated that their academic training was oriented towards the hospital environment had a worse perception of the work in the PHC setting. According to previous studies, less than 50% of recently graduated Peruvian physician consider that they have received adequate training for work in PHC [13], usually the training they received involved participation in student associations that carry out social activities [14,15]. This could cause physician to consider the work of the PHC setting as inferior and less interesting than that of hospitals, since their training in medical schools would be aimed to solving complex health problems that require facilities with greater problem-solving capacity.

On the other hand, we found that having a basic level of Quechua or Aymara, and having a dependent family were associated with a better perception of work in the PHC setting. Previous studies have described that having studied in the provinces or in rural areas [16-18], having learned Quechua, and having family from outside of Lima, are associated with the possibility of working in remote or rural areas [16]. This finding could be explained by the fact that the mentioned scenarios could increase the familiarity of serumist physicians with Quechua or Aymara and with medical work in rural areas. Regarding the association between having a dependent family and working in PHC, participating in the SERUMS allows the recently graduated professional to receive a salary even higher than that which would be obtained by working in urban areas, where there is greater competi-

Tabla 2. Scores obtained by the physicians who answered the baseline survey (n = 723) and the follow-up survey (n = 215) of the perception of work at the first level of care.

Questions	Baseline survey (n = 723)	Survey of perception of work in the PHC setting (n = 215)			
		Baseline	Follow-up	Difference	p value [a]
1. Do you think a physician who works in PHC has less prestige in society than a physician who works at a hospital?	2.3 (1.1)	2.3 (1.1)	2.8 (1.2)	0.5 (1.4)	<0.001
2. Do you think the physician who works in PHC. does so because he or she had no other employment option?	2.3 (0.9)	2.3 (1.0)	2.8 (1.1)	0.5 (1.2)	<0.001
3. Do you believe that physicians who work in PHC are less academically qualified than those working in a hospital?	2.2 (1.0)	2.3 (1.0)	2.6 (1.0)	0.3 (1.2)	<0.001
4. Do you think that physicians who work in PHC have lower income than those that work at a hospital?	3.4 (1.0)	3.5 (1.0)	3.2 (1.2)	–0.3 (1.4)	0.002
5. Do you consider that a physician working in PHC has lower status within the hospital guild?	2.6 (1.1)	2.7 (1.1)	3.0 (1.1)	0.4 (1.3)	<0.001
6. Do you think that if you worked in PHC in your country. you would not be able to meet your economic needs?	3.4 (1.1)	3.5 (1.0)	3.7 (1.1)	0.2 (1.2)	0.028
7. Is working in PHC a transition period for you between finishing your degree and specialization (residency)?	3.3 (1.0)	3.4 (1.0)	3.9 (1.0)	0.5 (1.2)	<0.001
8. Do you consider that in PHC there are uninteresting medical cases. when compared to hospital activity?	3.0 (1.0)	3.1 (1.0)	3.4 (1.1)	0.3 (1.4)	0.002
9. Do you consider that the work in the PNA is routine. compared to the hospital activity?	3.0 (1.0)	3.1 (0.9)	3.6 (1.0)	0.5 (1.2)	<0.001
10. Do you consider that the work in PHC is very limited. compared to the hospital activity?	3.4 (1.0)	3.5 (1.0)	3.8 (0.9)	0.4 (1.1)	<0.001
11. Do you consider that the academic training you have received at the university is aimed at hospital work rather than to PHC?	3.5 (1.1)	3.6 (1.1)	3.9 (1.0)	0.3 (1.3)	<0.001
Domains					
Perceptions about the physicians working in PHC (questions 1. 2. 3. 5 and 7; scores from 5 to 25)	12.7 (3.6)	13.0 (3.4)	15.1 (3.8)	2.1 (4.0)	<0.001
Perceptions about work in PHC (questions 8. 9. 10 and 11; scores 4-20)	12.8 (2.8)	13.3 (2.7)	14.7 (3.0)	1.5 (3.4)	<0.001
Perceptions of the economic consequences of working in PHC (questions 4 and 6; scores 2-10)	6.8 (1.8)	7.1 (1.8)	7.0 (2.0)	–0.1 (2.2)	0.447
Total	32.3 (6.5)	33.3 (5.9)	36.8 (6.9)	3.5 (6.7)	<0.001

PHC: Primary Health Care.
[a] Paired t-test.

tion for a job based on professional experience. This larger economic income could be attractive for those looking to work in the PHC setting during the SERUMS; it has been described that one of the physicians' motivations for work and retention of medical personnel in health facilities in rural and remote areas are the economic incentives [8,19].

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Tabla 3. Factors associated with physicians' perception of work in primary health care as found in the baseline survey (n = 723).

Variables	Baseline survey	
	Crude model β (95% CI)	Adjusted model β (95% CI)
Age (years)		
≤25	Ref.	
26	–0.42 (–1.78 to 0.94)	-
≥27	–0.85 (–1.92 to 0.22)	-
Sex		
Male	Ref.	
Female	–0.18 (–1.14 a 0.77)	-
Location of the university of origin		
City of Lima	Ref.	Ref.
Other cities of Perú	–1.79 (–3.30 to –0.27)	–0.42 (–2.41 to 1.56)
Abroad	–0.42 (–3.75 to 2.91)	3.35 (–0.98 to 7.67)
Place of birth		
City of Lima	Ref.	Ref.
Other cities	–0.69 (–1.65 to 0.28)	0.01 (–1.19 to 1.22)
Studied another career before Medicine		
No	Ref.	Ref.
Yes	–1.85 (–3.60 to –0.09)	–0.55 (–2.65 to 1.55)
Basic level of Quechua or Aymara		
No	Ref.	Ref.
Yes	–2.44 (–3.95 to –0.93)	–2.67 (–4.29 to –1.06)
Dependent family		
No	Ref.	Ref.
Yes	–1.55 (–3.01 to –0.09)	–1.75 (–3.48 to –0.01)
Medical relatives		
No	Ref.	
Yes	0.24 (–0.71 to 1.19)	-
Participation in PHC activities while being undergraduate students		
No	Ref.	Ref.
Yes	–1.55 (–3.62 to 0.53)	-1.86 (-4.23 to 0.51)

PHC: Primary Health Care.
[a] Adjusted by age, university of origin, place of birth, other careers, basic level of Quechua and Aymara, dependent family, and participation in PHC activities while being undergraduate.

The most negative perception of work in the PHC setting was found in the items "do you consider that the academic training you have received at university is more oriented to hospital work than to PHC", "do you consider that work in PHC is very limited when compared to hospital activity?", "do you consider that if you worked in PHC in your country, you would not be able to satisfy your economic needs?". Other studies mention that one of the reasons why physicians are not interested in working in PHC is because their professional work in remote areas is incompatible with professional development. For this reason, they consider that work in the PHC setting would be only for recently graduated physicians, that is, only a transition period before they work in the urban area [8,9]. In Peru, participation in the SERUMS is an indispensable requirement to opt for a specialization [4], so the physician with or without interest in working in the PHC setting must participate in this program to continue with his/her professional development.

The only item that lowered its average score (its perception improved when performing the SERUMS) was the one that considered that the physician in PHC receives a lower payment compared to the hospital physician. This may be due to the fact that the salary in the SERUMS is higher than that of a physician working in urban areas. Previously, it has been reported that Peruvian physicians receive low salaries [20]. When the physician density in the region is low, they can be expected to receive a higher salary; likewise, physicians expect to receive a higher salary if they work in rural areas [10], as a compensation for the difficulty and shortages in those areas [8]. Although the economic incentive is important for working in PHC, doctors also seek other benefits, such as being able to access training from their workplace or nearby areas and

Table 4. Factors associated with the difference in physicians' perceptions of work in primary health care between the baseline survey and the follow-up survey (n = 215)

Variables	Crude model β (95% CI)
Age in years	
≤25	Ref.
26	1.56 (–0.90 to 4.01)
≥27	0.32 (–1.82 to 2.45)
Sex	
Male	Ref.
Female	–111 (–2.95 to 0.73)
Location of the university of origin	
City of Lima	Ref.
Other cities from Peru	–0.19 (–4.94 to 4.57)
Abroad	–1.94 (–11.31 to 7.44)
Place of birth	
City of Lima	Ref.
Other cities	–1.21 (–3.07 to 0.65)
Studied another career before Medicine	
No	Ref.
Yes	1.29 (–2.36 to 4.94)
Basic level of Quechua or Aymara	
No	Ref.
Yes	–0.14 (–2.96 to 2.69)
Dependent family	
No	Ref.
Yes	1.60 (–2.04 to 5.24)
Medical relatives	
No	Ref.
Yes	1.19 (–0.61 to 2.98)
Participation in PHC activities while being undergraduate students	
No	Ref.
Yes	–2.05 (–6.12 to 2.01)
Type of healthcare facility	
Ministerio de Salud (MINSA)	Ref.
Others	–1.30 (–3.97 to 1.37)
Healthcare Facility Category	
I-1	Ref.
I-2	–1.27 (–3.61 to 1.07)
I-3 or I-4	0.72 (–1.90 to 3.34)
Head of the health facility	
No	Ref.
Yes	0.20 (–1.65 to 2.04)

PHC: Primary Health Care.

receiving scholarships or bonuses for working in these places [7-9]. It has been described that the use of mixed incentives (economic and non-economic) instead of solely economic ones, increases the interest of health professionals in working in PHC [21-23]. This type of incentive has been recommended by the World Health Organization to increase the number of professionals in PHC in remote and rural areas [23].

The deterioration in the perspective of physicians towards work in PHC when carrying out the SERUMS may be due to a series of problems reported in this population during their participation in this program, such as receiving verbal, psychological and physical aggressions [24], administrative and work environment problems [25, 26], exposure to traffic accidents during the transfer of patients [5, 27], and not having adequate insurance coverage [28]. In addition, the lack of supplies, technology, and problems in patient care limit the physician's ability to provide adequate care [9]. In this regard, a recent amendment to the Rural and Marginal Urban Health Service-SERUMS Law states that, starting in 2019, serumists, during their year of service, will have personal accident insurance that covers accidental death, permanent disability, healing costs and burial costs [5]; this could improve physicians' perception of PHC during the SERUMS.

In Peru, the number of paid positions for the SERUMS has increased in the Ministerio de Salud (MINSA), the Social Security and the armed forces. By 2015, 98% of districts in quintile 1 (the poorest quintile) had serumist physicians working [6]. The policy of allocating human resources to PHC seeks to improve the distribution of health professionals in remote and rural areas [5]. However, it should be considered that the serumist physician is a recent graduate and that the SERUMS would be his/her first professional experience, which comes with challenges and difficulties, such as managing the PHC facilities, a situation previously described (29,30). This last aspect highlights the need to evaluate the competences of the recently graduated professionals regarding PHC, given the existing gap in health education (which is more oriented to the hospital environment) to improve the training of these professionals and their insertion in the job market [6].

Other studies on undergraduate students showed that previous experience in PHC is associated with a greater intention to work at this level of care; but in our study it is described that working and residing several months in rural areas and having work difficulties decrease the intention to work later in PHC [10,12,15]. These findings about the student population differ from ours because the experience in PHC of students is more of an experiential event of the "student camp" type, of short duration (a few days), in which they experience some daily work situations in the PHC setting, which cannot be called actual work in PHC. This can be confirmed by multiple reports that describe various types of difficulties during work on the PHC setting [24,30]. Although experiences of the student population in PHC are described, we believe that more rigorous definitions are needed to be able to consider an activity as work experience at this level of care (for example, rotating in a surgical service cannot be catalogued as surgical experience, but rather as a rotation in a surgical area).

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Among the limitations of this study, we should mention the following: 1) This study is a secondary analysis of a database, so there is limited data for other variables such as safety, equipment availability, ongoing training, among others, which could influence the perception of serumists about the work in the PHC setting. 2) There was a high percentage of participants who did not respond to the follow-up survey (72.4%), which was to be expected considering that we used an online survey (difficulty of access and poor Internet coverage in the health facilities where the SERUMS was carried out). Also, the low number of participants who responded to the follow-up survey could have influenced the non-identification of variables associated with the difference in score in the serumists' perception of work in the PHC setting. However, the use of this survey offers certain advantages, such as the possibility of responding to the survey at any time when there is access to the Internet, on free days or when carrying out administrative procedures in the main cities.

Despite these limitations, the results show an overview of the recently graduated physicians' perception about work in the primary level of care, before and during the SERUMS, a program that, in many cases, is the first and only experience in PHC for Peruvian physicians.

The perception of the physicians participating in the SERUMS about the work in PHC deteriorates after a period of 8-12 months after starting the service. Strategies that seek to encourage physician interest in the PHC, including the serumist, could include new mixed (financial and non-financial) incentives. Similarly, a primary care-oriented curriculum, including rotations in the PHC, could increase the interest of medical professionals (or future professionals) in working at this level of care.

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REFERENCES

1. World Health Organization. Health workforce: data and statistics [Internet]. Ginebra: WHO; 2018 [cited on March 22, 2019]. Available at: https://www.who.int/hrh/statistics/en/.
2. Ministerio de Salud. Información de Recursos Humanos en el Sector Salud [Internet]. Lima: MINSA; 2017 [cited on June 14, 2020]. Available at: http://bvs.minsa.gob.pe/local/MINSA/4559.pdf.
3. Ministerio de Salud. Plan Nacional de Fortalecimiento del Primer Nivel de Atención 2011-2021 [Internet]. Lima: MINSA; 2011 [cited on June 14, 2020]. Available at: http://bvs.minsa.gob.pe/local/minsa/1620.pdf.
4. Congreso de la República. Decreto Ley 23330, Ley del Servicio Rural y Urbano Marginal de Salud – SERUMS [Internet]. Lima: Congreso de la República; 1981 [cited on June 14, 2020]. Available at: https://cdn.www.gob.pe/uploads/document/file/520483/ley-del-servicio-rural-y-urbano-marginal-de-salud-ley-n-23330.pdf.
5. Congreso de la República. Decreto Supremo 007-2008SA, aprueban modificaciones del reglamento de la ley No 23330, Ley de Servicio Rural y Urbano Marginal de Salud-SERUMS [Internet]. Lima: Congreso de la República; 2008 [cited on March 22, 2020]. Available at: https://cdn.www.gob.pe/uploads/document/file/277149/248433_DS007-2008SA.pdf20190110-18386-1i4lx2a.pdf.
6. Ministerio de Salud. Evaluación de competencias a los profesionales médicos, obstetras y enfermeros del Servicio Rural y Urbano Marginal en Salud SERUMS [Internet]. Lima; MINSA; 2008 [cited on March 22, 2020]. Available at: http://bvs.minsa.gob.pe/local/MINSA/4337.pdf.
7. Huicho L, Miranda JJ, Diez-Canseco F, Lema C, Lescano AG, Lagarde M, et al. Job preferences of nurses and midwives for taking up a rural job in Peru: a discrete choice experiment. PloS one. 2012;7(12):e50315. doi: 10.1371/journal.pone.0050315.
8. Huicho L, Canseco FD, Lema C, Miranda JJ, Lescano AG. Incentivos para atraer y retener personal de salud de zonas rurales del Perú: un estudio cualitativo. Cad Saude Publica. 2012;28:729-39. doi: 10.1590/s0102- 311x2012000400012.
9. Huaynate CFA, Travezaño MJP, Correa M, Malpartida HM, Oberhelman R, Murphy LL, et al. Diagnostics barriers and innovations in rural areas: insights from junior medical doctors on the frontlines of rural care in Peru. BMC Health Serv. Res. 2015;15(1):454. doi: 10.1186/s12913-015-1114-7.
10. Mayta-Tristán P, Mejia CR, Riega-Lopez P, Rojas-Mezarina L, Posso M, Mezones-Holguín E. Proyección de trabajo en el interior del país y factores asociados en médicos recién colegiados de Lima, Perú 2010. Rev Peru Med Exp Salud Publica. 2011;28:186-93. doi: 10.17843/rpmesp.2011.282.483.
11. Mayta-Tristán P, Mezones-Holguín E, Pereyra-Elías R, Montenegro-Idrogo JJ, Mejia CR, Dulanto-Pizzorni A, et al. Diseño y validación de una escala para medir la percepción sobre el trabajo en el primer nivel de atención en estudiantes de medicina de Latinoamérica. Rev Peru Med Exp Salud Publica. 2013;30(2):190-6. doi: 10.17843/rpmesp.2013.302.190.
12. Tarqui-Mamani CB, Sanabria Rojas HA, Zárate Cárdenas E. Expectativas de laborar en el primer nivel de atención de salud de los estudiantes de una facultad de medicina de Lima, Perú. An Fac Med. 2015;76(1):57-2. doi: 10.15381/anales.v76i1.11076.
13. Taype-Rondán Á, Inga-Berrospi F, Casiano Celestino R, Bastidas F. Percepción de médicos recién egresados sobre las habilidades clínicas adquiridas durante el pregrado en Lima, Perú. Rev Med Chil. 2015;143(4):540-2. doi: 10.4067/S0034-98872015000400019.
14. Rivas-Nieto AC, Curioso WH, Guillén C. Participación estudiantil en proyectos de intervención rural en salud: la experiencia IRIS-X en Perú. Rev Peru Med Exp Salud Publica. 2009;26(3):387-94. doi: 10.17843/ rpmesp.2009.263.1392.
15. Escalante-Romero L, Cueva-Chávez L, Linares-Reyes E, Blossiers-Mazzini C. Experiencias de trabajo en actividades en atención primaria de salud realizadas por estudiantes de medicina de Perú. CIMEL. 2011;15(1):14-18.
16. Rabinowitz HK, Diamond JJ, Markham FW, Paynter NP. Critical factors for designing programs to increase the supply and retention of rural primary care physicians. JAMA. 2001;286(9):1041-8. doi: 10.1001/ jama.286.9.1041.

17. Brooks RG, Walsh M, Mardon RE, Lewis M, Clawson A. The roles of nature and nurture in the recruitment and retention of primary care physicians in rural areas: a review of the literature. Acad Med. 2002;77(8):790-8. doi: 10.1097/00001888-200208000-00008.
18. Rabinowitz HK, Diamond JJ, Markham FW, Hazelwood CE. A program to increase the number of family physicians in rural and underserved areas: impact after 22 years. JAMA. 1999;281(3):255-60. doi: 10.1001/ jama.281.3.255.
19. Buykx P, Humphreys J, Wakerman J, Pashen D. Systematic Review of Effective Retention Incentives for Health Workers in Rural and Remote Areas: Towards Evidence-Based Policy. Aust J Rural Health. 2010 Jun;18(3):102-9. doi: 10.1111/j.1440-1584.2010.01139.x.
20. Jumpa M, Jan S, Mills A. The role of regulation in influencing income-generating activities among public sector doctors in Peru. Hum Resour Health. 2007;5:5. doi: 10.1186/1478-4491-5-5.
21. Blaauw D, Erasmus E, Pagaiya N, Tangcharoensathein V, Mullei K, Mudhune S, et al. Policy interventions that attract nurses to rural areas: a multicountry discrete choice experiment. Bull World Health Organ. 2010;88:350-6. doi: 10.2471/BLT.09.072918.
22. Kruk ME, Johnson JC, Gyakobo M, Agyei-Baffour P, Asabir K, Kotha SR, et al. Rural practice preferences among medical students in Ghana: a discrete choice experiment. Bull World Health Organ. 2010;88:333-41. doi: 10.2471/BLT.09.072892.
23. World Health Organization. Increasing access to health workers in remote and rural areas through improved retention: global policy recommendations [Internet]. Ginebra: WHO; 2010 [cited on March 22, 2019]. Available at: https://www.who.int/hrh/retention/guidelines/en.
24. Mejia CR, Inga-Berrospi F, Lezama CA, García AAQ. Problemas laborales en plazas del Servicio Rural Urbano-Marginal en Salud (SERUMS): auto-reporte de los médicos. Acta Méd Peru. 2016;33(1):82-3. doi: 10.35663/ amp.2016.331.23.
25. Mejía CR, Quiñones-Laveriano DM. SERUMS y la migración de médicos: a propósito de una cohorte de médicos de Lima. Rev Peru Med Exp Salud Publica. 2015;32(2):405-6. doi: 10.17843/rpmesp.2015.322.1647.
26. Taype-Rondan Á, Vidal-Torres MI, Chung-Delgado K, Maticorena-Quevedo J, Mayta-Tristán P. Problems perceived and experienced by health professionals rendering social service in Ancash, Peru. 2015. Rev Fac Med. 2017;65(3):441-6. doi: 10.15446/revfacmed.v65n3.59055.
27. Galán-Rodas E, Díaz-Vélez C, Villena J, Maguiña C. Mortalidad de médicos que realizan el servicio rural (SERUMS) en Perú, 2006-2009. Rev Peru Med Exp Salud Publica. 2010;27:483-4. doi: 10.17843/rpmesp.2010.273.1513.
28. Mejía CR, Quiñones-Laveriano DM, Espinoza KG, Quezada-Osoria C. Deficiente cobertura de aseguramiento a médicos durante el servicio rural y urbano-marginal en Perú. Rev Peru Med Exp Salud Publica. 2013;30:220-3. doi: 10.17843/rpmesp.2013.302.194.
29. Motta F, Frisancho A. La experiencia serums y la formación profesional. Rev Peru Epidemiol. 1992;5(2):24-8.
30. Valencia T, León B, Lezarneta U, Vidal M. Principales dificultades del profesional de salud encontrados durante el Serums en el departamento de Ancash, zona sierra. 2008. Rev. Aporte Santiaguino, 2011;4(1):118-22. doi: 10.32911/as.2011.v4.n1.537.

 https://doi.org/10.17843/rpmesp.2020.374.5294