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ORIGINAL

MOTIVATION AND BARRIERS TO ACTIVE COMMUTING IN TEACHERS: AN EXPLORATORY STUDY

MOTIVACIÓN Y BARRERAS DEL DESPLAZAMIENTO ACTIVO EN LOS PROFESORES: UN ESTUDIO EXPLORATORIO

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ABSTRACT

The aim of the present investigation was to know the relationships between intrinsic and extrinsic motivation, with the barriers related to active commuting in Spanish teachers. The sample was formed by 156 teachers, between 25 and 56 years old (37.98 ± 12.28). An adaptation of BREQ-3 questionnaire was used to measure the motivation towards active commuting. The perceived barriers were

measured with the BATACE scale. Descriptive analysis, correlations and regression models of the studied variables were conducted. Results proved that the intrinsic variable was negatively associated with the planning and psychosocial barriers towards active commuting. Extrinsic motivation was positively related with the environmental and security barriers, as well as with planning and psychosocial barriers. Thus, future interventions to increase the teachers number of journeys to their schools, should improve the intrinsic motivation in order to achieve positive results in their behaviour.

KEYWORDS: teachers, motivation, barriers perceived, active commuting and school

RESUMEN

El presente trabajo tuvo por objetivo conocer la relación entre la motivación intrínseca y motivación extrínseca con las barreras al desplazamiento activo en docentes. Se reclutaron un total de 156 profesores de 25 y 56 años (37.98 ± 12.28). Se utilizó una adaptación del cuestionario BREQ-3 para medir la motivación hacia el desplazamiento activo. Las barreras percibidas se midieron con la escala BATACE. Se realizaron análisis descriptivos, correlaciones y modelos de regresiones de las variables de estudio. Los resultados mostraron que la motivación intrínseca estaba asociada negativamente con las barreras de planificación y psicosociales hacia el desplazamiento activo. La motivación extrínseca se asoció positivamente con las barreras ambientales y seguridad y con las barreras de planificación y psicosociales. Las intervenciones futuras, cuyo objetivo sea aumentar la cantidad de desplazamientos al centro educativo del profesorado, deberían aumentar la motivación intrínseca para conseguir resultados positivos en este comportamiento entre los docentes.

PALABRAS CLAVE: docentes, motivación, barreras percibidas, desplazamiento activo y centro educativo

INTRODUCTION

Overweight and obesity has become a public health problem around the world (NCD Risk Factor Collaboration, 2017). World Health Organization (WHO, 2016) revealed that more than 1.9 billion adults were overweight, and more than 650 million were obese. Physical inactivity is a major factor in overweight and obesity levels (Larouche, 2014). Sedentary people age prematurely or faster than active people (Vergara, Ozimica, Fernández, Fuentealba, Costagliola, & Sacomori, 2018).

The characteristics of the teachers work environment have an impact on the health and well-being of teachers, and can have consequences on a physical level such as increased blood pressure, gastrointestinal problems or musculoskeletal conditions, and at a psychological level causing stress, general anxiety or fatigue (Jodra y Domínguez, 2020). It has recently been shown that

87.5% of Spanish teachers were inactive (Gutiérrez-Caballero, María, Blázquez-Manzano, & Feu, 2019).

Active commuting is recognized as a potential tool to increase daily physical activity and resolve physical inactivity, as well as the problems caused by overweight and obesity (Larouche, 2014; Gutiérrez-Caballero, 2019; Martin, Boyle, Corlett, Kelly, & Reilly, 2016; Muntaner-Mas, Herrador-Colmenero, Borràs, & Chillón, 2018; Slingerland, Borghouts, & Hesselink, 2012). Active commuting can be defined as the mode of transportation by which the distance between home and school or workplace is covered, in a way that does not involve motorized vehicles, such as walking or riding a bicycle. (Chillón, Evenson, Vaughn, & Ward, 2011; Larouche, Saunders, John Faulkner, Colley, & Tremblay, 2014).

However, there are multiple factors that influence the decision of how to travel to the school, which can lead to a decrease in the number of trips (Molina-García, Queralt, Estevan, Álvarez, & Castillo, 2016). These factors include active transportation, environmental, safety, planning, and psychosocial factors. (i.e., the distance from the home to the school, the number of crossings and intersections, the existence or not of bike lanes...), since they seem to mediate the final decision of parents and children to move actively or passively (Kerr et al., 2006). In this sense, the perception of barriers or limitations to access to active means of transport constitutes one of the main detrimental aspects for active commuting to the school (Villa-González, Rodríguez-López, & Chillón Garzón, 2012).

Motivation is another element to consider when commuting to the school or workplace. Along these lines, motivation for commuting can be justified through the Self-Determination Theory (SDT). This is a macro-theory of human motivation that includes six minor theories around the development of autonomous motivation (Deci & Ryan, 2000). A mini theory that considers not only the amount of motivation towards a target behavior, but also the quality of motivation, is the theory of organic integration (Ryan & Deci, 2017). This mini-theory establishes three general types of motivation (autonomous, controlled and amotivation) that are located along a continuum based on their degree of self-determination, reflecting to what extent the behavior would be developed voluntarily and in accordance with their own interests of the individual (Ryan & Deci, 2017). At one end of this continuum, autonomous motivation stems from inherent enjoyment, pleasure, curiosity and the search for new challenges (intrinsic motivation), from its alignment with the system of values, needs and objectives of the person that constitute the "I" (integrated regulation), or by its social importance and personal values (identified regulation). In this sense, the use of this theory to promote healthy habits such as increasing physical activity (active commuting), and reducing overweight and obesity is widely demonstrated (Flint & Cummins, 2016; Rojas-Rueda et al., 2016).

Therefore, to promote active commuting, there is an urgent need to identify the determining behaviors that can be associated with this behavior. According to the SDT, motivation represents the strength and stimuli of the individual to act (Ryan & Deci, 2017), which is the key influence on behavior, despite the fact

that few studies related to active commuting have considered this variable (Burgueño et al., 2019). According to this theory, previous research attempted to know the different reasons associated with these behaviors in adolescents (Burgueño et al., 2019). However, as far as we know, no studies have been found that report on the barriers and motivation associated with the number of trips to the schools for teachers. Nevertheless, it is important to note that researches have been carried out with workers from other sectors, identifying different types of barriers: internal (motivation, habits, time), external (weather, infrastructure, safety ...) and cultural (conflicts between cyclists and drivers, urban philosophy focused on the private car...) (Wallace, Green & Agarwal, 2016).

Thus, the present research aims to verify the association between intrinsic motivation and extrinsic motivation with barriers to active commuting in a sample of Spanish teachers. Thus, as a study hypothesis, it was proposed that teachers who have higher intrinsic motivation will perceive fewer barriers towards commuting, while higher extrinsic motivation will increase the perceived barriers.

METHOD

Participants

It is a cross-sectional, quantitative study and the selection of the sample for convenience. The data collection was developed during the organization of the I International Agora on Education, Research and Employment, held in the city of Badajoz from September 10 to 13, 2019. Teachers filled out the online questionnaire during the congress (<https://cutt.ly/crZVo96>). A total of 156 teachers participated (male, $n = 58$ and female, $n = 98$) of the different educational levels of Childhood, Primary Education and Secondary Education, without distinction of public, subsidized and private schools in Spain. The age of the participating teachers ranged from 25 to 56 ($M = 37.98 \pm 12.28$) years.

Instruments

Sociodemographic variables. To determine age and sex, participants were administered a questionnaire on sociodemographic variables.

Active commuting. The questions about the type of commuting were selected from a previous study with university students (Chillón, Gómez, Garzón, & Rodríguez, 2020). The questions are presented: round trip mode of commute which was evaluated with a closed question where the participant had to answer choosing only one of the following options: "walking", "bicycle", "car", "motorcycle", "bus", "Train / underground", "other". In addition, they asked about the distance and travel time both on the way out and on the way back.

Motivation towards active commuting. An adaptation of the BREQ-3 questionnaire was used (González-Cutre & Sicilia, 2010) to assess the motivation for active commuting in teachers, previously used by Orts-Torres (2015) (Anex I). The questionnaire is made up of 23 items preceded by the phrase: "I am going or would go to the school on foot or by bike because ..."

Different possibilities of answers were offered on a Likert-type scale of 4 points from 0 (not true) up to 3 (totally true). The results of the questionnaire allow grouping the results into six factors: intrinsic regulation (“*Because I think going to the school on foot or by bike is fun*”; $\alpha = .92$), integrated regulation (“*Because going to the school on foot or by bike is part of me*”; $\alpha = .88$), identified regulation (“*Because I value the benefits of going to the school on foot or by bike*”; $\alpha = .91$), introjected regulation (“*Because I feel guilty when I don't do it*”; $\alpha = .75$), external regulation or extrinsic motivation (“*Because others tell me that I should do it*”; $\alpha = .79$) and amotivation (“*I do not know what it is for me to go to the school on foot or by bike*”; $\alpha = .76$). All the factors showed an acceptable level of reliability ($\alpha > .70$).

Barriers to active commuting. A questionnaire on barriers to active commuting to the school was prepared for teachers (see anex I and II). In the elaboration, the study by Garcia, Gutierrez, Ruiz and Garzón (2017) and the BATACE scale (Molina-García et al., 2016) were taken as models, adapting the language that is more formal and easy to understand for the participants. In this sense, the first version was reviewed by several experts in questionnaire validation. These experts examined and tested the Spanish version of each and every item on the questionnaire. Thus, in all those items that did not reach a degree of agreement of at least 85%, on their understanding or equivalence of the content, they were adapted following the suggestions of the experts. Finally, the scale in Spanish was delivered to 10 university teachers, 10 secondary school teachers and 10 kindergarten and primary school teachers with the aim to test the understanding of the items. Later, and after checking the understanding of the items, the final version that has been used in the present investigation was obtained. Once prepared, the participants completed the questionnaire that evaluated the barriers perceived by those who do not commute actively. Finally, the questionnaire was made up of 19 items preceded by the statement: “*It is difficult for me to walk or bike to the school because ...*”. The results of this questionnaire allow classifying the sample into 2 factors: environmental and safety barriers (“*There are no sidewalks or bike lanes*”; $\alpha = .83$) and planning and psychosocial barriers (“*I'm too hot and sweaty, or it always rains*”; $\alpha = .80$). The factors of this questionnaire showed good reliability for the sample of the present study ($\alpha = .890$). All the factors showed an acceptable level of reliability ($\alpha > .70$).

Procedure

A study was developed with a non-experimental, cross-sectional and exploratory quantitative design, through surveys to know the mode of commuting of teachers at different educational levels: Early Childhood Education, Primary Education, Secondary Education, Professional Training and University, as well as their level of motivation and perceived barriers to active commuting.

The study was carried out in accordance with the Declaration of Helsinki, and was approved by the Ethics Committee of the University of Extremadura (145/2019). First, an informative letter was provided about the objectives of the research, as well as an informed consent was given. A total of 200 teachers

participating in the 1st International Agora on Education, Research and Employment were contacted. Next, the teachers were asked to share the questionnaire with their classmates from the same school. In this way, a total of 22 more teachers were recruited, finally achieving that 156 teachers filled out the questionnaire.

Statistic analysis

The characteristics of the study sample are presented as means and standard deviations. The analysis of differences between women and men was analyzed using the Student's T test for quantitative variables (expressed as mean (standard deviation)). A bivariate correlation analysis was performed to test the association between the study variables.

The association of barriers to active commuting with motivational indicators was tested using linear regression models. Linear regression analyzes were hierarchically adjusted for covariates creating 7 models. Model 1 was adjusted for sex and age, model 2 included intrinsic regulation, model 3 integrated regulation was added, model 4 incorporated the identified regulation, model 5 included external regulation, model 6 added regulation introjected and finally, model 7 amotivation was included.

All statistical analyzes were performed with SPSS version 23.0 for Windows (IBM, Armonk, New York), and the level of significance was established at $p < .05$.

Results

Table 1 shows the descriptive characteristics of the study sample. In summary, women showed significantly greater integrated regulation towards active commuting than men ($p < .05$). The rest of the variables did not show significance between genders.

Table 1. Descriptive analysis and gender differences of the study variables.

	Total		Men		Women		<i>p</i>
	M	SD	M	SD	M	SD	
<i>n</i> _{total}	156		58		98		
Age	37.98	12.28	38.48	9.03	37.68	13.88	.695
Motivation towards active commuting (0 – 3)							
Intrinsic regulation	1.95	1.05	2.08	1.01	1.88	1.07	.266
Integrated regulation	1.78	1.06	2.05	.98	1.63	1.08	< .05
Identified regulation	2.04	1.03	2.21	.94	1.95	1.08	.130
External regulation	.21	.44	.28	.61	.17	.28	.198
Introjected regulation	.60	.62	.70	.66	.53	.58	.172
Amotivation	.38	.56	.43	.59	.35	.54	.480
Barriers towards active commuting (1 – 4)							
Environmental barriers and safety	2.00	.66	1.96	.66	2.02	.67	.573
Planning and psychosocial barriers	1.86	.68	1.80	.68	1.89	.68	.428

The correlation analysis of the study variables (table 2) showed significance between the environmental and safety barriers with intrinsic regulation, external regulation and amotivation (all $p < .01$). However, the correlations of planning and psychosocial barriers were significant for all motivational indicators (all $p < .01$).

Table 2. Correlation analysis of the study variables

	1	2	3	4	5	6	7	8	9
1. Age	-	-.127	-.080	-.088	.165	.021	.129	.041	.079
2. Intrinsic Regulation	-	-	.869**	.878**	-.033	.185	-.433**	-.158*	-.235**
3. Integrated Regulation	-	-	-	.835**	-.059	.249**	-.406**	-.136	-.235**
4. Identified Regulation	-	-	-	-	-.055	.194*	-.455**	-.142	-.241**
5. External Regulation	-	-	-	-	-	.315**	.657**	.358**	.384**
6. Introjected Regulation	-	-	-	-	-	-	.292**	.182	.241*
7. Amotivation	-	-	-	-	-	-	-	.461**	.544**
8. Environmental barriers and safety	-	-	-	-	-	-	-	-	.749**
9. Planning and psychosocial barriers	-	-	-	-	-	-	-	-	-

Note. ** $p < .01$; * $p < .05$

Table 3 presents the associations between the different motivational indicators and barriers to active commuting. In summary, significant associations were found for Models 2, 5, 6 and 7 after controlling for possible confounding factors. Specifically, Model 2 (β $-.146$, $p < .01$) associated planning and psychosocial barriers with intrinsic regulation. Model 5 (β varying from $.528$ to $.512$, all $p < .01$), found positive associated all the indicators with barriers and external regulation showed positive associations. For Model 6 (β $.194$, $p < .05$), only positive associations might be found between planning and psychosocial barriers with introjected regulation. Finally, Model 7 (β varying from $.377$ to $.382$, all $p < .05$) was significant for both indicators of barriers in relation to motivation towards active commuting.

Table 3. Relationship of barriers to active commuting and motivation towards active commuting

	Environmental barriers and safety		Planning and psychosocial barriers	
	β	p	β	p
Model 1	.002	.600	.005	.312
Model 2	-.097	.063	-.146	< .01
Model 3	.011	.917	-.082	.442
Model 4	-.011	.925	-.082	.474
Model 5	.528	< .001	.512	< .001
Model 6	.115	.250	.194	< .05
Model 7	.377	< .05	.382	< .05

Note. β : Standardized coefficient values. Model 1: adjusted for sex + age (years). Model 2: Model 1 + intrinsic regulation. Model 3: Model 2 + integrated regulation. Model 4: Model 3 + identified regulation. Model 5: Model 4 + external regulation. Model 6: Model 5 + introjected regulation. Model 7: Model 6 + amotivation.

DISCUSSION

The present research aimed to examine the relationship between intrinsic and extrinsic motivation and perceived barriers in active commuting in a sample of teachers.

Regarding the hypotheses, the results obtained confirmed the first hypothesis suggested. A negative association between intrinsic motivation and planning and psychosocial barriers has been confirmed. Previous research (Burgueño et al., 2019) confirmed these results, as they found correlations between different constructs of intrinsic motivation (i.e.: intrinsic, integrated and identified regulation) associated with planning and psychosocial barriers. According to other studies (Murtagh, Rowe, Elliott, McMinn, & Nelson, 2012) that analyzed the Self-Determination Theory in the field of active commuting, it was observed that a low score in all types of motivation was associated with a decrease in the number of commutes. The explanation for these results is possibly a consequence of the perceived barriers to active commuting (Orts-Torres, 2015). However, previous study did take into account to evaluate each of the motivational items. A study carried out in university adolescents confirmed that one of the greatest barriers associated with active commuting was having or not

having a vehicle or private transport, since having this type of transport was associated with fewer trips to the school (Molina-García et al., 2016). It is important to note that, certainly having private transport decreases the intrinsic motivation towards active commuting as a result of the comfort of traveling by car or because of the time savings that this type of transport may entail. Adverse weather conditions, as barriers associated with intrinsic motivation (Molina-García et al., 2016), such as snow or extreme cold, could be a barrier to active commuting in other geographical latitudes. Previous research (Kerr et al., 2006) have shown that cities such as Valencia where the climate varies little during the year than in other geographical locations, such as in the northern areas of the United States or Canada, where extreme winter conditions (excess snow) are perceived as one of the main barriers associated with active transportation to the schools in adolescents, so this can surely be transferable to the study population.

The second hypothesis of the research can also be confirmed, since the teachers who showed greater extrinsic motivation perceived greater barriers towards active commuting, which could reduce the number of teachers' journeys. The increase in extrinsic motivation associated with an increase in barriers to active movement could be explained by the social pressure exerted by family or friends. However, there is not much research to confirm this assertion. In relation to our results, it has been shown that extrinsic motivation can decrease due to excess traffic, which can translate into an increase in the perception of environmental and safety barriers (Molina-García, Castillo, & Sallis, 2010). Local traffic can make teachers want to avoid the risk of being involved in traffic accidents by stopping walking or cycling, which in turn would have a greater association with environmental barriers and safety and reduce the number of travels to the school (Fyhri, Hjorthol, Mackett, Fotel, & Kytä, 2011). In addition to these barriers, recent studies have related extrinsic motivation to planning and psychosocial barriers in the urban environment (eg: distance from the school, connection and access at crossroads and roads, and sociodemographic characteristics) as barriers associated with extrinsic motivation towards active commuting in adolescents (Chillón et al., 2013; Villa-González et al., 2012). The convenience and time savings of having your own vehicle could be one of the consequences associated with the increase in planning and psychosocial barriers. In fact, in a study carried out with Spanish university students, both planning and psychosocial barriers showed a negative relationship with active commuting (Molina-García, Castillo, & Sallis, 2010).

Therefore, in relation to the results obtained, it has been shown that teachers with greater intrinsic motivation perceive fewer barriers towards active commuting, which can increase the number of travels to the schools for teachers. On the other hand, extrinsic motivation has been positively related to both environmental and safety barriers, which can reduce the number of travels. It is highlighted that intervening on the planning and psychosocial barriers associated with active commuting can be a complex and costly process at an economic level that could diminish the interest in developing strategies to promote this behavior. However, taking into account the results of the present research, interventions that focus on increasing the intrinsic motivation towards active commuting should be proposed in such a way as to reduce the

perception of barriers associated with this behavior and to increase the active commuting of Spanish teachers.

For future research, since active commuting is a very diverse behavior, it would be interesting to test this behavior by increasing the study sample and differentiate this behavior according to the teachers' educational level and other variables such as size of the municipality (rural or urban), age... Furthermore, it would be interesting to analyze the differences between active and inactive teachers in order to test the differences between the different motivational constructs based on the barriers to active commuting.

Although this study provides valuable information on the teachers' active commuting and has important implications for the development and delivery of interventions, the study has some limitations. First, the data was collected during the fall school term and some studies have shown that there is seasonal variation in children's behavior on the school trip, and commuting to school is less frequent during the fall and winter compared to spring or summer (Granville, Laird, Barber, & Rait, 2006), which is possibly similar in the sample studied. Second, the cross-sectional nature of the research that does not allow establishing cause-effect relationships, so the cause-effect relationship of motivation and the barriers associated with active commuting cannot be demonstrated.

CONCLUSIONS

In conclusion, this study offers evidence about the importance of motivation towards commuting on the barriers related to this behavior. It is noteworthy that a higher intrinsic motivation towards active commuting is associated with lower perceived barriers, which may translate into an increase in the number of travels. On the other hand, it seems that factors that increase extrinsic motivation, such as being encouraged by my friends or family, seem to increase perceived environmental and safety barriers as well as planning and psychosocial barriers. Therefore, it would be logical to develop strategies aimed at increasing the level of teachers' intrinsic motivation in order to increase the number of travels to the schools.

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ANEX I

Behavioural Regulation in Exercise Questionnaire, adapted from (BREQ-3)

Yo voy o iría al centro educativo andando o en bici porque...	Nada de acuerdo	1	2	3	4
1. Porque los demás me dicen que debo hacerlo	0	1	2	3	4
2. Porque me siento culpable cuando no lo practico	0	1	2	3	4
3. Porque valoro los beneficios que tiene el ejercicio físico	0	1	2	3	4
4. Porque creo que el ejercicio es divertido	0	1	2	3	4
5. Porque está de acuerdo con mi forma de vida	0	1	2	3	4
6. No veo por qué tengo que hacerlo	0	1	2	3	4
7. Porque mis amigos/familia/pareja me dicen que debo hacerlo	0	1	2	3	4
8. Porque me siento avergonzado si falto a la sesión	0	1	2	3	4
9. Porque para mí es importante hacer ejercicio regularmente	0	1	2	3	4
10. Porque considero que el ejercicio físico forma parte de mí	0	1	2	3	4
11. No veo por qué tengo que molestarme en hacer ejercicio	0	1	2	3	4
12. Porque disfruto con las sesiones de ejercicio	0	1	2	3	4
13. Porque otras personas no estarán contentas conmigo si no hago ejercicio	0	1	2	3	4
14. No veo el sentido de hacer ejercicio	0	1	2	3	4
15. Porque veo el ejercicio físico como una parte fundamental de lo que soy	0	1	2	3	4
16. Porque siento que he fallado cuando no he realizado un rato de ejercicio	0	1	2	3	4
17. Porque pienso que es importante hacer el esfuerzo de ejercitarse regularmente	0	1	2	3	4
18. Porque encuentro el ejercicio una actividad agradable	0	1	2	3	4
19. Porque me siento bajo la presión de mis amigos/familia para realizar ejercicio	0	1	2	3	4
20. Porque considero que el ejercicio físico está de acuerdo con mis valores	0	1	2	3	4
21. Porque me pongo nervioso si no hago ejercicio regularmente	0	1	2	3	4
22. Porque me resulta placentero y satisfactorio el hacer ejercicio	0	1	2	3	4
23. Pienso que hacer ejercicio es una pérdida de tiempo	0	1	2	3	4

Regulación intrínseca: 4, 12, 18, 22

Regulación integrada: 5, 10, 15, 20

Regulación identificada: 3, 9, 17

Regulación introyectada: 2, 8, 16, 21

Regulación externa: 1, 7, 13, 19

Desmotivación: 6, 11, 14, 23

ANEXO II

Barriers to active commuting in teachers

	Totalmente de acuerdo	Algo de acuerdo	Algo de acuerdo	Totalmente de acuerdo
<i>Para mí es difícil ir andando o en bicicleta al centro educativo porque</i>				
1. No hay aceras ni carriles bici	1	2	3	4
2. El camino es aburrido	1	2	3	4
3. El camino no tiene una buena iluminación	1	2	3	4
4. Hay uno o más cruces peligrosos	1	2	3	4
5. Paso demasiado calor y sudo, o llueve siempre	1	2	3	4
6. Otros profesores no van andando o en bicicleta	1	2	3	4
7. No se considera "guay" ir andando o en bicicleta	1	2	3	4
8. Voy demasiado cargado con cosas	1	2	3	4
9. Es más fácil ir conduciendo o que me lleven	1	2	3	4
10. Es necesaria demasiada planificación previa	1	2	3	4
11. No hay sitios donde dejar la bicicleta con seguridad	1	2	3	4
12. Hay perros callejeros	1	2	3	4
13. Está muy lejos	1	2	3	4
14. Tendría que ir por lugares inseguros debido a la delincuencia.	1	2	3	4
15. No disfruto yendo andando o en bicicleta al centro educativo	1	2	3	4
16. Hay demasiadas cuestas	1	2	3	4
17. Hay demasiado tráfico	1	2	3	4
18. Los carriles bici están ocupados por personas que van andando	1	2	3	4
19. Tengo que llevar a mis hijos/as.	1	2	3	4

Barreras ambientales y de seguridad: 1, 2, 3, 4, 11, 12, 13, 14, 16, 17, 18

Barreras de planificación y psicosociales: 5, 6, 7, 8, 9, 10, 15, 19