



UNIVERSIDADE DA CORUÑA
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**Características sociosanitarias
asociadas al envejecimiento:
factores predictores y de riesgo**

**Alba Cristina Sánchez Fernández
2014**

**Directores: Dr. José Carlos Millán Calenti
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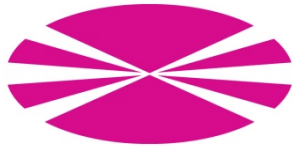
**Características sociosanitarias asociadas al
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Doctoranda: Alba Cristina Sánchez Fernández

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A Coruña, 2014



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D. José Carlos Millán Calenti, Catedrático de Escuela Universitaria del Departamento de Medicina de la Facultad de Ciencias de la Salud y D^a. **Ana Maseda Rodríguez**, Investigadora Posdoctoral Parga Pondal, ambos de la Universidade da Coruña, como Directores de este trabajo,

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Que la memoria titulada: “CARACTERÍSTICAS SOCIOSANITARIAS ASOCIADAS AL ENVEJECIMIENTO: FACTORES PREDICTORES Y DE RIESGO”, que para optar al grado de Doctor Internacional presenta **D^a. Alba Cristina Sánchez Fernández**, se realizó bajo nuestra dirección y que considerando que constituye un trabajo de tesis, autorizamos su presentación y defensa en la Universidade da Coruña.

En A Coruña, a 20 de septiembre de 2014

Fdo. Dr. José C. Millán Calenti

Fdo. Dra. Ana Maseda Rodríguez

A Javi y a Ibo

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RESUMEN

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Son escasos los estudios sociosanitarios que analizan la salud de las personas mayores desde una perspectiva multidimensional. El objetivo de este trabajo fue estudiar la salud psicológica, la salud percibida y los valores de laboratorio en las personas mayores no institucionalizadas. Se realizó un estudio transversal sobre una muestra representativa de 600 personas de 65 o más años del municipio de Narón (A Coruña). La dependencia funcional, la enfermedad cerebrovascular, la insuficiencia cardiaca congestiva y la diabetes se relacionaron con la coexistencia de deterioro cognitivo y síntomas depresivos. Tener un escaso contacto con otros se asoció con la presencia de deterioro cognitivo, mientras que la insatisfacción con el apoyo se relacionó con la presencia de síntomas depresivos y con la coexistencia de ambos. Los síntomas depresivos fueron el principal predictor de la mala salud percibida, seguidos de la necesidad de un cuidador en el total de la muestra y en las mujeres, y de la enfermedad del tejido conectivo en los hombres. En cuanto a los valores de laboratorio, un porcentaje importante de sujetos los mostraron fuera de los intervalos de referencia para los adultos jóvenes, sugiriendo la necesidad de elaborar patrones de referencia específicos para las personas mayores.

RESUMO

Son escasos os estudos sociosanitarios que analizan a saúde das persoas maiores desde unha perspectiva multidimensional. O obxectivo deste traballo foi estudar a saúde psicolóxica, a saúde percibida e os valores de laboratorio nas persoas maiores non institucionalizadas. Realizouse un estudo transversal cunha mostra representativa de 600 persoas de 65 ou máis anos do municipio de Narón (A Coruña). A dependencia para as actividades da vida diaria, a enfermidade cerebrovascular, a insuficiencia cardíaca conxestiva e a diabete relacionáronse coa coexistencia de síntomas depresivos e deterioro cognitivo. Ter un escaso contacto con outros asociouse coa presenza de deterioro cognitivo, mentres que a satisfacción co apoio relacionouse coa presenza de síntomas depresivos e coa coexistencia de ambos os dous. Os síntomas depresivos foron o principal preditor da mala saúde percibida, seguidos da necesidade dun coidador no total da mostra e nas mulleres, e da enfermidade do tecido conxuntivo nos homes. En canto aos valores de laboratorio, unha porcentaxe importante dos suxeitos mostráronos fóra dos intervalos de referencia para os adultos novos, suxerindo a necesidade de elaborar patróns de referencia específicos para as persoas maiores.

ABSTRACT

There are few studies analyzing the health of older people from a multidimensional perspective. The aim of this work was to study the psychological health, perceived health and laboratory values in non-institutionalized elderly people. We conducted a cross-sectional study including a representative sample of 600 community-dwelling residents of Narón Council (A Coruña), aged 65 years and older. The dependence in the activities of the daily living, cerebrovascular disease, congestive heart failure and diabetes were associated with the coexistence of depression and cognitive impairment. A limited amount of contact with others was significantly linked to the presence of cognitive impairment. The lack of satisfaction with social support affected depressive symptoms both alone and when they co-occurred with cognitive impairment. Depressive symptoms were a factor that showed the strongest relation to poor self-rated health followed by the need for caregiver support in women, but having a connective tissue disease was the second strongest factor in men. In many of the laboratory parameters analyzed we found an excess of values outside the range of the normal reference values set for the young adult population, suggesting the need for specific reference values for the elderly.

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I. INTRODUCCIÓN

1. La salud psicológica en las personas mayores

El estado de salud de las personas mayores es modificable, y se pueden obtener mejoras sustanciales invirtiendo en la promoción de la salud y en la prevención de la enfermedad¹. Generalmente, cuando se habla de la salud de las personas mayores, se suele hacer hincapié en la salud física. Sin embargo, los aspectos psicológicos y sociales son también elementos fundamentales en la salud y el bienestar. De hecho, ya en 1948, la Organización Mundial de la Salud (OMS) definió la salud como "un estado de completo bienestar físico, mental y social y no solamente la ausencia de afecciones o enfermedades"².

En las personas mayores, los trastornos relacionados con la salud psicológica, como la depresión o el deterioro cognitivo, son una importante causa de discapacidad y mortalidad³⁻⁶. Sin embargo, la salud psicológica continúa olvidándose en las políticas de promoción de la salud, en la investigación social y de la salud, y a la hora de planificar los objetivos de las intervenciones⁷. Existe por tanto, una fuerte necesidad de investigaciones que estudien los trastornos relacionados con la salud psicológica de las personas mayores, como la depresión y el deterioro cognitivo, y que analicen las relaciones complejas de comorbilidad y multimorbilidad que establecen con otros trastornos somáticos⁸. Identificar los predictores y los factores de riesgo de los trastornos relacionados con la salud psicológica es esencial para prevenir el deterioro en las personas mayores vulnerables y para poder determinar las necesidades de intervención específicas para este grupo de edad^{8,9}.

1.1. Deterioro cognitivo

El deterioro cognitivo es uno de los temas más relevantes en los estudios sobre envejecimiento, dada su alta prevalencia en la población de las personas mayores¹⁰⁻¹⁴.

Considerando el progresivo envejecimiento de la población, que tiene lugar especialmente en los países occidentales^{15,16}, es de esperar que en los próximos años se produzca un aumento sustancial en la prevalencia de deterioro cognitivo.

La presencia de deterioro cognitivo tiene importantes repercusiones en la salud y en la calidad de vida de aquellos que lo padecen. En las personas mayores, existe una relación estrecha entre el estado cognitivo y el estado funcional, observándose que las personas con deterioro cognitivo muestran una mayor dependencia para realizar las actividades de la vida diaria^{5,17} y que el estado cognitivo predice tanto la mejoría como el empeoramiento del estado funcional a lo largo del tiempo¹⁸⁻²⁰. El deterioro cognitivo es también un factor de riesgo para el desarrollo de algunos de los grandes síndromes geriátricos, como las caídas, las úlceras por presión, la incontinencia o el delirium²¹⁻²⁴. Además, el deterioro cognitivo aumenta el riesgo de presentar accidentes cerebrovasculares^{25,26}, y predice la institucionalización²⁷⁻²⁹ y la mortalidad^{6,29,30} en las personas mayores.

En las personas con deterioro cognitivo la utilización de recursos sanitarios es mayor, y con frecuencia reciben ayuda de un cuidador informal³¹. Los cuidadores suelen ser familiares cercanos, que dedican gran parte de su tiempo al cuidado, por lo que su salud y su calidad de vida también se suelen ver afectadas, siendo común la aparición de sintomatología depresiva, estrés o sobrecarga^{32,33}.

1.1.1. Factores predictores y de riesgo

Dadas las importantes consecuencias que supone el deterioro cognitivo en la salud y el bienestar de las personas mayores y de sus cuidadores, es importante conocer cuáles son los factores de riesgo y predictores que se relacionan con la presencia de deterioro cognitivo. Entre los aspectos relacionados con la salud física, se ha encontrado que la

diabetes^{13,18,34-36}, las enfermedades cerebrovasculares³⁷⁻⁴⁰ y los factores de riesgo vascular^{37,41} se asocian a un mayor riesgo de deterioro cognitivo en las personas mayores.

También los aspectos sociales y sociodemográficos se han relacionado con el estado cognitivo de las personas mayores, siendo la edad uno de los principales factores de riesgo para la presencia de deterioro cognitivo^{13,14,42-44}. Asimismo, existe una clara relación entre el nivel educativo y el estado cognitivo, observándose que las personas con un menor nivel educativo tienen un mayor riesgo de presentar deterioro cognitivo^{42,44-46}. En cuanto al género, en diferentes estudios se ha observado que el deterioro cognitivo es más común en las mujeres que en los hombres^{11,38,43}, si bien no siempre se observa esta relación^{18,42,47}.

El apoyo social es también un indicador del estado cognitivo en las personas mayores no institucionalizadas⁴⁸. La falta de apoyo social y la soledad afectan a la salud de las personas mayores, asociándose a un empeoramiento del estado cognitivo⁴⁹. Por el contrario, las personas que reciben más apoyo social o aquellos que están más integrados dentro de su red social, tienen una mayor capacidad cognitiva y son menos propensos a sufrir deterioro cognitivo⁵⁰⁻⁵². El apoyo social se considera un constructo multidimensional, diferenciando entre los aspectos cuantitativos (el tamaño de las redes sociales o la frecuencia de conductas de apoyo) y los aspectos cualitativos (la satisfacción con el apoyo social o la percepción de disponibilidad de ayuda en caso de necesitarla). Es importante por tanto determinar qué aspectos del apoyo social tienen una mayor influencia sobre el estado cognitivo. Algunos estudios han encontrado que los aspectos cuantitativos, como el tamaño de la red social o la participación en actividades sociales se relacionan con el estado cognitivo de las personas mayores^{47,53,54} y con el declive cognitivo a lo largo del tiempo^{53,55}. Sin embargo, en otros trabajos se ha

observado que los aspectos cualitativos del apoyo social, como el apoyo social percibido^{48,56} o la satisfacción con el apoyo social⁵⁷ también se relacionan con el desempeño cognitivo de las personas mayores.

1.2. Sintomatología depresiva

La depresión es un trastorno común en las personas mayores⁵⁸⁻⁶¹, que merece especial atención ya que a menudo es crónica o recurrente, presenta considerables problemas de diagnóstico y con frecuencia no es detectada ni manejada adecuadamente^{62,63}. La presentación de la depresión en las personas mayores a menudo es diferente en comparación con los adultos más jóvenes. Las personas mayores son menos propensas a mostrar síntomas afectivos y más propensas a mostrar cambios cognitivos, síntomas somáticos y pérdida de interés⁶⁴. En este grupo de edad, el curso del trastorno es en ocasiones atípico y los pacientes son especialmente sensibles a los efectos adversos de la farmacoterapia⁶⁵.

Aunque los casos de depresión mayor son también comunes, en las personas mayores tiene especial importancia la depresión subsindrómica⁶⁶⁻⁶⁸. Esto es, un nivel de sintomatología depresiva que está asociado con un riesgo más elevado de depresión mayor, discapacidad física y enfermedades médicas, pero que no cumple los criterios diagnósticos de la depresión mayor ni de la distimia⁶⁸.

La presencia de síntomas depresivos causa sufrimiento físico y emocional y empeora significativamente la calidad de vida de las personas mayores⁶⁹. Los síntomas depresivos constituyen un factor de riesgo independiente para el desarrollo de enfermedades coronarias^{70,71}, predicen el declive del funcionamiento físico a lo largo del tiempo^{3,72} y se relacionan con un mayor riesgo de muerte y suicidio^{4,58,73-75}. Además, la presencia de depresión y síntomas depresivos supone importantes consecuencias

socioeconómicas para las familias y para la sociedad, ya que conlleva un incremento significativo en la utilización de los recursos sociosanitarios^{68,76}.

1.2.1. Factores predictores y de riesgo

La aparición de la sintomatología depresiva en las personas mayores puede entenderse como una interacción entre ciertas vulnerabilidades, incluyendo factores genéticos, la presencia de enfermedades crónicas, la dependencia en las actividades de la vida diaria, y la influencia de diferentes estresores sociales, que pueden ser mayores en esta etapa de la vida⁶⁴.

En comparación con las personas de mediana edad, las personas mayores parecen tener una mayor vulnerabilidad biológica hacia la depresión⁷⁷. La presencia de enfermedades crónicas se ha mostrado como un factor de riesgo importante para la aparición de sintomatología depresiva en las personas mayores^{61,78-81}. Algunas enfermedades que se han relacionado con un mayor riesgo de síntomas depresivos son los accidentes cerebrovasculares, la pérdida de audición, la pérdida de visión, las enfermedades cardíacas o la enfermedad pulmonar crónica^{82,83}. Con respecto a las variables relacionadas con el estilo de vida, se ha observado un mayor riesgo de depresión en las personas mayores fumadoras⁸⁴. Igualmente, el estado funcional es también un factor de riesgo a tener en cuenta, observándose que la dependencia para las actividades de la vida diaria predice la existencia de sintomatología depresiva en las personas mayores^{78,80,84-86}.

Por otra parte, los aspectos sociales y sociodemográficos juegan también un papel importante en la aparición de la sintomatología depresiva. Existe evidencia de que en las personas mayores, al igual que en la población adulta, la sintomatología depresiva es más común en las mujeres que en los hombres⁸⁷⁻⁹⁰, si bien, no en todos los estudios

se observa esta relación⁹¹⁻⁹³. La relación entre la sintomatología depresiva y otras variables sociodemográficas, como la edad, todavía no está clara^{85,90,92-94}.

En diferentes estudios se ha observado que la falta de apoyo social se asocia a una mayor presencia de sintomatología depresiva en las personas mayores⁹⁵⁻¹⁰¹. Aunque se ha encontrado que tanto los aspectos cuantitativos¹⁰²⁻¹⁰⁵ como los aspectos cualitativos del apoyo social¹⁰⁶⁻¹¹⁰ se relacionan con la sintomatología depresiva, la evidencia empírica parece apoyar la idea de que, en general, los aspectos cualitativos, como la satisfacción con el apoyo social, son predictores más importantes de la sintomatología depresiva que los aspectos cuantitativos^{104,111}.

1.3. Coexistencia de la sintomatología depresiva y el deterioro cognitivo

En las personas mayores el deterioro cognitivo y los síntomas depresivos aparecen con frecuencia relacionados, existiendo una relación estrecha y compleja entre ambos¹¹²⁻¹¹⁴. No está claro si la depresión es un factor de riesgo para el desarrollo de deterioro cognitivo y demencia, o bien, un síntoma temprano en las primeras fases de la demencia, existiendo un apoyo sustancial para ambas hipótesis¹¹⁵.

En las personas mayores con diagnóstico de depresión es común la presencia de deterioro cognitivo^{116,117}, observándose déficits en el funcionamiento cognitivo global y en diferentes dominios cognitivos como la memoria, la velocidad de procesamiento o las funciones ejecutivas¹¹⁸⁻¹²⁴. Además, se ha observado que estos déficits cognitivos persisten incluso tras la remisión de la depresión¹²⁵⁻¹³⁰.

Los estudios longitudinales muestran que en las personas mayores cognitivamente sanas los síntomas depresivos son factor de riesgo para el desarrollo de deterioro cognitivo¹³¹⁻¹³⁴. Asimismo, la presencia de síntomas depresivos se ha relacionado con un mayor riesgo de desarrollar demencia años después^{132,135-137},

especialmente demencia vascular y enfermedad de Alzheimer (EA)¹³⁸, y con un mayor declive cognitivo a lo largo del tiempo¹³⁹⁻¹⁴³. En las personas que presentan Deterioro Cognitivo Leve (DCL), los síntomas depresivos son un factor de riesgo de conversión a demencia¹⁴⁴⁻¹⁴⁶ y se relacionan con una mayor atrofia de la sustancia blanca frontal, parietal y temporal¹⁴⁶.

Por otra parte, existe también evidencia que apoya la idea de que el deterioro cognitivo precede a la sintomatología depresiva en las personas mayores. En este sentido, se ha observado que las personas mayores con deterioro cognitivo^{147,148} y demencia¹⁴⁹⁻¹⁵² tienen una mayor probabilidad de presentar sintomatología depresiva y depresión mayor. Una explicación sería que los síntomas depresivos podrían ser una manifestación temprana de la demencia, más que un factor de riesgo, con el argumento de que la condición subyacente que causa DCL o demencia también provocaría la aparición de depresión o sintomatología depresiva^{115,152}. Asimismo, se ha propuesto que, en algunos casos, la sintomatología depresiva podría ser una reacción psicológica que aparece cuando la persona es consciente de la incipiente pérdida cognitiva en las primeras etapas de la demencia¹⁵³.

A falta de determinar la naturaleza de relación entre el deterioro cognitivo y los síntomas depresivos, lo que sí está claro es que la coexistencia de ambos conlleva consecuencias especialmente negativas en la salud y en la calidad de vida de las personas mayores y de sus cuidadores. La presencia conjunta de deterioro cognitivo y síntomas depresivos se ha asociado a un mayor riesgo de deterioro funcional¹⁵⁴, a un peor funcionamiento físico¹⁵⁵ y a una mayor morbi-mortalidad¹⁵⁶. Además, supone un aumento en la carga que sufren los cuidadores informales y un incremento en el uso de los recursos sanitarios¹⁵⁷.

Sin embargo, a día de hoy existe escasa información sobre cuáles son los factores de riesgo que predicen la coocurrencia del deterioro cognitivo y la sintomatología depresiva¹⁵⁸. Esta información, además de servir para fines preventivos y de promoción de la salud, podría ayudarnos a comprender la compleja relación que se establece entre ambos.

2. La salud percibida en las personas mayores

La salud percibida es un indicador de la salud ampliamente utilizado, que se refiere a la percepción que tienen las personas sobre su propio estado de salud¹⁵⁹⁻¹⁶². Normalmente se evalúa mediante una única pregunta en la que la persona tiene que valorar su estado de salud actual en una escala con cuatro o cinco opciones de respuesta que van desde excelente hasta mala¹⁶³.

La utilización de la salud percibida como un indicador del estado de salud ha ido en aumento en los últimos años y se ha recomendado como una herramienta adecuada para la detección del riesgo de patologías en atención primaria¹⁶⁴, como un indicador de resultados en atención primaria¹⁶⁵, y como una parte estándar de los ensayos clínicos¹⁶⁶ y de las encuestas de salud¹⁶⁷.

Se ha observado también que es una buena medida de la salud incluso a edades muy avanzadas¹⁶⁸. En las personas mayores, una mala percepción de la salud predice la aparición de enfermedades crónicas^{169,170}, es un predictor importante del declive funcional¹⁷⁰⁻¹⁷² y se asocia con un mayor riesgo de caídas¹⁷³. Las personas mayores que informan de una mala salud percibida tienen un mayor riesgo de hospitalización y requieren una mayor utilización de los recursos sociosanitarios¹⁵⁹. Además, la salud percibida es un predictor del estado psicológico de las personas mayores, observándose

un mayor riesgo de depresión^{78,174} y demencia¹⁷⁵ en las personas que informan de una mala salud percibida.

La relación entre la salud percibida y la mortalidad está bien establecida. En numerosos estudios se ha observado que la salud percibida es un buen predictor de la mortalidad independientemente de las condiciones objetivas de salud¹⁷⁶⁻¹⁸⁰, siendo su capacidad para predecir la mortalidad comparable a la de una valoración integral de la salud basada en parámetros objetivos¹⁸¹. En el caso de la mortalidad por cáncer, es un predictor especialmente potente, mostrándose superior a la valoración de la salud realizada por un médico¹⁸⁰.

2. 1. Factores predictores y de riesgo

A pesar de ser uno de los indicadores de salud más utilizados, la salud percibida es también uno de los menos comprendidos¹⁶³. Esta falta de comprensión se debe, en parte, a la escasez de investigación psicológica en esta área. La mayoría de los estudios que incluyen la salud percibida entre las medidas a analizar proceden del campo de la sociología y la epidemiología, por lo que no suelen incluir medidas psicológicas¹⁷⁶.

La salud percibida podría entenderse como un concepto multidimensional influenciado tanto por variables relacionadas con la salud física y funcional, como por aspectos psicológicos y sociales. En esta línea, Jylhä¹⁶³ ha definido la salud percibida como una concepción individual y subjetiva que constituye un cruce de caminos entre el mundo social y las experiencias psicológicas, por una parte, y el mundo biológico, por otra. Para poder llegar a una adecuada comprensión de la salud percibida y entender porqué es un predictor tan potente de la morbi-mortalidad, es necesario estudiar los factores de riesgo de la mala salud percibida desde una perspectiva multidimensional,

que tenga en cuenta la influencia tanto de los aspectos relacionados con la salud física y funcional, como de los aspectos psicológicos y sociales.

Existe amplia evidencia de la influencia de los factores relacionados con la salud física, como las enfermedades crónicas^{160,182-184} o la presencia de comorbilidad¹⁸⁵ en la salud percibida. Algunas de las enfermedades que se han relacionado con una mala salud percibida son la diabetes, las enfermedades cardiovasculares, las enfermedades neurológicas o el cáncer^{160,186}. Asimismo, el número de enfermedades crónicas^{182,183} y la capacidad funcional predicen la salud percibida en las personas mayores^{184,187,188}.

Las variables sociales y sociodemográficas también parecen afectar a la percepción de la salud de las personas mayores. En relación al apoyo social, estar socialmente integrado y tener una eficiente red de amigos se ha relacionado con una buena salud percibida¹⁸⁹. En cuanto al género, algunos estudios han encontrado peores percepciones en las mujeres^{176,190}, si bien en otros estudios no se observa esta relación^{189,191}.

Aunque la evidencia es hasta ahora escasa, en los últimos años se ha empezado a estudiar la influencia de los aspectos emocionales sobre la salud percibida de las personas mayores, encontrándose que la presencia de síntomas depresivos podría ser un predictor significativo de la mala salud percibida^{160,186,192,193} y del empeoramiento de la salud percibida a lo largo del tiempo¹⁹⁴.

3. Parámetros bioquímicos y hematológicos en las personas mayores

Los parámetros bioquímicos y hematológicos se utilizan a menudo para detectar diferentes condiciones médicas como, por ejemplo, la diabetes o las dislipidemias. Durante un episodio agudo, los parámetros bioquímicos pueden desempeñar un papel

importante en el diagnóstico, especialmente en los pacientes mayores, en los que los signos clínicos a menudo son débiles o están ausentes¹⁹⁵.

Igualmente, en trastornos relacionados con la salud psicológica, de alta prevalencia en las personas mayores, como el deterioro cognitivo o la depresión, los parámetros bioquímicos muestran valores fuera de los rangos de los parámetros de referencia. Por ejemplo, se ha observado que los niveles de colesterol se relacionan con la presencia de deterioro cognitivo^{41,196} y sintomatología depresiva en las personas mayores^{197,198}. En las personas mayores que se encuentran hospitalizadas, la presencia de valores anormales en diferentes parámetros bioquímicos, como la hiperglucemia, la leucocitosis, los niveles bajos de hemoglobina, los niveles elevados de urea en sangre, y/o los niveles altos de creatinina se han asociado a la presencia de deterioro cognitivo¹⁹⁹. Asimismo, algunos parámetros bioquímicos y hematológicos como el recuento de leucocitos, la hemoglobina y el colesterol asociado a lipoproteínas de alta densidad (HDL) se han relacionado con la salud percibida en las personas mayores^{200,201}.

Teniendo en cuenta estos resultados, parece adecuado que en los estudios sociosanitarios en el ámbito del envejecimiento se incluyan los parámetros de laboratorio entre los factores de riesgo a analizar. Sin embargo, previamente es necesario determinar si los valores de referencia de los parámetros bioquímicos y hematológicos que se utilizan habitualmente en el conjunto de la población son adecuados para las personas mayores. Los valores de referencia se definen generalmente a partir de muestras de adultos jóvenes sanos, por lo que podrían no resultar adecuados para la población de personas mayores. De hecho, se han observado cambios significativos dependientes de la edad en los perfiles hematológicos, que indican la presencia de un subyacente declive en el sistema hematopoyético, lo que

haría necesaria la elaboración de intervalos de referencia específicos en función de la edad²⁰².

Existen pocas publicaciones que aporten intervalos de referencia en muestras de personas mayores de 65 y más años, y en ocasiones las muestras utilizadas en esos estudios incluyen también a personas jóvenes^{202,203}. Los estudios que han aportado intervalos de referencia a partir de muestras de personas mayores, suelen incluir personas mayores sanas²⁰⁴⁻²⁰⁷, si bien el criterio de salud varía dependiendo del estudio. Los estudios realizados con personas mayores que no sufren trastornos graves muestran que, en general, los parámetros bioquímicos y hematológicos están dentro de los parámetros de referencia convencionales para adultos jóvenes^{204,205}. Sin embargo, incluso en las personas mayores aparentemente sanas, algunos parámetros muestran intervalos de referencia más amplios que los de los adultos jóvenes¹⁹⁵.

El problema de utilizar muestras de personas mayores sanas para establecer valores de referencia es que en la población de personas mayores existe una alta prevalencia de patologías crónicas como la diabetes, las dislipidemias, la demencia, la enfermedad renal o la anemia²⁰⁸⁻²¹¹, y una alta prevalencia de comorbilidad^{212,213}. Además, un porcentaje importante de las personas mayores consumen fármacos regularmente^{214,215} y muchos de ellos son dependientes en las actividades básicas e instrumentales de la vida diaria^{216,217}. Por todo ello, la utilización de un criterio de salud muy estricto podría resultar en una muestra bastante pequeña y no representativa de la población de personas mayores²⁰⁶.

Resulta necesario, por tanto, estudiar los parámetros bioquímicos y hematológicos con una muestra amplia de personas mayores sin utilizar un criterio de salud estricto, y comprobar si muestran valores anormales, fuera de los límites establecidos por los valores de referencia para la población de adultos jóvenes.

II. JUSTIFICACIÓN Y OBJETIVOS

1. Justificación

Actualmente son escasos los estudios sociosanitarios sobre la población de personas mayores en Galicia, por lo que la mayor parte de las veces es necesario acudir a estudios realizados en otras Comunidades Autónomas o en otros países a fin de establecer las necesidades de nuestra población. Esto hace que en numerosas ocasiones los datos no sean del todo adecuados, ya que las peculiaridades de la población objeto de estudio, como los aspectos sociales o el nivel cultural, van a influir en los resultados obtenidos.

Además, la investigación en el ámbito de las personas mayores suele centrarse en las enfermedades médicas y en la discapacidad, olvidando a menudo aspectos tan importantes como los trastornos relacionados con la salud psicológica, o la percepción subjetiva del propio estado de salud. Las personas mayores que presentan deterioro cognitivo y síntomas depresivos y aquellas que informan de una mala salud percibida ven afectada su salud y su calidad de vida, presentando mayores índices de discapacidad, morbilidad, mortalidad y un mayor consumo de recursos sociosanitarios. Por ello, resulta fundamental conocer cuáles son los factores predictores y de riesgo de la coexistencia de síntomas depresivos y deterioro cognitivo, y de la mala salud percibida, de cara a la promoción de la salud física y psicológica de las personas mayores y a la prevención de la enfermedad y la dependencia.

Los parámetros bioquímicos y hematológicos se utilizan con frecuencia en la detección de diferentes trastornos y patologías. Para poder incluirlos entre los factores de riesgo a analizar en los estudios sociosanitarios y en la práctica clínica con las personas mayores, es necesario comprobar previamente si los valores de referencia para los adultos jóvenes son adecuados para las personas mayores o si, por el contrario, es necesario elaborar intervalos de referencia específicos para este grupo de edad.

2. Objetivos

El **objetivo general** de este trabajo fue estudiar los factores predictores y de riesgo de diferentes aspectos relacionados con la salud en las personas mayores no institucionalizadas. Los **objetivos específicos** del trabajo fueron:

- Identificar los factores relacionados con la salud física y funcional que se relacionan con la presencia de deterioro cognitivo, síntomas depresivos y con la coexistencia de ambos en las personas mayores.
- Evaluar la influencia de los aspectos cuantitativos y cualitativos del apoyo social en las personas mayores con deterioro cognitivo, síntomas depresivos y con la presencia de ambos.
- Identificar los factores relacionados con la salud física, psicológica y funcional, así como los factores sociodemográficos y sociales que se relacionan con una mala salud percibida en las personas mayores.
- Examinar y describir los índices bioquímicos y hematológicos de una muestra representativa de personas mayores y compararlos con los valores de referencia de la población de adultos jóvenes.

En base a estos cuatro objetivos, se publicaron 4 artículos científicos en revistas indexadas en el Journal Citation Report, que se incluyen en este trabajo (Apartado IV. Publicaciones Científicas) y constituyen su núcleo principal.

III. MATERIAL Y MÉTODOS

1. Sujetos

Se realizó un estudio transversal sobre una muestra representativa de 600 personas de 65 o más años residentes en el municipio de Narón (A Coruña). La selección de los sujetos se realizó mediante un muestreo aleatorio simple, estratificado por quinquenios de edad y sexo, a partir del padrón municipal, con un nivel de confianza del 95% ($\alpha=0,05$) y un error muestral de $\pm 4\%$.

Los sujetos fueron valorados de manera individual en el Centro de Salud de Narón por un grupo multidisciplinar integrado por médicos, psicólogos y enfermeros. Aquellos pacientes que no pudieron acudir al Centro de Salud, por encontrarse encamados o presentar alguna limitación, fueron evaluados en su domicilio.

La media de edad de la muestra fue de $75,1 \pm 7,5$ años ($75,9 \pm 8,0$ años en las mujeres (57,2%) y $73,9 \pm 6,7$ años en los hombres).

2. Instrumentos

Se llevó a cabo una valoración gerontológica integral, que comprendió la evaluación de las variables sociodemográficas y sociales, las variables psicológicas, la salud percibida, las variables funcionales, las variables físicas y los hábitos de vida de los participantes en el estudio.

Variables sociodemográficas y sociales

Para evaluar los aspectos sociodemográficos y los recursos sociales de los participantes se utilizó la versión española²¹⁸ de la Escala de Recursos Sociales del cuestionario multidimensional OARS-MFAQ (Older Americans Resources and Services Program-Multidimensional Functional Assessment Questionnaire-Anexo I)²¹⁹. La Escala de

Recursos Sociales consta de siete ítems, y las puntuaciones directas se codifican en una escala basada en las siguientes seis categorías: (a) excelentes, (b) buenos, (c) ligeramente deteriorados, (d) moderadamente deteriorados (e) severamente deteriorados y (f) totalmente deteriorados. Además, esta escala incluye tres subescalas validadas²¹⁹ que pueden utilizarse de forma independiente: el Grado de contacto con otros (*“Número de personas a las que conoce lo suficiente como para ir de visita a su casa”*, *“Número de veces por semana que habla con alguien por teléfono”*, *“Número de veces por semana que pasa algún tiempo con alguien con quien no vive”*), la Satisfacción con los contactos (*“Tener alguien en quien poder confiar”*, *“Frecuencia de sentimientos de soledad”*, *“Satisfacción con el contacto con familiares o amigos”*), y la Disponibilidad de ayuda en caso de necesitarla (*“Tener a alguien que le ayude en caso de estar enfermo/a o incapacitado/a”*). Las puntuaciones brutas de estas subescalas se calcularon sumando las respuestas de los ítems correspondientes a cada subescala y transformándose posteriormente en las siguientes categorías: de 1 (escaso) a 3 (extenso) para el Grado de contacto con otros, de 1 (insatisfecho) a 3 (muy satisfecho) para la Satisfacción con los contactos, y de 0 (ninguna) a 3 (a largo plazo) para la Disponibilidad de ayuda.

Variables psicológicas

El estado cognitivo y la presencia de síntomas depresivos fueron evaluados por un psicólogo clínico con experiencia en evaluación psicológica.

La evaluación del estado cognitivo se llevó a cabo mediante el Mini Examen del Estado Mental (Mini Mental State Examination, MMSE-Anexo II)²²⁰, que ha sido ampliamente utilizado en la población española. La presencia de deterioro cognitivo se definió de acuerdo a los criterios de Crum considerando la edad y el nivel educativo²²¹.

Para evaluar la presencia de síntomas depresivos se utilizó la versión breve de la Escala de Depresión Geriátrica (Geriatric Depression Scale, GDS-Anexo III) de Yesavage²²². Esta escala consta de 15 ítems y está diseñada específicamente para detectar la presencia de sintomatología depresiva en las personas mayores. Los ítems están formulados como preguntas, con respuesta dicotómica sí/no. Cada ítem se puntúa como 0 o 1, oscilando la puntuación total de la escala entre 0 y 15. El punto de corte óptimo para la presencia de síntomas depresivos se estableció en 5/6²²³.

Salud percibida

La salud percibida se evaluó con la pregunta: ¿Cómo valora usted su salud globalmente en el momento actual -excelente, buena, regular o mala-?^{162,184}. A continuación, siguiendo el método utilizado por diferentes autores^{97,182}, la salud percibida se dicotomizó en dos categorías: buena (excelente y buena) y mala (regular y mala).

VARIABLES FUNCIONALES

Con respecto al estado funcional, se utilizó el Índice de Katz (Anexo IV)²²⁴ para evaluar la dependencia en las actividades básicas de la vida diaria (ABVD) y el Índice de Lawton y Brody (Anexo V)²²⁵ para evaluar la dependencia en las actividades instrumentales de la vida diaria (AIVD).

El Índice de Katz valora seis ABVD: bañarse, vestirse, ir al servicio, desplazarse, mantener la continencia y alimentarse. Para cada actividad la persona puede ser independiente o dependiente. Se considera independiente a aquella persona que no precisa ayuda o utiliza ayuda mecánica y dependiente a aquella que necesita ayuda de otra persona, incluyendo la mera supervisión de la actividad. En este trabajo

las personas que no eran capaces de realizar alguna de las seis actividades se consideraron dependientes para las ABVD.

El Índice de Lawton valora las AIVD mediante ocho ítems: capacidad para utilizar el teléfono, ir de compras, preparación de la comida, realización de tareas domésticas, lavado de la ropa, uso de medios de transporte, responsabilidad respecto a la medicación y capacidad de manejar el dinero. A cada ítem se le asigna un valor numérico de 1 (independiente) o 0 (dependiente). La puntuación final es la suma del valor de todas las respuestas, oscilando entre 0 (máxima dependencia) y 8 (independencia total).

Una cuestión importante a tener en cuenta es que en la población española los factores de género influyen fuertemente en las respuestas del Índice de Lawton. Para evitar este factor de confusión, en este trabajo hemos considerado la capacidad latente para realizar una tarea, corrigiendo así la posibilidad de que el género u otros factores contextuales fuesen responsables de la dependencia funcional. Las personas que no tenían la capacidad para realizar alguna de las actividades incluidas en la escala se consideraron dependientes para las AIVD.

Asimismo, se evaluó la necesidad de un cuidador con la pregunta del OARS-MFAQ²¹⁸: “Durante los últimos seis meses ¿hubo algún tiempo en el que alguien tuvo que estar con usted las 24 horas del día?”.

Variables físicas

Las historias clínicas fueron recogidas por un médico o un/a enfermero/a entrenado/a. Las enfermedades crónicas de los participantes se registraron mediante el Índice de comorbilidad de Charlson (Charlson Comorbidity Index, CCI-Anexo VI)²²⁶. La

presencia de discapacidad visual y auditiva, y el número de visitas al médico en los últimos seis meses se registraron utilizando el OARS-MFAQ (Anexo VII)²¹⁸.

Se recogieron los parámetros bioquímicos y hematológicos más comúnmente solicitados en la bioquímica clínica. Los parámetros bioquímicos analizados fueron glucosa, urea, creatinina, ácido úrico, aspartato aminotransferasa (AST), alanina aminotransferasa (ALAT), gamma glutamil transpeptidasa (GGT), colesterol total, triglicéridos, colesterol asociado a lipoproteínas de alta densidad HDL, colesterol asociado a lipoproteínas de baja densidad (LDL), fósforo, calcio y hormona estimulante del tiroides (TSH). Los parámetros hematológicos analizados fueron leucocitos, recuento de hematíes, hemoglobina (Hb), hematocrito (HCT), volumen corpuscular medio (VCM), hemoglobina corpuscular media (HCM), concentración de hemoglobina corpuscular media (CHCM), recuento de plaquetas y velocidad de sedimentación globular (VSG).

Las muestras de sangre se recogieron en un Centro de Salud de Atención Primaria. Todos los participantes fueron examinados por la mañana después de una noche de ayuno. Las muestras de los parámetros bioquímicos se recogieron en tubos separadores de suero (SST) y las muestras de los parámetros hematológicos en tubos con ácido etilendiaminotetraacético (EDTA).

Se utilizaron tubos Vacutainer (Becton Dickinson) de 4 ml para analizar los parámetros bioquímicos y hematológicos y tubos Seditainer para la VSG. Los tubos se centrifugaron a temperatura ambiente a 3000 rpm. Las determinaciones bioquímicas se realizaron en un analizador Advia (Bayer Diagnostics) y las determinaciones hematológicas se realizaron en un analizador Beckman-Coulter. Todos los análisis se realizaron en el laboratorio del Complejo Hospitalario Universitario (CHUAC) en la ciudad de A Coruña en el mismo día de la recogida de las muestras.

Hábitos de vida

Se registró el consumo de tabaco y alcohol. El estatus de fumador (fumador o no fumador) se determinó basándose en la prevalencia del consumo de tabaco en los últimos 30 días (esto es, si la persona había fumado cigarrillos en los últimos 30 días)²²⁷. Se consideraron consumidores de alcohol a aquellas personas que consumían alcohol diariamente. En función del nivel de consumo de alcohol, se estableció un “consumo moderado de alcohol” hasta un límite superior de 80 gramos al día, y un “consumo excesivo de alcohol”, cuando el nivel de consumo era superior a 80 gramos diarios²²⁸.

Se evaluó también la práctica habitual de actividad física. De acuerdo con las recomendaciones de actividad física para la salud de la OMS en los adultos de 65 y más años²²⁹, se consideró práctica regular de actividad física al realizar una actividad semanal de al menos 2 horas y 30 minutos de actividad física moderada, o bien 1 hora y 15 minutos de actividad física vigorosa o una combinación equivalente de actividad moderada y vigorosa.

3. Aspectos éticos

El protocolo de este estudio fue aprobado por el Comité de Ética de la Universidad de A Coruña. Previamente a la recogida de datos, A los participantes incluidos se les solicitó su consentimiento oral y escrito después de haber sido informados debidamente acerca de las características del estudio, sus objetivos, beneficios y riesgos posibles (de haberlos) y sobre su derecho a participar o no sin exponerlos a limitaciones.

Se respetó la integridad de los participantes en la investigación, asegurando la confidencialidad de toda la información personal recogida durante el estudio según la legislación vigente, la Ley Orgánica 15/1999/179, de 13 de diciembre, de Protección de

Datos de Carácter Personal, cuyo objetivo es garantizar y proteger, en lo que concierne al tratamiento de los datos personales, las libertades públicas y los derechos fundamentales de las personas físicas, y especialmente de su honor e intimidad personal y familiar y el Real Decreto 994/1999, de 11 de junio, por el que se aprueba el Reglamento de medidas de seguridad de los ficheros automatizados que contengan datos de carácter personal.

4. Análisis estadístico

Las variables cuantitativas se expresaron como media \pm DT y las variables cualitativas se expresaron como frecuencia y porcentaje. La comparación de medias se realizó con los estadísticos t de Student y Kruskal-Wallis para las variables continuas y por medio del estadístico Chi cuadrado en el caso de las variables cualitativas.

La correlación de variables cuantitativas entre sí se realizó por medio del coeficiente de correlación de Spearman. Para determinar los predictores de las variables dependientes se realizaron modelos de regresión logística múltiple.

La significación estadística se estableció en $p < 0,05$. Los análisis estadísticos se realizaron utilizando el paquete Statistical Package for the Social Sciences (SPSS).

IV. PUBLICACIONES CIENTÍFICAS

RESEARCH ARTICLE

International Journal of
Geriatric Psychiatry

Mental and psychological conditions, medical comorbidity and functional limitation: differential associations in older adults with cognitive impairment, depressive symptoms and co-existence of both

José C. Millán-Calenti, Ana Maseda, Sophie Rochette, Gustavo A. Vázquez, Alba Sánchez and Trinidad Lorenzo

1. Comorbilidad médica y limitación funcional: asociaciones diferenciales en personas mayores con deterioro cognitivo, síntomas depresivos o con la presencia de ambos

Int J Geriatr Psychiatry 2011; 26: 1071-1079.

Resumen

El deterioro cognitivo y los síntomas depresivos son comunes entre la población de personas mayores y aparecen con frecuencia relacionados, sin embargo la coocurrencia de ambos ha sido poco estudiada. El objetivo de este estudio fue identificar y comparar los factores de riesgo relacionados con la salud física y funcional en tres grupos de personas mayores: con deterioro cognitivo, con síntomas depresivos, y con la presencia de ambos.

La dependencia para realizar las AIVD (Odds ratios [OR]: 11,9), la dependencia para las ABVD (OR: 11,5), la enfermedad cerebrovascular (OR: 3,6), la insuficiencia cardiaca congestiva (OR: 3,4), la diabetes (OR: 2,6) y el número de medicamentos consumidos se relacionaron significativamente con la coexistencia de síntomas depresivos y deterioro cognitivo.

Tras ajustar por las variables de confusión, la dependencia para realizar las AIVD y las ABVD continuaron siendo predictores de la coexistencia de deterioro cognitivo y síntomas depresivos. Ser dependiente para las AIVD y las ABVD y tener una baja esperanza de vida aumentaba significativamente la probabilidad de presentar síntomas depresivos. La dependencia en las AIVD se asoció indistintamente con la presencia de deterioro cognitivo, síntomas depresivos y con la coexistencia de ambos.

Los resultados del estudio mostraron la particular relevancia de ciertas comorbilidades médicas en los tres grupos de personas mayores.

Mental and psychological conditions, medical comorbidity and functional limitation: differential associations in older adults with cognitive impairment, depressive symptoms and co-existence of both

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Objective: Cognitive impairment and depressive symptoms are common among the geriatric population but the co-occurrence of both is rarely studied. The purpose of this study was to identify and compare the factors associated with three groups of elderly people: those assessed with cognitive impairment *alone* (COG), depressive symptoms *alone* (DEP) or co-existence of both (COG-DEP).

Methods: The cross-sectional study included 600 community-dwellers ages 65 and older. All participants underwent a comprehensive evaluation. Global cognition was measured by the Mini-Mental State Examination (MMSE) and depressive symptoms were defined by the Geriatric Depression Scale (GDS). Specific chronic illnesses relevant to the Charlson comorbidity index (CCI) were self-reported. Functional status was evaluated by the Katz' basic (ADL) and Lawton's instrumental (IADL) activities of daily living scales.

Results: COG-DEP was explained by IADL dependence (OR: 11.9, 95% CI: 4.59–30.78), ADL dependence (OR: 11.5, 95% CI: 5.59–23.69), cerebrovascular disease (OR: 3.6, 95% CI: 1.48–8.68), congestive heart failure (OR: 3.4, 95% CI: 1.77–6.59) and diabetes (OR: 2.6, 95% CI: 1.30–5.18), but it was best predicted by functional limitations in the adjusted model. Being functionally dependent and medically ill with shorter life expectancy was shown to significantly increase the odds of being DEP. Functional limitation in IADL was without distinction associated to COG, DEP and COG-DEP.

Conclusion: The present results on COG, DEP and COG-DEP show the particular relevance of certain medical comorbidities and functional limitations to those three distinct groups of elderly people. Copyright © 2010 John Wiley & Sons, Ltd.

Key words: cognitive impairment; geriatric depression; medical comorbidity; functional limitation; life expectancy; elderly people

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Introduction

As long as mortality in old age continues to fall and fertility remains low, the proportion of older persons will continue to increase. The percentage of the Spanish population aged 60 years and older represents 22.2% of the whole population (United Nations, 2009). Due to senescence, elderly people are at a particularly high risk of developing illnesses related to

aging, not to mention cognitive impairment, which has been shown to affect 22.2% of the elderly population (Millán-Calenti *et al.*, 2009).

Research has shown that cognitive decline, reaching the threshold for dementia, affects a large proportion of elderly in-patients and is associated with certain alterations (Holstein *et al.*, 1994), the treatment of which is complicated by the mental state of this segment of the population, as missed diagnosis and

self-neglect are likely (Wolf-Klein *et al.*, 1988; Löppönen *et al.*, 2004).

According to the most recent studies, the number of comorbid conditions seems to be similar in demented and non-demented subjects, but certain chronic medical conditions have been shown to be differentially associated with the cognitively impaired as compared to the unimpaired (Zekry *et al.*, 2008). For example, heart disease, stroke and diabetes have been reported to be associated with cognitive impairment (Breteler *et al.*, 1994; Ferrucci *et al.*, 1996; Strachan *et al.*, 1997). Not only the presence of medical conditions but also declines in the ability to perform certain activities considered important in independent functioning (e.g. activities of daily living (ADL) and instrumental activities of daily living (IADL)) were shown to be associated with cognitive impairment (Bassett and Folstein, 1991; Artero *et al.*, 2001).

It has been observed that a large proportion of cognitively impaired geriatric out-patients have been diagnosed with depression. However, the rate of coexisting depression decreased significantly with increasing severity of cognitive impairment: 33% of mildly impaired patients were depressed, compared with 23% of moderately impaired and 12% of severely impaired (Reifler *et al.*, 1982). Depressive symptoms (referring to mood and affective syndromes rather than clinical depression, which fulfils rigorous diagnostic criteria) were shown to be more frequent among the non-clinical population of elderly people (Zung, 1967) and to similarly co-exist with cognitive impairment. It has been shown that some diseases that alter biological systems can play a role in the development of specific psychological disturbances. Depressive symptoms are highly prevalent in patients with congestive heart failure (Charlson and Peterson, 2002), but the link between cognitive impairment coexisting with depression and chronic illnesses is unclear. The same can be reported for other important limitations, like the ability to perform ADL and IADL (Armenian *et al.*, 1998).

Cognitively impaired and/or depressed elderly people are likely to experience different medical conditions and functional limitations, and thus may have different health care needs. In this study examining a large sample of community-dwelling older adults, we sought to identify and compare the factors associated with three groups of elderly people: those assessed with cognitive impairment *alone* (COG), depressive symptoms *alone* (DEP) and co-existence of both (COG-DEP). That is to say, we wanted to primarily determine whether certain medical comorbidities and functional limitations were

similarly associated to COG, DEP and COG-DEP and then examine the independent effect of those variables on COG, DEP and COG-DEP by use of a multivariate model.

Methods

Selection and description of participants

Data for this study came from a representative sample ($N = 600$) of community-dwelling residents of Narón Council (A Coruña, Spain), aged 65 years and older. The subjects were selected from the municipal register using a random number table, arranged by age quinquennia and sex. In the sample, mean \pm standard deviation (SD) age was 75.1 ± 7.5 years (75.9 ± 8.0 years for women and 73.9 ± 6.7 years for men). The level of confidence was 95%, sampling error $\pm 4\%$ and estimation for data losses 10%.

Procedure

The study protocol was approved by the Ethics Committee at the University of A Coruña. Participants were individually assessed in a health centre, or at home in the case of people with mobility difficulties. Before the data collection, all participants were informed about the study and signed the corresponding informed consent form.

Variables and instruments

Cognitive status was assessed by a psychologist using the Mini-Mental State Examination (MMSE) (Folstein *et al.*, 1975). This questionnaire includes items assessing five cognitive domains, with a maximum score of 30 corresponding to the best cognitive status and a cut-off score of 23 or less indicating cognitive impairment (COG). However, it is widely accepted that this cut-off score must be varied according to age and educational level, particularly when assessing elderly populations (Morgado *et al.*, 2010). Crum *et al.* (1993) examined the distribution of the MMSE score according to age and educational level and defined cut-off median scores according to those criteria. In this paper, cognitive impairment is defined according to Crum's cut-off median scores. The score was treated as a continuous variable in multivariate analysis. The acceptance rate to undergo the MMSE test was 98.5%. Nine subjects with minimal level of consciousness were

excluded from the random sample as they were unable to be assessed by the MMSE.

Depressive symptoms were also assessed by a psychologist, using the short-form of the Geriatric Depression Scale (GDS-SF) (Sheikh and Yesavage, 1986). This questionnaire was scored to yield a continuous scale from 0 to 15, with a score of 6 or higher indicating probable clinical depression (DEP) (Herrmann *et al.*, 1996). Due to data losses, 12 additional individuals were excluded from the study.

The standardized Older Americans Resources and Services (OARS) questionnaire (Duke University, 1978) was used to assess socio-demographic and general health status variables. Medical histories were collected by a physician or a trained nurse in charge of the participant during the research. Participants' report was given by the patient or their relatives according to medical records. Comorbidity conditions were defined according to the Charlson comorbidity index (CCI) (Charlson *et al.*, 1987). The weighted index taking into account both the number and the seriousness of comorbid diseases served to calculate a comorbidity score. A composite comorbidity-age score was created by adding to the comorbidity score an age points coded in decades. The composite comorbidity-age score was then used to calculate a 10-year survival expectancy estimation for each participant in a low-risk population.

Functional status was measured using the ADL (Katz *et al.*, 1963) and IADL (Lawton and Brody, 1969) scores. Participants were asked by a physician or a trained nurse if they had any difficulty performing each task without the help of another person. Individuals who were unable to perform any one of the activities were considered to be functionally incapacitated in that activity (ADL or IADL dependent). With regard to the remaining pathologies suffered (personal background and illnesses), data were obtained from the participants' report, collecting the answers given by the patient or their relatives according to the medical records.

Statistical analysis

Analyses assessed the prevalence of cognitive impairment and depressive symptomatology, and the related sociodemographic, comorbidity illnesses and functional status variables. Spearman's correlation coefficient (r) was used to analyse the association between quantitative variables. The crude odds ratio (OR) measured the association for dichotomous variables of nominal level or higher. Categorical differences were tested with Chi-square (χ^2) analysis, and continuous variables were compared using the Kruskal–Wallis test. To adjust for the confounding effect of variables correlated with each other, multinomial logistic regression assessing cognitive functioning, depressive symptoms and both was then used. The model estimated the independent effect of each correlate, and the odds ratios (OR) along with their 95% confidence intervals (CI) were calculated.

Statistical significance was set at $p < 0.05$. Statistical analyses were performed using the SPSS statistical package version 16.0.1 (SPSS Inc., 2007).

Results

Co-occurrence of cognitive impairment and depressive symptoms

In the sample used for this study the mean \pm standard deviation (SD) for cognitive performance, according to the MMSE scale, was 23.9 ± 5.6 , and that for the number of depressive symptoms, as measured by the GDS-SF scale, was 3.9 ± 3.3 . We found that cognitive performance was negatively correlated to the amount of depressive symptoms (Spearman correlation $r = -0.3$, $p < 0.001$). As shown in Table 1, 12.6% of the participants were found to have cognitive impairment *alone* (COG), without depressive symptoms, and 17.3% were assessed with depressive symptomatology

Table 1 Co-occurrence of cognitive impairment and depressive symptomatology

	GDS-SF		Total N (%)
	No depressive symptoms N (%)	Depressive symptoms N (%)	
MMSE			
No cognitive impairment	360 (62.2)	100 (17.3)	460 (79.5)
Cognitive impairment	73 (12.6)	46 (7.9)	119 (20.5)
Total	433 (74.8)	146 (25.2)	579 (100.0)

MMSE, Mini-Mental State Examination; GDS-SF, Short-form of the Geriatric Depression Scale. Prevalence odds ratio = 2.3 (1.48–3.49).

alone (DEP), without cognitive impairment. Considering full independence of the variables, we would have expected 5.2% of the sample to report both (COG-DEP), but in fact nearly 7.9% did (OR = 2.3 (1.48–3.49)).

Table 2 presents the characteristics of the sample as a function of cognitive status and/or depressive symptoms of the participants. The oldest subjects (≥ 85 years) were more COG (29.4%) and presented more COG-DEP (22.1%) than the rest of the population. Those cognitive and psychological afflictions, predominantly DEP, affected women primarily (22.7%) and particularly those with no formal education (19.3%). Those *solely* DEP and those COG-DEP were also more medicated, with 26.5% of the participants consuming more than six drugs

when DEP and 15.7% when COG-DEP ($\chi^2 = 38.4, 9 df, p < 0.001$).

Medical comorbidity, functional limitation and risk of cognitive and/or depressive disorders

In Table 2, *solely* COG and *solely* DEP participants were shown to suffer similar average amount of diseases (5.8 and 5.6, respectively), as assessed in the composite Charlson comorbidity-age score. COG-DEP participants reported a higher average amount of disease according to age, 6.5. *Solely* COG and *solely* DEP participants were shown to have comparable mean predicted 10-year survival expectancies (2.3 and 2.0 years, respectively), which was greater than the

Table 2 Characteristics of elderly patients with cognitive impairment *alone* (COG), depressive symptoms *alone* (DEP) and co-existence (COG-DEP) or not (NCOG-NDEP) of cognitive impairment and depressive symptoms

	NCOG-NDEP	COG	DEP	COG-DEP		
	<i>n</i> = 360	<i>n</i> = 73	<i>n</i> = 100	<i>n</i> = 46		
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	χ^2	<i>df</i>
Age						
65–74	227 (70.5)	24 (7.5)	61 (18.9)	10 (3.1)	65.3**	6
75–84	108 (57.2)	29 (15.3)	31 (16.4)	21 (11.1)		
≥ 85	25 (36.7)	20 (29.4)	8 (11.8)	15 (22.1)		
Sex						
Men	194 (76.6)	24 (9.5)	26 (10.3)	9 (3.6)	42.3**	3
Women	166 (51.0)	49 (15.0)	74 (22.7)	37 (11.3)		
Educational level						
No formal education	289 (59.4)	63 (12.9)	94 (19.3)	41 (8.4)	14.2*	6
Primary	55 (79.7)	7 (10.2)	5 (7.2)	2 (2.9)		
\geq Secondary	14 (77.8)	2 (11.0)	1 (5.6)	1 (5.6)		
IADL dependence						
Absent	213 (77.2)	18 (6.5)	40 (14.5)	5 (1.8)	61.9**	3
Present	147 (48.5)	55 (18.2)	60 (19.8)	41 (13.5)		
ADL dependence						
Absent	282 (72.1)	42 (10.8)	56 (14.3)	11 (2.8)	68.5**	3
Present	78 (41.5)	31 (16.5)	44 (23.4)	35 (18.6)		
Visual limitations						
No	336 (64.1)	67 (12.8)	85 (16.2)	36 (6.9)	15.0*	3
Yes	24 (43.6)	6 (10.9)	15 (27.3)	10 (18.2)		
Hearing limitations						
No	311 (64.1)	58 (12.0)	84 (17.3)	32 (6.6)	9.6*	3
Yes	49 (52.1)	15 (16.0)	16 (17.0)	14 (14.9)		
Number of medication						
0–1	111 (75.0)	20 (13.5)	14 (9.5)	3 (2.0)	38.4**	9
2–3	112 (64.3)	25 (14.4)	24 (13.8)	13 (7.5)		
4–5	90 (58.1)	16 (10.3)	35 (22.6)	14 (9.0)		
≥ 6	47 (46.1)	12 (11.7)	27 (26.5)	16 (15.7)		
Mean \pm SD	5.0 \pm 1.6	5.8 \pm 2.0	5.6 \pm 1.6	6.5 \pm 2.2			$\chi^2$	df
Composite comorbidity-age score					30.8**	3
Predicted 10-year survival expectancy (years)	3.2 \pm 3.0	2.3 \pm 2.9	2.0 \pm 2.6	1.6 \pm 2.6	30.8**	3

Categorical variables: data expressed as number of cases (%) (*p*-value of Chi-square test comparing four groups).

Continuous variables: data expressed as mean \pm SD (*p*-value of Kruskal–Wallis test comparing four groups).

**p* < 0.05.

***p* < 0.001.

mean for COG-DEP participants: 1.6 years. Participants without cognitive impairment and depressive symptoms were on average healthier and had a higher life expectancy. Notably, as disparity in the sample is very important, the accuracy of those values should be viewed cautiously.

As shown in Table 3, elderly people with cancer were 3.7 times more likely to be *solely* COG than be without cognitive impairment and depressive symptoms (with cancer referring to any malignancy, including those that spread to the brain). Subjects *solely* DEP differed in terms of limitations and diseases, with the most common ailments concerning: visual limitation (OR 2.5, 95% CI 1.24–4.91), connective tissue (OR 3.6, 95% CI 1.78–7.11), peripheral vascular (OR 1.9, 95% CI 1.20–2.97) and ulcer (OR 1.9, 95% CI 1.20–3.06) diseases. Additionally, people limited visually (OR 3.9, 95% CI 1.72–8.78) and auditorily (OR 2.8, 95% CI 1.38–5.57) and those suffering from dementia (OR 16.3, 95% CI 1.45–186.66), cerebrovascular disease (OR 3.6, 95% CI 1.48–8.68), congestive heart failure

(OR 3.4, 95% CI 1.77–6.59) and diabetes (OR 2.6, 95% CI 1.30–5.18), were found to be significantly more likely to be COG-DEP.

Concerning functional disability, participants assessed with cognitive and/or depressive disorders in Table 3 were all dependent in instrumental (IADL) and basic (ADL) activities of daily living. Elderly people dependent in IADL were 4.4 times more likely to be *solely* COG, 2.2 times more likely to be *solely* DEP and 11.9 times more likely to be COG-DEP. Participants dependent in ADL were almost four times more likely to be COG-DEP rather than *solely* COG or DEP, which was significant at the $p = 0.001$ level.

Multivariate analysis

Many of the variables examined in Table 3 may be correlated with each other. Thus, the multinomial logistic regression analysis presented in Table 4 was used to control for confounding effects. After fitting the multinomial logistic regression, the apparent

Table 3 Cognitive impairment (COG), depressive symptoms (DEP) and both coexisting (COG-DEP), and risk estimates of sociodemographics, functional status and medical comorbidities

	COG ($n = 73$)	DEP ($n = 100$)	COG-DEP ($n = 46$)
	OR ^a (95% CI)	OR ^a (95% CI)	OR ^a (95% CI)
Age			
≥85 (vs. 65–74)	7.6 (3.67–15.59)**	1.2 (0.51–2.77)	13.6 (5.54–33.52)**
75–84 (vs. 65–74)	2.5 (1.41–4.57)*	1.1 (0.66–1.74)	4.4 (2.01–9.70)**
Sex (Female vs. male)	2.4 (1.40–4.06)*	3.3 (2.03–5.44)**	4.8 (2.25–10.25)**
Educational level			
≥Secondary (vs. no formal education)	0.7 (0.15–2.96)	0.2 (0.03–1.69)	0.5 (0.06–3.93)
Primary (vs. no formal education)	0.6 (0.25–1.34)	0.3 (0.11–0.72)*	0.3 (0.06–1.09)
IADL dependence	4.4 (2.50–7.85)**	2.2 (1.38–3.42)*	11.9 (4.59–30.78)**
ADL dependence	2.8 (1.78–4.54)**	2.7 (1.58–4.52)**	11.5 (5.59–23.69)**
Visual limitations	1.3 (0.49–3.19)	2.5 (1.24–4.91)*	3.9 (1.72–8.78)*
Hearing limitations	1.6 (0.86–3.12)	1.2 (0.65–2.23)	2.8 (1.38–5.57)*
Number of medication			
≥6 (vs. 0–1)	1.4 (0.64–3.13)	4.6 (2.20–9.45)**	12.6 (3.50–45.28)**
4–5 (vs. 0–1)	1.0 (0.48–2.01)	3.1 (1.56–6.08)*	5.8 (1.60–20.65)**
2–3 (vs. 0–1)	1.2 (0.65–2.36)	1.7 (0.84–3.45)	4.3 (1.19–15.49)**
Diseases assessed in the CCI			
Myocardial infarction	0.6 (0.28–1.48)	0.9 (0.47–1.74)	1.3 (0.56–2.89)
Congestive heart failure	1.2 (0.59–2.24)	0.9 (0.46–1.63)	3.4 (1.77–6.59)**
Peripheral vascular disease	1.7 (1.00–2.76)	1.9 (1.20–2.97)*	1.2 (0.63–2.14)
Cerebrovascular disease	2.1 (0.88–4.95)	1.9 (0.85–4.18)	3.6 (1.48–8.68)*
Dementia	26.4 (3.04–229.49)**	7.3 (0.66–81.64)	16.3 (1.45–183.66)*
Chronic pulmonary disease	1.0 (0.49–1.99)	1.1 (0.63–2.06)	1.3 (0.62–2.95)
Connective tissue disease	0.7 (0.42–1.22)	3.6 (1.78–7.11)**	1.9 (0.85–4.16)
Ulcer disease	0.6 (0.30–1.15)	1.9 (1.20–3.06)*	0.9 (0.46–1.93)
Liver disease mild	2.1 (0.85–5.36)	0.6 (0.18–2.17)	0.5 (0.06–3.45)
Diabetes	1.2 (0.59–2.31)	1.1 (0.66–2.08)	2.6 (1.30–5.18)*
Cancer	3.7 (1.14–12.03)*	0.5 (0.06–4.19)	1.1 (0.14–9.32)

IADL, Instrumental Activities of Daily Living; ADL, Basic Activities of Daily Living.

CCI, Charlson Comorbidity Index.

^aOR = crude odds ratio (CI = confidence interval).

*Significant correlations are indicated in bold $p < 0.05$.

** $p < 0.001$.

Table 4 Multinomial logistic regression model predicting the effect of functional limitation and survival expectancy, as a function of medical comorbidities, on cognitive impairment (COG), depressive symptoms (DEP), and both coexisting (COG-DEP), adjusting for sociodemographics

	COG (<i>n</i> = 73) OR ^a (95% CI)	DEP (<i>n</i> = 100) OR ^a (95% CI)	COG-DEP (<i>n</i> = 46) OR ^a (95% CI)
Age	1.1 (1.03–1.13)*	0.9 (0.89–0.98)*	1.0 (0.99–1.11)
Sex (Female vs. male)	2.7 (1.49–4.84)*	3.2 (1.87–5.43)**	4.3 (1.89–9.96)*
Education			
≥ Secondary (vs. no formal education)	1.3 (0.26–6.67)	0.5 (0.06–4.20)	2.1 (0.18–22.95)
Primary (vs. no formal education)	1.1 (0.45–2.75)	0.5 (0.17–1.23)	0.8 (0.16–3.75)
IADL dependence	3.4 (1.72–6.54)**	2.5 (1.46–4.31)*	6.7 (2.30–19.56)*
ADL dependence	1.2 (0.65–2.22)	1.9 (1.14–3.16)*	4.6 (2.07–10.20)**
10-year survival expectancy	2.7 (0.83–8.48)	0.3 (0.09–0.69)*	1.6 (0.33–7.78)

IADL, Instrumental Activities of Daily Living; ADL, Basic Activities of Daily Living.

Model reference category = no cognitive impairment and no depressive symptoms (NCOG-NDEP); model Chi-square test: 215.7; *df* 21; *p* < 0.001.

^aOR = adjusted odds ratio (CI = confidence interval).

*Significant correlations are indicated in bold *p* < 0.05.

***p* < 0.001.

association based on crude odds ratio for sex and cognitive and/or depressive disorders remained significant at *p* < 0.05. Age was no longer associated to COG-DEP, and it was marginally significant for *solely* COG and *solely* DEP. In this study, educational attainment was not associated to cognitive and/or psychological functioning when cognitive impairment was defined by a cut-off score based on age- and education-specific norms.

For the *solely* COG, limitations in instrumental functional autonomy remained significant in Table 4 at the *p* < 0.001 level when all possible confounders were controlled for simultaneously, whereas limitations in basic functional autonomy was no longer associated. All the correlates that were associated with DEP *alone* in the unadjusted analyses remained significant in the full-adjusted model. There was a significant decrease in 10-year survival expectancy (OR 0.3, 95% CI 0.09–0.65) for those DEP. Being a woman (OR 3.2, 95% CI 1.87–5.43), having limitations in IADL (OR 2.5, 95% CI 1.46–4.31) and ADL (OR 1.9, 95% CI 1.14–3.16) increased the risk of DEP *alone*. For elderly people, the independent effects of limitations in instrumental and basic functional autonomy persisted in their relation to COG-DEP after adjusting for the other correlates. Elderly women (OR 4.3, 95% CI 1.89–9.96) with limitations in IADL (OR 6.7, 95% CI 2.30–19.56) and ADL (OR 4.6, 95% CI 2.07–10.20) were more likely to experience COG-DEP.

Discussion

The rate for depressive symptoms among older adults is consistent but slightly higher than the average prevalence of depressed older adults in a worldwide

community-based study, yielding 13.5% (Beekman *et al.*, 1999). An explanation for the difference observed may be that the study did not use the same instruments for depressive assessments. In our case, depression was measured using a self-report rating scale and the results pertained to clinically relevant syndromes rather than depressive disorders as defined in the DSM-IV-TR classification (American Psychiatric Association, 2001). However, depressive syndromes not fulfilling rigorous diagnostic criteria are highly prevalent in older adults, while their consequences have been shown to be similar to those of major depressive illness (Wells *et al.*, 1989; Beekman *et al.*, 1997).

Depression is a common feature of cognitive impairment in older age (Forsell *et al.*, 2003; Gabryelewicz *et al.*, 2004). Our findings are consistent with these studies, suggesting that cognitive impairment and depressive symptoms coexist for 7.9% of the sample. Whether depressive symptoms are a reaction to cognitive deficits or constitute an early symptom of neurodegeneration is unclear. Some studies have suggested that depressive symptoms follow the onset of dementia (Chen *et al.*, 1999; Vinkers *et al.*, 2004). Conversely, research on the glucocorticoid cascade in the hippocampus have shown that older depressed adults with high or rising cortisol levels during 5 years have poorer memory and greater hippocampal atrophy (Lupien *et al.*, 1998). These findings have been supported by studies that show that cognitive function can improve when depressive symptoms are treated (Bulbena and Berrios, 1993), although some degree of cognitive impairment may remain even after recovery (Marcos *et al.*, 1994; Kessing, 1998). An alternative explanation was that the symptoms of cognitive

deterioration may partially overlap with the symptoms of depression, and the underlying neuropathological condition that causes cognitive impairment also causes depressive symptoms (Barnes *et al.*, 2006; Panza *et al.*, 2010). Due to the high prevalence of depression in cognitive decline and their common adverse consequences such as apathy, agitation and social withdrawal, screening for depression and cognitive impairment remains an important challenge for psychogeriatric medicine (Lyketsos *et al.*, 2000).

Solely COG, *solely* DEP or both simultaneously (COG-DEP) have been associated to certain socio-demographic characteristics. In contrast to other authors (Luck *et al.*, 2010; Morgado *et al.*, 2010) we did not find a clear relationship of cognitive function with age and low educational attainment, most likely because in our study cognitive impairment was based on both variables so that discrepancies on age and education were minimized (Crum *et al.*, 1993). Meanwhile, being a woman has been reported to be independent correlate of COG, DEP or COG-DEP and many authors agree on the fact that women in the general population suffer from more depressive symptoms than men (Kockler and Heun, 2002). It has been suggested that risk factors were rather associated to biological sex, as the impact of gender on psychological health was demonstrated not to vary across societies whether they were promoting an egalitarian culture between men and women or not (Zunzunegui *et al.*, 2007). As cognitive impairment and depression are closely related, differences in sex were also observed for the COG and the COG-DEP elderly people, although it could be argued that COG and COG-DEP may be better explained by the worse physical state observed in older women (Agüero-Torres *et al.*, 2002; Millán-Calenti *et al.*, 2010).

Previous studies on community-based samples have not reported on the correlates of co-occurrence of cognitive impairment and depressive symptoms. To address the problem, comorbidity illnesses were assessed for their differential association with COG, DEP and COG-DEP. Our study clearly demonstrated that certain comorbidities reported in the CCI were specific to COG, DEP and COG-DEP. Nonetheless it must be considered before interpreting these findings that this cross-sectional study is not appropriate for drawing causal inferences. While it is likely that physical and psychological changes related to chronic medical conditions can cause cognitive impairment and/or depressive symptoms, COG and/or DEP may also worsen chronic medical conditions due to poor self-care. Despite the strength of this study, including large number of subjects, valid measurement instru-

ments and adjustment for multiple potential confounders, some limitations should nevertheless be pointed out. It cannot be excluded that the measurement of depressive symptoms could be confounded with the measurement of disability, with depressed elderly giving unrealistically pessimistic appraisals of their disabilities (Kempen *et al.*, 1996). Additionally, chronic medical conditions were established using patients' reports, but Kriegsman *et al.* (1996) demonstrated that deviations in cognitive function and depressive symptomatology had no influence on the level of accuracy.

Primarily, our results showed that cancer was more prevalent in participants COG. This could be an indirect effect of health and psychological factors increasing vulnerability to cognitive dysfunction, as it is the case after chemotherapy for breast cancer (Vearncombe *et al.*, 2009). Cognitive dysfunction is also a common occurrence among patients with small-cell lung cancer, although prophylactic cranial irradiation has been described as one explanation for these cognitive deficits (Meyers *et al.*, 1995). Poor cognitive performance was also highly prevalent in patients with heart disease, stroke and diabetes (Breteler *et al.*, 1994; Ferrucci *et al.*, 1996; Strachan *et al.*, 1997) and was not reported in our study of *solely* COG participants. Secondarily, some evidence suggests an association between DEP and connective tissue disease, visual limitation, ulcers and peripheral vascular disease. Studies show that patients with arthritis, visual limitation or gastrointestinal diseases often score highly on measures of depression (Jess and Eldrup, 1994; Ormel *et al.*, 1997; Papadopoulos *et al.*, 2005). The limited available data suggest that depression may precede the development of ulcers. Participants with peripheral vascular diseases seemed to experience more depressive symptoms than reported by other researchers, who rather stressed the importance of heart conditions and diabetes (Ormel *et al.*, 1997; Charlson and Peterson, 2002). Thirdly, chronic medical conditions varied in the extent they were associated with COG-DEP. In this study, COG-DEP was experienced by patients with vision impairment, cerebrovascular disease, congestive heart failure, hearing impairment and diabetes. As previously described (Reuben *et al.*, 1999), sensory impairment in the elderly was independently associated with IADL restriction in household maintenance activities, but not with cognitive performances. The chronic medical conditions cited above are commonly associated with depression *alone* or cognitive impairment *alone* rather than co-occurrence of both. The present results on COG, DEP and COG-DEP show the particular

relevance of certain CCI conditions to those three distinct groups.

Elderly people with COG and/or DEP were shown to have significantly larger numbers of comorbidity conditions and to be polymedicated (6 drugs or more). This was more evident for DEP people for whom poorer outcomes remained significantly associated even after adjustment for socio-demographics and functional status. In the study by Penninx *et al.* (1999), depressive symptoms and comorbidity also predicted higher long-term mortality when controlling for comorbidity and physical function. Ultimately, patients with increased comorbidity were also shown to be at higher risk for functional deterioration in basic and instrumental activities of daily living, impairing their quality of life. Significant new research is needed to determine whether among patients with the greatest comorbidity and functional limitations, by preventing or treating new cognitive decline and/or depressive symptoms, morbidity and mortality also can be reduced. Additionally, if chronic medical conditions are interpreted as a risk for COG and/or DEP, they might help understanding the pathophysiology of depression and cognitively impairment. Inversely, if comorbidities are regarded as a consequence of cognitive impairment and/or depressive symptoms, their presence could help the clinician in solidifying the diagnosis of COG and DEP.

Conclusions

Our findings suggest that elderly people with COG, DEP and COG-DEP should be carefully screened for associated chronic medical conditions, and *vice versa*. However, controlled trials are necessary to assess the impact this may have on service utilization. Additionally, if comorbidity is not adequately measured in COG and/or DEP elderly people, there is an important potential for confounding. Studies must be designed with appropriate methodology to measure the independent impact of comorbidity disease on outcomes. Another potential direction for research is exploring medical illness in subtypes of depression and cognitive impairment.

Conflict of interest

None declared.

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Key Points

- The co-occurrence of cognitive impairment and depressive symptoms (COG-DEP) was explained by IADL and ADL dependence, cerebrovascular disease, congestive heart failure and diabetes, but it was best predicted by functional limitations in the adjusted model.
- Being functionally dependent and medically ill with shorter life expectancy was shown to significantly increase the odds of being DEP.
- Functional limitation in IADL was without distinction associated to COG, DEP or both (COG-DEP).

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**INFLUENCE OF SOCIAL SUPPORT ON OLDER
ADULTS WITH COGNITIVE IMPAIRMENT,
DEPRESSIVE SYMPTOMS, OR BOTH COEXISTING***

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2. Influencia del apoyo social en personas mayores con deterioro cognitivo, síntomas depresivos y con la presencia de ambos

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Resumen

El apoyo social es un predictor importante de la salud mental de las personas mayores, afectando tanto al funcionamiento cognitivo como al estado emocional. El objetivo de este estudio fue evaluar la influencia de los diferentes componentes del apoyo social (el grado de contacto con otros, la satisfacción con los contactos, y la disponibilidad de ayuda en caso de necesitarla) en las personas mayores con deterioro cognitivo, con síntomas depresivos, y con la presencia de ambos.

Tener un escaso contacto con otros se relacionó con la presencia de deterioro cognitivo (OR: 2,26). Una satisfacción media con los contactos se relacionó con la presencia de síntomas depresivos (OR: 2,88) y con la coexistencia de ambos (OR: 4,22). Sentirse insatisfecho con los contactos fue un predictor importante de la presencia de síntomas depresivos (OR: 7,99) y de la coexistencia de deterioro cognitivo y síntomas depresivos (OR: 7,88). La disponibilidad de ayuda en caso de necesitarla no fue un predictor significativo en ninguno de los tres grupos de sujetos.

En base a estos resultados podemos decir que los diferentes componentes del apoyo social se relacionan con la salud mental de manera independiente. Los aspectos cuantitativos del apoyo social se asocian con la presencia de deterioro cognitivo, mientras que la satisfacción con el apoyo social afecta a la sintomatología depresiva y a la coexistencia de deterioro cognitivo y síntomas depresivos. Por lo tanto, para garantizar una salud mental adecuada en las personas mayores es necesario que cuenten con una extensa red social y que se sientan satisfechos con el apoyo social recibido.

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ABSTRACT

The influence of social support dimensions (the extent of contact with others, the satisfaction with contacts, and the availability of help if sick or disabled) in elderly people with cognitive impairment (COG), depressive symptoms (DEP), or the co-occurrence of these symptoms (COG-DEP) was assessed in a cross-sectional analysis of a representative sample of 579 individuals aged 65 years and older. A lower extent of contact was related to COG (*OR*: 2.26). Fair satisfaction with contacts was related to DEP (*OR*: 2.88) and COG-DEP (*OR*: 4.22). A low level of satisfaction with contacts was an important predictor for DEP (*OR*: 7.99) and COG-DEP (*OR*: 7.88). Therefore, different dimensions of social support were independently correlated with different aspects of mental health. Quantitative aspects of social support were significantly linked to the presence of cognitive impairment. Satisfaction with social support affected depressive symptoms both alone and when they co-occurred with cognitive impairment.

*Millán-Calenti designed the study, interpreted the data, and critically reviewed the final version of the manuscript. Sánchez undertook the statistical analysis in close collaboration with Cao. Sánchez and Maseda wrote the first draft of the manuscript. Lorenzo-López and Maseda managed the literature searches. All coauthors contributed to and approved the final version of the manuscript.

Social support is a significant predictor of mental health in the elderly, affecting cognitive functioning (Holtzman, Rebok, Saczynski, Kouzis, Wilcox-Doyle, & Eaton, 2004; Seeman, Albert, Lusignolo, & Berkman, 2001; Yeh & Liu, 2003) and emotional status (Brummett, Barefoot, Siegler, & Steffens, 2000; Lee & Shinkai, 2005; Leung, Chen, Lue, & Hsu, 2007; Mechakra-Tahiri, Zunzunegui, Prévillé, & Dubé, 2009; Prince, Harwood, Blizard, Thomas, & Mann, 1997; Zunzunegui, Béland, & Otero, 2001).

Social support is a multidimensional construct that includes quantitative (e.g., social network size and frequency of support behavior) and qualitative (e.g., satisfaction with contacts and perception that support will be provided if needed) aspects. In this sense, greater social resources have been associated with reduced cognitive decline in old age (Barnes, Mendes de Leon, Wilson, Bienias, & Evans, 2004; Green, Rebok, & Lyketsos, 2008), and interaction in larger networks has been positively related to the maintenance of global cognitive function for approximately 12 years (Holtzman et al., 2004). A relationship between perceived positive social support (Krueger, Wilson, Kamenetski, Barnes, Bienias, & Bennett, 2009; Yeh & Liu, 2003) or satisfaction with support (Hughes, Andel, Small, Borenstein, & Mortimer, 2008) and higher cognitive function has also been observed among the elderly.

Moreover, previous studies have reported the importance of the quantitative (Chan, Malhotra, Malhotra, & Østbye, 2011; Chiao, Weng, & Botticello, 2011) and qualitative (Bisschop, Kriegsman, Beekman, & Deeg, 2004; Chi & Chou, 2001; Cornman, Goldman, Gleib, Weinstein, & Chang, 2003) aspects of social support in predicting depressive symptomatology in older adults. Nevertheless, qualitative aspects of the supporting relationship, including satisfaction with the support received, have been identified as important in preventing depression among elderly individuals than quantitative support (Chao, 2011; Chi & Chou, 2001).

In the elderly population, cognitive impairment and depressive disturbances are frequently associated with each other (Gabryelewicz, Styczynska, Pfeffer, Wasiak, Barczak, Luczywek, et al., 2004; Steffens & Potter, 2008). However, few studies in the literature have attempted to determine the risk factors that predict the occurrence of both diseases. Recently, the co-occurrence of cognitive impairment and depressive symptoms was explained by functional dependence and the presence of chronic diseases, such as cerebrovascular disease, congestive heart failure, and diabetes (Millán-Calenti, Maseda, Rochette, Valquez, Sanchez, & Lorenzo, 2011). With regard to social variables, dissatisfaction with social support increased the risk of co-occurrence of depressive symptomatology and cognitive impairment (Fuhrer, Antonucci, & Dartigues, 1992); however, to the best of our knowledge, little is known about the effect of other components of social support.

The aim of this study was to examine the influence of several social support dimensions (the extent of contact with others, the satisfaction with contacts, and the availability of help if sick or disabled) on the presence of cognitive

impairment alone (COG), depressive symptoms alone (DEP), and the co-occurrence of both sets of symptoms (COG-DEP) in elderly individuals.

METHOD

Selection and Description of Participants

The current cross-sectional study included a representative sample of 600 community-dwelling residents of Narón Council (A Coruña, Spain), aged 65 years and older. Participants were selected from the Municipal Register using a random number table and were grouped by 5-year age intervals and by gender based on the council census (Table 1). The Municipal Register saves and exploits the information of the administrative recordings grouping to ensure the confidentiality and privacy of individuals, and includes information for the entire population (not only those aged 65 years and older).

The confidence level was 95%, the sampling error was $\pm 4\%$, and the estimate for missing data was 10%. The mean age was 75.1 ± 7.5 years (75.9 ± 8.0 years for females (57.2%) and 73.9 ± 6.7 years for males). In Table 2, characteristics of the sample according to cognitive state and depressive symptoms are reported. As shown in Table 2, 12.6% of participants were cognitively impaired, 17.3% of participants had depressive symptoms, and 7.9% of participants suffered the co-occurrence of both depressive symptoms and cognitive impairment.

Measures

The Spanish version (Grau, Eiroa, & Cayuela, 1996) of the standardized Older Americans Resources and Services (OARS) Social Resources Scale (Fillenbaum, 1988) was used to rate the adequacy of social support. The cross-cultural adaptation process of the instrument made by Grau et al. (1996) did not modify the questionnaire or its internal validity. Nevertheless, the Spanish adaptation

Table 1. Distribution (Number of Participants in Each Category Group) of the Population and the Study Sample in Narón (INE, 2000) by Age and Gender

	Population		Sample	
	Males	Females	Males	Females
	2,339	3,118	256	342
65-69 years	916	957	84	88
70-74 years	653	779	73	83
75-79 years	415	586	51	67
80-84 years	209	400	27	48
85 years and over	146	396	21	56

Table 2. Characteristics of Elderly Subjects with Cognitive Impairment Alone (COG), Depressive Symptoms Alone (DEP), and Both Sets of Symptoms (COG-DEP), or No Cognitive Impairment or Depressive Symptoms (NCOG-NDEP)

	COG N = 73 (12.6%)	DEP N = 100 (17.3%)	COG-DEP N = 46 (7.9%)	NCOG-NDEP N = 360 (62.2%)
Age	M (SD) 79.2 (9.0)	M (SD) 73.9 (6.2)	M (SD) 80.8 (8.3)	M (SD) 73.5 (6.4)
	N (%)	N (%)	N (%)	N (%)
Sex				
Men	24 (32.9)	26 (26.0)	9 (19.6)	194 (53.9)
Women	49 (67.1)	74 (74.0)	37 (80.4)	166 (46.1)
Educational level				
No formal education	63 (87.5)	94 (94.0)	41 (93.2)	289 (80.7)
Primary	7 (9.7)	5 (5.0)	2 (4.5)	55 (15.4)
≥ Secondary	2 (2.8)	1 (1.0)	1 (2.3)	14 (3.9)
IADL dependence				
Absent	18 (24.7)	40 (40.0)	5 (10.9)	213 (59.2)
Present	55 (75.3)	60 (60.0)	41 (89.1)	147 (40.8)
ADL dependence				
Absent	42 (57.5)	56 (56.0)	11 (23.9)	282 (78.3)
Present	31 (42.5)	44 (44.0)	35 (76.1)	78 (21.7)
Chronic diseases (CCI)				
< 2	24 (32.9)	15 (15.0)	12 (26.1)	120 (33.3)
≥ 2	49 (67.1)	85 (85.0)	34 (73.9)	240 (66.7)

Note: M, Sample mean; SD, Standard deviation; IADL, Instrumental Activities of Daily Living; ADL, Basic Activities of Daily Living; CCI, Charlson Comorbidity Index.

showed that items included in the social network dimension measured characteristics that were not strongly related to each other, because the items represented quite different aspects of the definition of a social network. Thus, the construct heterogeneity of the social network variable is high, but there are few items that can be used to measure it. The scale's homogeneity would improve with the addition of more items.

This scale consists of seven items, and raw scores are coded on a scale based on the following six categories: (a) excellent, (b) good, (c) mild impairment, (d) moderate impairment, (e) severe impairment, and (f) total impairment. This scale comprises three psychometrically identified subscales that can be used separately, providing a new approach for the examination of specific aspects of social resources. Based on the work of Fillenbaum (1988), we utilized a regression-based equation (entering the values for the relevant items and then weighting them in a regression equation), which is likely to be more consistent (reliable) than the manual assignment of scores. The information from all three scales can be combined into a 6-point summary measure. These three validated social resources subscales (Fillenbaum, 1988), derived from the 7-item SOC, include the extent of contact with others ("Number of people known well enough to visit," "Times talking with someone on telephone per week," "Times visiting with someone per week"), the satisfaction with contacts ("Have someone you trust," "Frequency of feelings of loneliness," "Satisfaction with contact with loved ones"), and the availability of help when needed ("Have someone who would help you if sick or disabled"). The raw scores of these subscales were calculated by summing responses to the questions related to each dimension and then transformed into the following categories: from 1 (few) to 3 (extensive) for the extent of contact with others, from 1 (unsatisfactory) to 3 (very satisfactory) for the satisfaction with contacts, and from 0 (none) to 3 (long term) for the availability of help.

Cognitive status was assessed using the Mini-Mental State Examination (MMSE) (Folstein, Folstein, & McHugh, 1975), which is widely used in the Spanish population. Cognitive impairment was defined according to Crum's median cut-off scores, accounting for age and educational level (Crum, Anthony, Bassett, & Folstein, 1993). Applying the age or level of education distribution, rather than using the cut-off point of 23/24, minimizes the differences found when comparing the results from the 30-point Folstein's Mini-Mental State Examination with the results from its validated and slightly modified Spanish translation, the 35-point Lobo's Mini-Examen Cognoscitivo (MEC; Lobo, Ezquerra, Gómez Burgada, Sala, & Seva Diaz, 1979). In particular, accounting for age and the level of education avoided the possibility of obtaining "false positives" in subjects with a low educational level or aged 80 years or older (Vinyoles Bargalló et al., 2002).

Nine subjects with a minimal level of consciousness were excluded from the random sample because they could not be assessed by the MMSE.

The Geriatric Depression Scale-Short Form (GDS-SF; Sheikh & Yesavage, 1986) was used to assess depressive symptoms. It was scored to yield a continuous scale from 0 to 15, with 6 or higher indicating probable clinical depression (Herrmann, Mittman, Silver, Shulman, Busto, Shear, et al., 1996). Due to data losses, 12 additional individuals were excluded from the study, thus, the final analysis sample was 579.

A number of confounders were selected to examine the relationships between social support and mental health. Demographic variables (age, gender, and educational level) were assessed using the OARS (Duke University, 1978). Functional status was measured using the basic activities of daily living (ADL; Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963) and the instrumental activities of daily living (IADL; Lawton & Brody, 1969) scores. Based on these scores, individuals who were unable to perform any of the activities were considered as functionally incapacitated for that activity (ADL- or IADL-dependent). One important issue to take into account is that gender factors strongly influence responses to the IADL measure in the Spanish population. To avoid this confound, we took into consideration the latent ability to perform a task, to correct for the possibility that gender could account for a functional disability. Thus, the items were phrased as “Can you . . . ?” rather than “Do you . . . ?” Therefore, the current study employed the latent-ability or “could do” approach in IADL use, which has the advantage of addressing environmental barriers and other contextual factors that may inhibit performance.

Medical histories were collected by a physician or a trained nurse in charge of the participant during the research. Participants’ reports were provided by the patients or their relatives according to medical records. General comorbidity and number of comorbid diseases were registered using the Charlson comorbidity index (CCI; Charlson, Pompei, Ales, & MacKenzie, 1987), and the health conditions of interest were included in the CCI.

Procedure

Participants were individually assessed in a health center or at home in the case of people with mobility difficulties. A medical doctor (practitioner) and/or a trained nurse with extensive experience conducted the clinical evaluation. The doctor was in charge of some of the patients during the research and also contacted additional practitioners to follow the medical history of the other subjects to provide comprehensive ongoing knowledge of each patient’s status. Subjects without medical records from their respective practitioner were interviewed by the research doctor to establish their medical history. The participants’ overall personal functional status and service use were assessed with a questionnaire based on the standardized Older Americans Resources and Services Multidimensional Functional Assessment Questionnaire by an occupational therapist. The Mini-Mental State Examination and the Geriatric Depression Scale-Short Form

were administered by a qualified clinical psychologist with extensive experience in cognitive assessment.

Prior to the data collection, all participants were informed about the study and signed the corresponding informed consent form. The study protocol was approved by the Ethics Committee at the University of A Coruña and conformed to the principles embodied in the Declaration of Helsinki.

Statistical Analysis

Characteristics of the sample were summarized in terms of frequency and percentage for the categorical variables, and ordinal and continuous variables were summarized as the mean \pm *SD*.

A multinomial logistic regression analysis was used to determine how the different components of social support affect cognitive impairment, depressive symptoms, and the co-occurrence of both sets of symptoms, while also controlling for age, gender, level of education, functional status, and comorbidity.

Odds ratios (OR) and 95% confidence intervals (CI) were calculated for each covariate included in the model. Statistical significance was set at a *p* value of less than 0.05. Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 16.0.1 (SPSS Inc, 2007).

RESULTS

Scores on the social resources scale are presented in Table 3 as a function of the participants' cognitive state and depressive symptoms.

As shown in the Table 3, 12.7% of the cognitively impaired (COG) participants reported an excellent level of social resources, in contrast with 53.5%, who reported a good level and 28.2%, who reported a mild impairment level. More than half of the participants (56.3%) reported their extent of contact with others as limited. In terms of satisfaction, 45.8% of the COG participants were fairly satisfied with their contacts, and 52.8% were very satisfied. Of this sample, 91.6% of the participants in this group reported the long-term availability of someone who could provide help if they were sick or disabled.

In the group with depressive symptoms alone (DEP), social resources were considered excellent (11.0%), good (38.0%), or mildly impaired (42.0%). Of this group, 41.0% reported their contact with others as extensive, and 44.0% reported having little contact with others. With regard to satisfaction with contacts, 22.0% of DEP participants were unsatisfied, and 57.0% were fairly satisfied. Of these participants, 90.0% reported the long-term availability of someone who could provide help if the were sick or disabled.

Finally, in the DEP-COG group with the co-occurrence of depressive symptoms and cognitive impairment, 32.6% of the participants reported good social resources, and 58.7% of the participants reported mildly impaired social

Table 3. Social Resources of Elderly Subjects with Cognitive Impairment Alone (COG), Depressive Symptoms Alone (DEP), co-occurrence of Both Sets of Symptoms (COG-DEP), or No Cognitive Impairment or Depressive Symptoms (NCOG-NDEP)

	COG N = 73 (12.6%) N (%)	DEP N = 100 (17.3%) N (%)	COG-DEP N = 46 (7.9%) N (%)	NCOG-NDEP N = 360 (62.2%) N (%)
Social resources (SOC)				
Excellent	9 (12.7)	11 (11.0)	1 (2.2)	110 (30.7)
Good	38 (53.5)	38 (38.0)	15 (32.6)	166 (46.4)
Mild impairment	20 (28.2)	42 (42.0)	27 (58.6)	59 (16.5)
Moderate impairment	—	2 (2.0)	1 (2.2)	10 (2.8)
Severe impairment	2 (2.8)	2 (2.0)	1 (2.2)	10 (2.8)
Total impairment	2 (2.8)	5 (5.0)	1 (2.2)	3 (0.8)
Extent of contact with others				
Few	40 (56.3)	44 (44.0)	26 (56.5)	97 (27.0)
Adequate	12 (16.9)	15 (15.0)	11 (23.9)	67 (18.7)
Extensive	19 (26.8)	41 (41.0)	9 (19.6)	195 (54.3)
Satisfaction with contacts				
Unsatisfactory	1 (1.4)	22 (22.0)	9 (19.6)	15 (4.2)
Fairly satisfactory	33 (45.8)	57 (57.0)	31 (67.4)	146 (40.6)
Very satisfactory	38 (52.8)	21 (21.0)	6 (13.0)	199 (55.2)
Availability of help if sick or disabled				
None	4 (5.6)	6 (6.0)	2 (4.3)	12 (3.3)
Occasional	—	2 (2.0)	—	10 (2.8)
Short term	2 (2.8)	2 (2.0)	2 (4.3)	3 (0.8)
Long term	66 (91.6)	90 (90.0)	42 (91.4)	334 (93.1)

Note: SOC, Social Resources Scale.

resources. Of this group, 56.6% reported their extent of contact with others as limited, and 67.4% were fairly satisfied with their level of contact. In addition, 91.3% of the DEP-COG participants reported the long-term availability of someone who could provide help if they were sick or disabled.

Potential covariates likely to influence outcomes were first tested in bivariate models and then included in a multivariate model when significant. Table 4 displays the results of the multinomial logistic regression to model the effect of the three social support dimensions on the COG, DEP, and COG-DEP groups after adjusting for sociodemographic variables, functional status, and medical comorbidity.

As shown, the participants who reported that their extent of contact with others was limited were more likely (*OR*: 2.26, 95% CI: 1.17-4.38) to suffer COG. Fair satisfaction with contacts was significantly related to DEP (*OR*: 2.88, 95% CI: 1.64-5.05) and COG-DEP (*OR*: 4.22, 95% CI: 1.61-11.04). In addition, a low satisfaction with contacts was a significant predictor of DEP (*OR*: 7.99, 95% CI: 3.66-17.47) and COG-DEP (*OR*: 7.88, 95% CI: 2.30-26.97). In contrast, a low satisfaction with contacts was inversely related to COG (*OR*: 0.07, 95% CI: 0.01-0.58). The availability of someone who could provide help if the participant was sick or disabled was not linked to changes for any of the study groups.

DISCUSSION

The results from this randomly selected representative sample support the importance of social support for the mental health of elderly individuals.

With regard to the first dimension of social support, the extent of contact with others, the findings provide evidence that a person with limited contact with others is more likely to develop cognitive impairment. In contrast, no significant association was found between the extent of contact and the presence of depressive symptoms or the co-occurrence of cognitive impairment and depressive symptoms.

In the existing literature, there is a discrepancy about the relationship between the quantitative aspects of social support and cognitive functioning. Several studies suggested that maintaining many social connections and activities may help to prevent or postpone cognitive deterioration in old age (Bassuk, Glass, & Berkman, 1999; Crooks, Lubben, Petitti, Little, & Chiu, 2008; Fratiglioni, Wang, Ericsson, Maytan, & Winblad, 2000; Zunzunegui, Alvarado, Del Ser, & Otero, 2003). In contrast, other authors found that none of the social network measures were related to cognitive impairment (Glei, Landau, Goldman, Chuang, Rodriguez, & Weinstein, 2005; Krueger et al., 2009). Discrepancies between these results may be due to study differences based on the definition and assessment of social networks.

Several hypotheses have been proposed to explain the relationship between social networks and cognitive functioning. The cognitive reserve hypothesis suggests that aspects of life experiences, such as engagement in social leisure

Table 4. Multinomial Logistic Regression Model Predicting the Effect of Social Resources on Cognitive Impairment Alone (COG), Depressive Symptoms Alone (DEP), and Co-Occurrence of Both Sets of Symptoms (COG-DEP), Adjusting for Sociodemographics (Age, Gender, and Level of Education), Functional Status (ADL and IADL) and Medical Comorbidities (Number of Health Conditions)

	COG (N = 73)		DEP (N = 100)		COG-DEP (N = 46)	
	<i>b</i>	OR (95% CI)	<i>b</i>	OR (95% CI)	<i>b</i>	OR (95% CI)
Extent of contact						
Adequate (vs. extensive)	0.309	1.36 (0.61-3.04)	-0.053	0.95 (0.47-1.91)	0.886	2.42 (0.88-6.65)
Few (vs. extensive)	0.816	2.26 (1.17-4.38)*	0.301	1.35 (0.78-2.34)	0.486	1.63 (0.67-3.94)
Satisfaction with contacts						
Fairly satisfactory (vs. very satisfactory)	-0.517	0.60 (0.34-1.05)	1.057	2.88 (1.64-5.05)**	1.440	4.22 (1.61-11.04)*
Unsatisfactory (vs. very satisfactory)	-2.605	0.07 (0.01-0.58)*	2.079	7.99 (3.66-17.47)**	2.064	7.88 (2.30-26.97)*
Availability of help						
Occasional/short term (vs. long term)	-0.021	0.98 (0.21-4.57)	0.240	1.27 (0.38-4.21)	0.806	2.24 (0.42-11.80)
None (vs. long term)	-0.041	0.96 (0.25-3.68)	0.261	1.30 (0.45-3.78)	-0.114	0.89 (0.14-5.72)

Note: ADL, Basic Activities of Daily Living; IADL, Instrumental Activities of Daily Living; *b*, Estimated multinomial logistic regression coefficients for the model; OR, crude odds ratio; CI, confidence interval.

* $p < .05$, ** $p < .001$.

activities, may supply cognitive reserves, resulting in a slower cognitive decline in healthy elderly individuals (Scarmeas & Stern, 2003). Social networks, as positive social relationships with friends and relatives, might produce continued mental stimulation and better cognitive strategies or increase neural growth and synaptic density, thus delaying cognitive impairment (Zunzunegui et al., 2003). Furthermore, social networks may facilitate access to health care and healthy behaviors, thereby indirectly reducing or forestalling brain pathology and other conditions that affect cognition (Crooks et al., 2008).

Another hypothesis includes a contrary relationship between social networks and cognitive function. People with a better neural structure (i.e., more resistant to late damage and cognitive decline) may be better able to acquire and maintain social abilities and contacts (Zunzunegui et al., 2003). Furthermore, individuals with more frequent contacts with others have more opportunities for engagement with others, which may protect against cognitive decline through effects on positive emotional and cognitive states such as self-esteem, social competence, and adequate mood (Berger, Fratiglioni, Forsell, Winblad, & Backman, 1999; Devanand, Sano, Tang, Taylor, Gurland, Wilder, et al., 1996).

With regard to the second dimension of social support, satisfaction with contacts, the data suggest a significant relationship between low or fair satisfaction with contacts and the risk for depressive symptoms alone and the co-occurrence of depressive symptoms and cognitive impairment. This relation is consistent with previous findings (Fuhrer et al., 1992) that indicate that lack of satisfaction with social support increased the risk of depressive symptoms alone and the co-occurrence of depressive symptoms and cognitive impairment. Other studies confirmed the influence of subjective measures of social support, including satisfaction with social support (Chi & Chou, 2001; Cornman et al., 2003) and feelings of loneliness (Bisschop et al., 2004), on depressive symptoms in elderly individuals. Support of the elderly in Spain increases physical and mental health practices, reduces stress through emotional support, and facilitates more efficient caregiving (Zunzunegui et al., 2001).

The results of the current study suggest that the qualitative aspects of social support are more related to depressive symptoms than are the quantitative aspects such as social network size. However, these findings should be cautiously considered due to wide confidence intervals in some data, which may be due to the diversity of individual needs in terms of social contact. Extent of contact with others may not be an adequate predictor of emotional status because the number or frequency of social relationships required by each person may be influenced by personality and/or contextual variables. These data were obtained using the original 15-item Geriatric Depression Scale, and a cut-off point of 6 or higher was considered. Following the collection of the current data, in 2002, Martínez, Onís, Dueñas, Aguado, Albert, and Luque (2002) adapted and validated the abbreviated version of the Geriatric Depression Scale to the Spanish language and found a higher sensibility (81.1%) and specificity (76.7%) for a cut-off point

of 5 or more. Thus, the present data may underestimate the number of people with depressive symptomatology, suggesting that social support may have a stronger effect on depressive symptomatology than indicated in the current study.

Recent studies found that quantitative aspects also significantly affected depressive symptomatology among older adults (Chan et al., 2011; Chiao et al., 2011). Moreover, Litwin (2011) reported that the structure of the network seems to matter more than the perceived quality of the ties as an indicator of depressive symptoms.

The last dimension of the assessed social support, the availability of someone who could provide help if the elderly individual was sick or disabled, was unrelated to the three study groups (i.e., not linked to either cognitive impairment or depressive symptoms). In contrast, previous research (Koizumi, Awata, Kuriyama, Ohmori, Hozawa, Seki, et al., 2005) showed a higher risk of depression with the lack of social support (having someone who can take care of you when you are ill in bed). The lack of significant results in the present study may be due to the high percentage of participants reporting the long-term availability of someone to provide help if sick or disabled and the low percentage of subjects reporting the unavailability of help.

This investigation provides interesting and practical approaches. First, mental health assessment should include both quantitative and qualitative aspects of social support. Moreover, both aspects should be considered in all socio-sanitary policies that promote social support in the elderly population with the aim of health promotion. This social support should consider the importance of the extent and frequency of social networks and the subjective satisfaction with such support.

Although the results of the study are interesting, this research is based on cross-sectional data, and longitudinal data are needed to further understand the causal and temporal relations between the studied variables. Therefore, future longitudinal research is required to make causal inferences between the various components of social support and mental health in older adults.

In conclusion, the results demonstrate how various dimensions of social support affect the mental health of elderly adults. These findings demonstrate that a limited amount of contact with others is related to the development of cognitive impairment, whereas the lack of satisfaction with social support is linked to changes in depressive symptoms and the co-occurrence of cognitive impairment and depressive symptoms. Therefore, an extensive social network and a feeling of satisfaction with the received social support received appear to be critical aspects for ensuring adequate mental health in older adults.

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ORIGINAL ARTICLE: EPIDEMIOLOGY,
CLINICAL PRACTICE AND HEALTH

Depressive symptoms and other factors associated with poor self-rated health in the elderly: Gender differences

José C Millán-Calenti, Alba Sánchez, Trinidad Lorenzo and Ana Maseda

3. Síntomas depresivos y otros factores asociados con la mala salud percibida en las personas mayores: diferencias de género

Geriatr Gerontol Int. 2012; 12: 198-206.

Resumen

La salud percibida es un buen indicador del bienestar y de la calidad de vida en las personas mayores, encontrándose que tener una mala percepción de la salud se relaciona con un mayor riesgo de morbi-mortalidad independientemente de las condiciones objetivas de salud. El principal objetivo de nuestro estudio fue identificar los determinantes de la mala salud percibida en las personas mayores, partiendo de la hipótesis de que la mala salud percibida se asocia no solo con factores relacionados con la salud física, psicológica y funcional, sino también con factores sociodemográficos y sociales.

Se evaluó la salud percibida de los participantes y las respuestas se dicotomizaron en dos valores: buena salud percibida (excelente y buena) y mala salud percibida (regular y mala). El 43,9% de los participantes percibían su salud como mala. La presencia de síntomas depresivos fue el factor más fuertemente relacionado con mala

salud percibida tanto en el total de la población (OR: 5,06), como cuando se dividió la muestra en función del género (mujeres, OR: 4,70, y hombres, OR: 5,19). La necesidad de un cuidador las 24 horas del día fue el segundo factor más importante tanto en el total de la población (OR: 3,67) como en las mujeres (OR: 3,53). Tener una enfermedad del tejido conectivo fue el segundo factor más importante en los hombres (OR: 2,07).

A partir de estos resultados podemos confirmar que la salud percibida es un constructo multidimensional que incluye variables físicas, psicológicas, funcionales y sociales. Reconocer e intervenir sobre los diferentes factores implicados, especialmente sobre la sintomatología depresiva, podría contribuir a mejorar la salud percibida y por tanto el estado de bienestar de este grupo poblacional.

ORIGINAL ARTICLE: EPIDEMIOLOGY,
CLINICAL PRACTICE AND HEALTH

Depressive symptoms and other factors associated with poor self-rated health in the elderly: Gender differences

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Aim: The main objective of this study was to identify determinants of poor self-rated health. We hypothesized that poor self-rated health reflects not only health, but also physical, functional, psychological and social factors.

Methods: We conducted a cross-sectional analysis of a representative Spanish population sample of 600 subjects aged 65 years and older. Self-rated health status was measured and dichotomized into good (excellent and good) and poor (fair and poor). Univariate and multiple logistic regression analyses were used to determine these independent variables modifying poor self-rated health.

Results: Of the participants, 43.9% perceived their health as poor. Depressive symptoms were a factor that showed the strongest relation to poor self-rated health (odds ratio [OR] 5.06), even when distributed by sex (women, OR 4.70 and men, OR 5.19), followed by the need for caregiver support 24 h a day in both the total population (OR 3.67) and women (OR 3.53), but having a connective tissue disease was the second strongest factor in men (OR 2.07). When depressive symptoms and the need for caregiver support were present, the likelihood for poor self-rated health was 91.5% in the total population and 94.4% in women. In men, the likelihood reached 78.4% in the presence of depressive symptoms and connective tissue disease.

Conclusions: Self-rated health is a multidimensional construct, which includes physical, psychological, functional and social variables. To recognize and intervene on the different factors involved, especially depressive symptoms, caregiver support and connective tissue disease, may contribute to improving self-rated health and ultimately the welfare for this group. *Geriatr Gerontol Int* 2012; 12: 198–206.

Keywords: aged, caregiver support, depressive symptoms, risk factors, self-assessed health.

Introduction

Self-rated health (SRH) is a widely used general health indicator, which refers to the subject's own health

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perception.^{1–4} Normally, it is assessed by a questionnaire with which people have to rate their present health status on a four- or five-point scale from excellent to poor.

Based on the questionnaire results, SRH has become a key measure of welfare and quality of life for elderly people, confirming that clinical measures are less powerful predictors than self-reports about diverse aspects of well-being.⁵

Several studies have proved that when a person has SRH below good (fair or poor), the risk of morbidity and

mortality increases,^{1,6-8} particularly in the elderly, and it becomes a good predictor for mortality independent of the objective health conditions.^{3,4,9,10} Poor SRH has also been associated with the lack of long-term functional ability,^{7,11} and a high demand for sanitary services.¹

SRH has been confirmed as a multidimensional concept, influenced by health, functional, psychological and social aspects. Health-specific factors such as chronic disease^{2,12-14} or comorbidity diagnosis⁵ decrease the perception of good health. Furthermore, functional capacity is one of the main determinants of SRH in the elderly.^{12,14}

Some studies have found that depression is associated with poor SRH^{2,15} in the elderly and that it was an independent predictor of the SRH worsening.¹⁶

In regard to sociodemographic variables, a relationship has been established between having a good SRH and being socially integrated and having an efficient network of friends.¹⁷ Relationships between other sociodemographic variables, such as age and gender, and SRH are unclear,^{12,14,18,19} although some studies have found worse perceptions among older people and women.

The main purpose of this study was to identify the factors associated with poor SRH among a representative sample of non-institutionalized elderly people in Spain. We tested the hypothesis that poor SRH is associated with not only health (physical, psychological and functional) factors but also sociodemographic and social determinants.

Materials and methods

We conducted a cross-sectional study including a representative sample of 600 community-dwelling residents of Narón Council (A Coruña, Spain), aged 65 years and older. They were selected from the municipal register using a random number table arranged by 5-year age groups and sex. The level of confidence was 95%, the sampling error was $\pm 4\%$, and the estimate for missing data was 10%.

Participants were individually assessed in a health centre or at home in the case of people with mobility difficulties. Before the data collection, all participants were informed about the study and signed the corresponding informed consent form. The study protocol was approved by the Ethics Committee at the University of A Coruña and conformed to the principles embodied in the Declaration of Helsinki.

Self-rated health

SRH was assessed with a single question: In general, would you say your health is excellent, good, fair, or poor?^{4,14} Next, following the methods used by different

authors, SRH was dichotomized into two outcome measures: good (excellent and good) and poor (fair and poor).^{12,20}

Sociodemographic aspects and social resources

The Older Americans Resources and Services (OARS) standardized questionnaire was used to collect sociodemographic variables (age, gender, educational level and marital status),²¹ and need for caregiver support and regular practice of physical activity information. The need for caregiver support was assessed with the question "In the past six months, has someone helped you with your personal care; for example, helping you to bathe or dress, feeding you, or helping you with toilet care?" According to the World Health Organization global recommendations on physical activity for the health of adults 65-years-old and above,²² habitual physical activity should include at least 2 h and 30 min of moderate-intensity or 1 h and 15 min of vigorous-intensity aerobic physical activity throughout the week, or include an equivalent combination of moderate- and vigorous-intensity activity.

Social support was measured by items from the social resources section of the OARS.²¹ Three validated social resources subscales, derived from the seven-item social resources index, were obtained: the extent of contact with others ("Number of people you know well enough to visit," "Number of times you talk with someone on the telephone per week," "Number of times you visit with someone per week"), the satisfaction with contacts ("Have someone you trust," "Frequency of feelings of loneliness," "Satisfaction with contacts with loved ones") and the availability of help ("Have someone who would help you if you became sick or disabled").

Health aspects

Physical aspects and habits

Participant's anamneses were given by the patient or their relatives according to the medical records. Tobacco and alcohol consumption was registered. The variable smoking status (smoker or non-smoker) was assessed based on the 30 days prevalence of cigarette smoking (i.e. whether or not someone had smoked a cigarette in the past 30 days).²³ Alcohol consumers were those reporting daily alcohol consumption. According to the level of alcohol intake, we defined "moderate drinking" with an upper limit of 80 grams per day, and "heavy drinking," with an upper level of consumption greater than 80 grams per day.²⁴ General comorbidity and number of comorbid diseases were also registered, using the Charlson comorbidity index (CCI).²⁵

Functional aspects

Functional status was assessed by a physician or a trained nurse. The patient's dependence on other people was assessed using the Katz Index²⁶ for the basic activities of daily living (ADL) and the Lawton and Brody Index²⁷ for the instrumental activities of daily living (IADL). Individuals who were unable to perform any one of the activities were considered to be functionally incapacitated in that activity (ADL or IADL dependent).

Psychological aspects

Cognitive status was assessed using the Mini Mental State Examination (MMSE),²⁸ which is widely used in the Spanish population. Cognitive impairment was defined according to Crum's median cut-off scores accounting for age and educational level.²⁹

People were also assessed with the short-form version of the Geriatric Depression Scale (GDS-SF),³⁰ a validated, reliable, 15-item, self-reporting, depressive symptoms checklist designed to detect the presence of current depression in the elderly. The optimal cut-off score as a screening instrument for depression was 5 out of 6.³¹

Both instruments were administered by a clinical psychologist with experience in psychological assessment.

Statistical analysis

Characteristics of the sample were summarized in terms of frequency and percentage for the categorical variables. The Student's *t*-test for continuous variables and the χ^2 test for categorical variables were used to examine differences in parameters between individuals with good and poor self-rated health. A multiple logistic regression analysis was used to determine which independent variables modified SRH; SRH was used as the dependent variable, and the other variables were introduced into the model as covariates. Odds ratios (OR) and 95% confidence intervals (CI) were calculated for each covariate included in the model. Statistical significance was set at a *P*-value of less than 0.05. Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS, SPSS Inc., Chicago, IL, USA) version 16.0.2.³²

Results

For the SRH, 5.9% of the participants reported their health was "excellent," 50.2% reported it was good, while 33.2% and 10.7% reported that it was "fair" and "poor," respectively. After SRH was dichotomized into two levels of "good" versus "poor," 56.1% of the subjects responded that their health was "good," while 43.9% perceived their health as poor.

Table 1 shows the sociodemographic, social and health characteristics of the subjects with poor SRH for the total population and distributed by gender.

Various sociodemographic variables were associated with poor health status: female sex; low educational level; less than 4 years of schooling; and being single or separated. The social factors of the need for caregiver support 24 h a day in the last 6 months and physical inactivity were associated with poor SRH. In addition, congestive heart failure, chronic pulmonary disease, connective tissue disease, ulcer, mild liver disease, diabetes and having two or more chronic diseases showed associations with poor SRH. ADL dependence and IADL dependence, cognitive impairment and depressive symptoms were also associated with poor SRH.

Stratifying by sex, in women poor SRH was significantly associated with the need for caregiver support 24 h a day, physical inactivity, little contact and low or fair satisfaction with contacts. With respect to health variables, congestive heart failure, connective tissue disease, diabetes and having two or more chronic diseases showed significant associations with poor SRH. ADL dependence, IADL dependence, and depressive symptoms were also significantly associated with poor SRH.

In men, being single or separated was significantly associated with poor SRH. Regarding health variables, no alcohol consumption, chronic pulmonary disease, connective tissue disease, ulcer, mild liver disease and having two or more chronic diseases were associated with poor SRH. Finally, ADL dependence, IADL dependence, cognitive impairment and depressive symptoms were associated with poor SRH.

The variables showing significant associations with poor SRH in the univariate analysis were included in a multiple logistic regression analysis to assess the determinants of poor SRH. Age was not significantly associated with poor SRH, but it was included in the model since it has been considered an important predictor of poor SRH by other authors.^{12,33}

Table 2 contains the results of the multiple logistic regression analysis only for those variables showing significant differences between poor and good SRH in the regression model.

Based on the adjusted regression coefficients, depressive symptoms were the single best predictor of risk of poor SRH. Elderly people with depressive symptoms were 5.06 times (95% CI 3.07–8.36) more likely to report poor SRH than those without depressive symptoms. Other factors increasing the risk of reporting poor SRH were the need for caregiver support 24 h a day (OR 3.67, 95% CI 1.70–7.94) and being single (OR 2.24, 95% CI 1.10–4.54). Other significant risk factors of poor SRH were chronic pulmonary disease (OR 2.07, 95% CI 1.15–3.71), connective tissue disease (OR 2.19, 95% CI 1.29–3.72), presence of two or more chronic

Table 1 Distribution of poor self-rated health (SRH) by sociodemographic, social and health variables (*P*-value shows significance level between poor and good SRH)

	Total		<i>P</i> -value	Women		<i>P</i> -value	Men		<i>P</i> -value
	<i>N</i>	%		<i>N</i>	%		<i>N</i>	%	
Sociodemographic variables									
Age			0.585			0.685			0.508
65–74 years	136	42.2		86	51.5		50	32.3	
75–84 years	85	45.0		55	48.7		30	39.5	
>85 years	34	48.6		28	56.0		6	30.0	
Sex			<0.001						
Women	169	52.2							
Men	86	34.3							
Education			0.041			0.622			0.063
0–4 years	223	45.9		150	50.7		73	38.4	
5–9 years	23	3.3		13	56.5		10	21.7	
9–12 years	2	23.5		1	33.3		1	10.0	
College or higher degree	2	50.0		1	100.0		1	33.3	
Marital status			0.035			0.121			0.026
Single	36	61.0		25	62.5		11	57.9	
Married or partnered	152	41.8		86	53.8		66	32.4	
Widowed	63	41.7		56	44.4		7	28.0	
Separated	2	66.7		0	0.0		2	100.0	
Social variables									
Need for caregiver support 24 h a day			<0.001			<0.001			0.056
Yes	49	73.1		37	84.1		12	52.2	
No	201	39.8		128	45.9		73	32.3	
Physical activity			<0.001			<0.001			0.068
Yes	142	35.8		82	39.8		58	31.2	
No	110	61.8		84	71.9		28	43.8	
Extent of contact			0.015			0.017			0.060
Few	107	51.9		67	59.8		40	42.6	
Adequate	38	36.5		20	36.4		18	36.7	
Extensive	110	41.4		82	50.9		28	26.7	
Satisfaction with contacts			<0.001			0.029			0.002
Unsatisfactory	25	53.2		24	57.1		1	20.0	
Fairly satisfactory	140	52.8		89	57.4		51	46.4	
Very satisfactory	89	36.5		55	42.3		34	25.0	
Availability of help			0.689			0.732			0.155
None	9	37.5		7	46.7		2	22.2	
Occasional	4	33.3		3	75.0		1	12.5	
Short term	5	55.6		2	40.0		3	75.0	
Long term	236	44.3		156	51.5		80	34.8	
Health variables									
Tobacco consumption			0.053			0.305			0.397
Yes	7	25.9		0	0.0		7	26.9	
No	248	44.8		169	51.4		79	35.3	
Alcohol consumption			<0.001			0.236			0.009
Yes	20	24.1		5	35.7		15	21.7	
No	235	47.3		164	51.9		71	39.2	
Level of alcohol consumption			0.684			–			0.397
Moderate drinking	17	23.9		5	38.5		12	20.7	
Heavy drinking	3	33.3		0	0.0		3	33.3	

Table 1 *Continued*

	Total		<i>P</i> -value	Women		<i>P</i> -value	Men		<i>P</i> -value
	<i>N</i>	%		<i>N</i>	%		<i>N</i>	%	
Physical variables (according to Charlson' comorbidity index)									
Myocardial infarction	40	51.3	0.099	26	59.1	0.261	14	41.2	0.361
Congestive heart failure	60	60.0	<0.001	43	68.3	0.003	17	45.9	0.105
Peripheral vascular disease	140	47.6	0.040	101	53.2	0.410	39	37.5	0.363
Cerebrovascular disease	25	54.3	0.091	14	56.0	0.618	11	52.4	0.068
Dementia	8	72.7	0.051	7	77.8	0.106	1	50.0	0.638
Chronic pulmonary disease	58	61.7	<0.001	29	63.0	0.084	29	60.4	<0.001
Connective tissue disease	219	50.3	<0.001	153	55.8	<0.001	66	41.0	0.003
Ulcer	84	54.5	0.001	56	58.3	0.097	28	48.3	0.010
Mild liver disease	18	64.3	0.021	10	62.5	0.354	8	66.7	0.015
Diabetes	51	56.0	0.011	34	66.7	0.016	17	42.5	0.231
Metastatic solid tumor	9	64.3	0.120	4	66.7	0.445	5	62.5	0.087
Mean number of chronic diseases			<0.001			<0.001			<0.001
0–2	109	32.4		71	40.8		38	23.5	
≥2	146	59.6		98	62.8		48	53.9	
Functional variables									
Basic activities of daily living			<0.001			0.002			0.015
Dependence	111	57.5		85	61.2		26	48.1	
Independence	144	37.2		84	44.2		60	30.5	
Instrumental activities of daily living			<0.001			<0.001			0.002
Dependence	94	52.6		102	61.1		59	42.4	
Independence	161	34.3		67	41.4		27	24.1	
Psychological variables									
Cognitive impairment			0.026			0.543			0.047
Yes	63	52.9		47	54.0		16	50.0	
No	189	41.5		119	50.2		70	32.1	
Depressive symptoms			<0.001			<0.001			<0.001
Yes	113	76.9		87	77.0		26	76.5	
No	141	32.8		81	37.9		60	27.8	

diseases (OR 1.86, 95% CI 1.18–2.94), dependence in IADL (OR 1.81, 95% CI 1.15–2.85) and physical inactivity (OR 1.81, 95% CI 1.13–2.90). However, age (OR 0.95, 95% CI 0.91–0.98) and alcohol consumption (OR 0.36, 95% CI 0.20–0.67) showed significant inverse associations with poor SRH.

Regarding the data obtained after distributing the population sample by sex, the best predictors of poor SRH in women were the presence of depressive symptoms (OR 4.70, 95% CI 2.94–7.53) and the need for caregiver support 24 h a day (OR 3.53, 95% CI 1.73–7.20). Other significant predictors were connective tissue disease (OR 2.09, 95% CI 1.27–3.44), the presence of two or more chronic diseases (OR 2.00, 95% CI 1.32–3.01), dependence in IADL (OR 1.84, 95% CI 1.20–2.83) and physical inactivity (OR 1.80, 95% CI 1.15–2.82). Age (OR 0.95, 95% CI 0.92–0.98) was inversely related to poor SRH in women.

In men, depressive symptoms (OR 5.19, 95% CI 3.26–8.28) were the best predictors of poor SRH. Con-

nective tissue disease (OR 2.07, 95% CI 1.27–3.36), dependence in IADL (OR 2.00, 95% CI 1.30–3.07), chronic pulmonary disease (OR 1.97, 95% CI 1.13–3.44) and the presence of two or more chronic diseases (OR 1.92, 95% CI 1.25–2.93) were also significant predictors. Age (OR 0.97, 95% CI 0.94–0.99) and alcohol consumption (OR 0.37, 95% CI 0.20–0.67) had significant inverse associations with poor SRH in men.

Finally, Table 3 shows the results of a logistic regression model including the two best single predictors of poor SRH. For the total population, the two main predictors were depressive symptoms and the need of caregiver support 24 h a day in the last 6 months. The combination of having both factors increased the risk of reporting poor SRH to 91.5%. The best predictors for women were also depressive symptoms and the need of caregiver support 24 h a day in the last 6 months, reaching a 94.4% likelihood of poor SRH. In men, the main predictors of poor SHR were depressive symptoms and

Table 2 Logistic regression coefficients and *P*-values for those variables showing significant differences between poor and good self-related health

	Total			Women			Men		
	B	<i>P</i> -value	Odds ratio	B	<i>P</i> -value	Odds ratio	B	<i>P</i> -value	Odds ratio
Age	-0.06	0.002	0.95	-0.05	0.002	0.95	-0.04	0.020	0.97
Marital status									
Single vs. married	0.81	0.026	2.24	NS	NS	NS	NS	NS	NS
Need for caregiver support 24 h a day	1.30	0.001	3.67	1.26	0.001	3.53	NS	NS	NS
Physical inactivity	0.59	0.014	1.81	0.59	0.010	1.80	NS	NS	NS
Alcohol consumption	-1.01	0.001	0.36	NS	NS	NS	-1.00	0.001	0.37
Chronic pulmonary disease	0.73	0.015	2.07	NS	NS	NS	0.68	0.017	1.97
Connective tissue disease	0.79	0.004	2.19	0.74	0.004	2.09	0.73	0.003	2.07
Mean number of chronic diseases (≥2)	0.59	0.011	1.81	0.69	0.001	2.00	0.65	0.003	1.92
Instrumental activities of daily living dependence	0.59	0.010	1.81	0.61	0.006	1.84	0.69	0.001	2.00
Depressive symptoms	1.62	<0.001	5.06	1.55	<0.001	4.70	1.65	<0.001	5.19

B, regression coefficient B; NS, no significant difference.

Table 3 Logistic regression of two major predictor variables and poor self-rated health

	Total			Women			Men		
	B	<i>P</i> -value	Odds ratio	B	<i>P</i> -value	Odds ratio	B	<i>P</i> -value	Odds ratio
Need for caregiver support 24 h a day	1.35	<0.001	3.87	1.84	<0.001	6.30	NS	NS	NS
Connective tissue disease	NS	NS	NS	NS	NS	NS	0.67	0.033	1.96
Depressive symptoms	1.88	<0.001	6.57	1.68	<0.001	5.35	2.01	<0.001	7.47

B, regression coefficient B; NS, no significant difference.

connective tissue disease; and when considered together, the risk of reporting poor SRH was 78.4%.

Discussion

Our results are consistent with those from other studies that found that SRH improves with age.^{12,14} The reason could be that the expectations for health decrease with age so that older persons with the same health problems would perceive that their health is better than those who are younger.

However, as reported by other authors, sex is not significantly associated with poor SRH.¹⁵ This could be because men perceive their health as being better as adults, but after reaching the age of 50, they have steeper linear rates of decline than women. As a result, sex differences in SRH disappear in late adulthood.³³

Being single was also a significant predictor of poor SRH for the entire population. The relationship between marital status and SRH is unclear. Previous

studies have found that not being married was a risk factor for poor SRH, when compared to being married or living as a couple, for both men and women.^{34,35} Though other authors have found that single/divorced/separated participants were at no greater risk for poor health than married/cohabiting participants.³⁶

There exist problems of inequality in health among older adults according to sex, age, education, wealth status and marital status.³⁷ As regards lifestyles, we have found that a lack of physical activity is significantly associated with poor SRH in the total population and in women, but not in men. In the past, other research has found that a low level of physical activity is a predictor of poor SRH in women,¹³ and a decrease in physical activity predicts SRH worsening among the elderly.³⁸ As regards alcohol consumption, we observed that, in the total population, it had an inverse correlation with poor SRH. A previous study found that people who do not drink alcohol perceive their health to be worse than those who drink occasionally or daily.¹⁷ This

relationship could be due to the effects of alcohol consumption combined with the effects from other socio-economic variables. Another explanation could be that people with a better health perception are those who think they are allowed to drink; nevertheless, further research is needed to clarify this connection. Alcohol consumption was inversely related with poor SRH in men but not in women. This is consistent with the results of other authors² and could be explained by the fact that most drinkers were men. Regarding smoke consumption no significant results were found. The association between smoke consumption and SRH is not clear. Some authors have found that smoke consumption is a risk factor for poor SRH,¹⁷ while others did not find a direct affect on SRH,⁹ others still found that female smokers had higher odds for good SRH.²

Several studies have found that the physical dimension of health is a major factor in SRH. The proportion of poor SRH that can be attributed to chronic diseases is higher in the elderly than in middle-aged adults.¹⁴ Chronic diseases such as diabetes, cardiovascular diseases, neurological diseases, rheumatoid arthritis and cancer have been distinguished as important predictors of poor SRH in the elderly.^{2,15} In our study, connective tissue disease was a significant predictor of poor SRH in the total population and when distributed by gender. Chronic pulmonary disease was a significant predictor of poor SRH in the total population and in men, but not in women. This could be explained by the fact that the most important risk factor for chronic pulmonary disease is smoke consumption,³⁹ which is more frequent in men. Furthermore, the presence of two or more chronic diseases was a significant predictor of poor SRH in the total population and in both sexes, which is consistent with those studies showing that the increase in the number of chronic diseases is an independent risk factor for poor SRH.^{12,13}

Dependence in IADL also was a significant predictor of poor SRH in the total population and when distributed by gender, similar to what has been found in other studies showing that functional capacity is one of the main determinants of SRH in the elderly.^{14,40}

Despite the influence of mood on poor SRH, it has not been studied much; some studies have found that depression is one of the major predictors of poor SRH^{2,15,41} and that depressive symptoms predict the worsening of SRH in the elderly as time goes by.¹⁶ These data are similar to our results, where depressive symptoms appear to be the main predictor of poor SRH in the total population and in both sexes.

An individual's degree of dependence has a significant impact on health and quality of life, both for the individual and for his or her caregivers and relatives.⁴² Need for caregiver support 24 h a day in the last 6 months was the next predictor of importance in the total population and in women. However, it was not a significant predic-

tor for poor SRH in men, and this could be due to the fact that in our country care giving has been historically women's work. In fact, data from the Spanish Ministry of Work and Social Affairs reports that 84% of the informal caregivers of dependent older people are women.⁴³

In 1978, the World Health Organization reaffirmed the definition of health as a "state of complete physical, mental and social well-being and not merely the absence of disease or infirmity," from our results, we can state that SRH is also a multidimensional construct,⁴⁰ influenced by different health (physical, psychological and functional) and social aspects. Based on the above, identifying potential risk factors for poor SRH is essential to understanding their validity as predictors of future health outcomes.

The results from this and other similar studies have important implications on a practical level because the knowledge of the main factors determining SRH in people over 65 years of age could result in strategies that improve the quality of life of this growing segment of the population.

Due to the great contribution of depression to poor SRH and the high prevalence of depressive symptoms in the elderly,⁴⁴ it is particularly important to increase the measures aimed to prevent depression and promote mental health.

Our study focused on the risk factors for poor SRH, but we think it is also important to know the factors associated with good SRH, as they could suggest additional ways to intervene for improving the health and welfare of older people. Predictors of good and poor SRH are not mirror images,⁴⁰ and therefore, further research is needed to clarify the determinants of good SRH.

In conclusion, SRH is a multidimensional construct associated with physical, psychological, functional, and social health; depressive symptoms were the main predictor of poor SRH. Other factors, such as the need for caregiver support, being single, connective tissue disease, chronic pulmonary disease, the presence of two or more chronic diseases, the dependence for IADL living and not practicing exercise regularly, must also be considered.

We understand that prevention strategies addressing the significant factors of poor SRH are fundamental to improving it and to ultimately improving the welfare and quality of life of the target population.

Lastly, and because our results show that depressive symptoms are the main predictor of poor SRH, early prevention and intervention programs should give priority to this pathological manifestation.

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Laboratory values in a Spanish population of older adults: A comparison with reference values from younger adults

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4. Valores de laboratorio en una población de personas mayores: comparación con los valores de referencia en adultos jóvenes

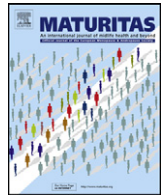
Maturitas. 2012; 71: 306-401.

Resumen

Los parámetros bioquímicos y hematológicos se utilizan a menudo para detectar diferentes trastornos y patologías. El problema es que los valores de referencia de los parámetros de laboratorio se definen normalmente en base a muestras de personas jóvenes y sanas, por lo que podrían no ser adecuados para las personas mayores. El objetivo de este estudio fue examinar los parámetros bioquímicos y hematológicos de una muestra de personas de 65 y más años y compararlos con los valores de referencia para la población de adultos jóvenes. En varios de los parámetros analizados un porcentaje importante de los sujetos mostraron valores fuera del rango de los intervalos de referencia: un elevado porcentaje de sujetos presentaban niveles altos de glucosa (25,0%), urea (26,6%), creatinina (27,2% de los hombres), colesterol total (54,6%) y colesterol LDL (35,8%). El 31,8% de los sujetos que cumplían el diagnóstico de diabetes según la OMS aseguraron que no habían sido diagnosticados previamente. De forma similar, el 74,9% de los sujetos con niveles de colesterol total superiores al valor

de referencia indicado en la “Guía europea sobre prevención de la enfermedad cardiovascular”, no informaron de dislipidemia, al igual que el 75,5% de los que mostraban valores de colesterol LDL superiores al valor de referencia europeo. El porcentaje de sujetos que no sabían que padecían esos trastornos fue significativamente mayor entre aquellos que no habían ido al médico en los últimos 6 meses.

Los resultados de este estudio ponen de manifiesto la necesidad de establecer valores de referencia que tengan en cuenta las características específicas de las personas mayores y ayuden a los clínicos a realizar un diagnóstico temprano y correcto y a decidir cuándo es necesaria la intervención.



Laboratory values in a Spanish population of older adults: A comparison with reference values from younger adults

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ABSTRACT

Objective: To examine the laboratory indices in a population aged 65 years or more and compare them with the reference values used for young adults.

Study design: Distribution patterns of frequently used biochemical and hematological indices were examined in a sample ($N=600$) of non-institutionalized adults aged over 65.

Outcome measures: The obtained values were compared with the reference intervals for young adults.

Results: On some of the indices analyzed, large proportions of the participants had values above the upper limit of the reference interval: glucose, 25.0%; urea, 26.6%; creatinine, 27.2% of males; total cholesterol, 54.6%; and low-density lipoprotein cholesterol, 35.8%. Of the participants who met the World Health Organization's diagnostic criteria for diabetes, 31.8% said they had not been previously diagnosed. Similarly, 74.9% of subjects with total cholesterol values above the reference value indicated in the European guidelines on cardiovascular disease said they had not been diagnosed with dyslipidemia, as did 75.5% of those with low-density lipoprotein cholesterol values above the European reference value. The proportion of participants who were not aware that they might be suffering from those disorders was significantly higher among those who reported not having visited their doctor within the last 6 months.

Conclusion: Further studies should examine whether the use of adapted, more appropriate reference values for elderly populations will help physicians to make early and correct diagnoses and to decide when medical intervention is required.

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1. Introduction

Laboratory tests are used to detect pathology and confirm diagnoses. To interpret the results of these tests, it is necessary to compare them with reference values drawn from a healthy population. Unfortunately, the reference population often largely comprises young adults, and this may make the reference values inappropriate for an elderly patient. For example, significant age-related changes have been observed in hematological profile [1]. Since the use of inappropriate reference values may impede the detection of pathologies in older adults, it would be useful to establish age-specific reference values.

Few papers have included reference values for adults aged over 65 and some even of these studies have included younger subjects

Abbreviations: ALAT, alanine aminotransferase; AST, aspartate aminotransferase; ESR, erythrocyte sedimentation rate; GGT, gamma glutamyl transpeptidase; HCT, hematocrit; Hb, hemoglobin; HDL-cholesterol, high-density lipoprotein cholesterol; LDL-cholesterol, low-density lipoprotein cholesterol; MCH, mean corpuscular hemoglobin; MCHC, mean corpuscular hemoglobin concentration; MCV, mean corpuscular volume; TSH, thyroid-stimulating hormone.

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[1,2]. A further problem is that where age-appropriate reference intervals have indeed been based wholly on samples of healthy older subjects [2–6], the criteria used to determine their 'healthy' status have varied across studies.

Most research done with elderly adults not suffering severe disorders has shown that their biochemical parameters are in fact within the conventional reference values for young adults [3,4]. Nevertheless, some biochemical and hematological indices have shown wider normal (healthy) reference intervals for older adults than for young adults [7].

A likely reason for the lack of reference values specific to an elderly population is that older adults have a relatively high prevalence of chronic pathologies such as diabetes, dyslipidemia, dementia, renal disease and anemia [8–11], as well as high comorbidity [12], which makes it difficult to find an appropriate healthy reference sample. Furthermore, a large proportion of older subjects regularly take medication [13] and many of them are dependent in activities of daily living (ADL) and instrumental activities of daily living (IADL) [14]. Again, the use of a strict health criterion is likely to result in a small and unrepresentative sample of the elderly population [5].

In this study we determined biochemical and hematological indices for a representative sample of adults aged over 65 years and

compared them with the reference values derived from a younger general adult population.

2. Methods

2.1. Subjects

A cross-sectional descriptive study was carried out on a representative sample of 600 people (257 men, 343 women) aged 65 years or more (75.1 ± 7.5 , range 65–101), randomly selected from the Narón municipal register (A Coruña, Spain). The level of confidence was 95%, accuracy $\pm 4\%$, and estimation for data losses 10%.

Participants were individually assessed in a health center. Before data collection, all participants were informed about the study and signed the corresponding informed consent form. The study protocol was approved by the Ethics Committee at the University of A Coruña and conformed to the principles embodied in the Declaration of Helsinki.

2.2. Diabetes and dyslipidemia

Medical histories were given by the patients or their relatives and their medical records were consulted. The Older Americans Resources and Services (OARS) standardized questionnaire [15] was used to elicit information regarding pathologies and any visits to the doctor within the last 6 months.

Locally derived and used reference intervals were used for evaluation of all the indices (see below). In addition, the World Health Organization (WHO) reference values for diabetes were consulted [16], as were values cited in the 'European guidelines on cardiovascular disease' [17] for high total cholesterol and high low-density lipoprotein cholesterol (dyslipidemia).

2.3. Blood collection

Distribution patterns of the biochemical and hematological indices commonly analyzed in clinical chemistry were explored. The specific biochemical indices analyzed were glucose, urea, creatinine, uric acid, aspartate aminotransferase (AST), alanine aminotransferase (ALAT), gamma glutamyl transpeptidase (GGT), total cholesterol, triglycerides, high-density lipoprotein cholesterol (HDL-cholesterol), low-density lipoprotein cholesterol (LDL-cholesterol), phosphorus, calcium and thyroid-stimulating hormone (TSH). The specific hematological indices analyzed were leucocyte count, erythrocyte count, hemoglobin (Hb), hematocrit (HCT), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), platelet count and erythrocyte sedimentation rate (ESR).

Blood samples were collected at a primary health care center. For all participants, samples were drawn in the morning, after an overnight fast. Samples for the biochemical indices were collected into SST-gel tubes and those for the hematological indices into EDTA tubes. For determination of the biochemical and hematological indices, analyses were done using 4 ml Vacutainer tubes (Becton Dickinson); Seditainer tubes were used for the ESR determination. Biochemistry tubes were centrifugated at room temperature at 3000 rpm. The biochemical indices were determined using an Advia analyzer (Bayer Diagnostics) and the hematological indices were determined using a Beckman-Coulter analyzer. All measurements were reported in SI units.

All analyses were performed in the laboratories of the Complejo Hospitalario Universitario (CHUAC) in A Coruña city on the day of sample collection.

2.4. Statistical analysis

A descriptive analysis of the biochemical and hematological indices was carried out; the mean (standard deviation) and median values, maximum and minimum values and the 2.5th and 97.5th percentiles were calculated for each parameter. These values were compared with the CHUAC reference intervals used by the Galician Health Service (SERGAS). Gender-specific intervals were used where appropriate. The number and percentage of sample results that were higher or lower than the CHUAC reference intervals were identified. Results that were more than 5% above the upper end of the reference interval or 5% below the lower value were considered to be significantly different from a population perspective.

For any indices on which more than 25% of participants returned values above those of the reference intervals, further exploration was done. This applied to glucose and cholesterol. The number and percentage of subjects with had glucose levels above the reference interval who reported having been diagnosed with diabetes were noted, as were the number and percentage of subjects with levels of cholesterol above the reference value who reported having been diagnosed with dyslipidemia. Finally, a chi-square test was performed to determine whether awareness of a diagnosis of dyslipidemia and diabetes was related to having visited a doctor within the last 6 months.

Statistical analysis was performed using SPSS software version 16.0.2 [18].

3. Results

Table 1 summarizes the results for each biochemical and hematological index for the whole sample.

Table 2 shows the reference intervals for the biochemical and hematological indices, and the number and frequency of values from the study sample that fell below and above those intervals.

3.1. Biochemical indices (see Tables 1 and 2)

The mean glucose concentration in the study sample was 5.5 ± 1.4 mmol/l, and 25.0% of the subjects had glucose values above the CHUAC reference interval. The mean urea concentration was 7.6 ± 2.5 mmol/l, and 26.6% of participants had values above the reference interval. Among women, the mean creatinine level was 89 ± 18 μ mol/l and among men it was 106 ± 27 μ mol/l; 13.0% of the women and 27.2% of the men had values above the reference interval. The mean concentration of uric acid was 300 ± 72 μ mol/l in women and 377 ± 90 μ mol/l in men; 24.5% of women and 22.9% of men had values above the reference interval.

If we refer to transaminases, the mean AST value was 0.37 ± 0.27 μ kat/l, and 97% of participants were within the reference range. The mean ALAT value was 0.43 ± 0.54 μ kat/l in women and 0.45 ± 0.25 μ kat/l in men; 6.3% of women and 8.1% of men had ALAT levels above the reference interval. The mean GGT value was 22 ± 29 U/l and it was found that 10.1% of all participants had GGT levels above the reference interval.

As regards cholesterol, mean values were 5.8 ± 1.1 mmol/l for total cholesterol, 1.5 ± 0.4 mmol/l for HDL-cholesterol and 3.6 ± 0.9 mmol/l for LDL-cholesterol; 54.6% of the sample had levels of total cholesterol above the reference value, and 35.8% had levels of LDL-cholesterol above the reference value.

The mean concentration of triglycerides was 1.8 ± 1.1 μ mol/l, and 12.9% of participants had levels above the reference interval. The mean concentration of phosphorus was 1.0 ± 0.2 mmol/l, and 8.6% of the subjects had levels below the reference interval. The mean calcium concentration was 2.3 ± 0.1 mmol/l, and 99.0% of participants were within the reference range. The TSH mean value

Table 1
Descriptive statistics of laboratory values.

	<i>n</i>	Mean (SD)	Median	2.5th and 97.5th percentiles	Range
Biochemistry					
Glucose (mmol/l)	580	5.5 (1.4)	5.2	4.0–8.5	2.1–19.3
Urea (mmol/l)	579	7.6 (2.5)	7.1	4.2–14.8	2.9–26.9
Creatinine ($\mu\text{mol/l}$)					
Female	330	89 (18)	89	62–133	62–248
Male	243	106 (27)	98	80–160	71–381
Uric acid ($\mu\text{mol/l}$)					
Female	326	300 (72)	294	174–474	0–714
Male	245	377 (90)	372	222–576	174–810
AST ($\mu\text{kat/l}$)	574	0.37 (0.27)	0.35	0.22–0.66	0.17–4.33
ALAT ($\mu\text{kat/l}$)					
Female	333	0.43 (0.54)	0.36	0.20–0.91	0.13–9.00
Male	247	0.45 (0.25)	0.40	0.22–1.23	0.17–2.35
GGT (U/l)	566	22 (29)	15	6–86	4–422
Total cholesterol (mmol/l)	581	5.8 (1.1)	5.8	3.5–8.0	3.0–11.1
Triglycerides ($\mu\text{mol/l}$)	580	1.8 (1.1)	1.6	0.7–4.0	0.5–19.1
HDL-cholesterol (mmol/l)	570	1.5 (0.4)	1.5	0.91–2.33	0.6–3.1
LDL-cholesterol (mmol/l)	567	3.6 (0.9)	3.5	1.9–5.5	0.9–6.6
Phosphorus (mmol/l)	547	1.0 (0.2)	1.0	0.7–1.3	0.6–1.8
Calcium (mmol/l)	548	2.3 (0.1)	2.3	2.1–2.5	0.2–2.7
TSH (mIU/l)	558	2.34 (7.19)	1.45	0.26–5.84	0.00–148.00
Hematology					
Leucocyte count ($\times 10^9/l$)	549	5.0 (2.5)	6.3	3.9–11.4	2.2–39.9
Erythrocyte count ($\times 10^{12}/l$)					
Female	331	4.6 (0.4)	4.6	3.7–5.4	3.0–5.9
Male	247	4.8 (0.5)	4.9	3.9–5.7	2.0–6.4
Hb (mmol/l)					
Female	331	8.4 (0.6)	8.3	7.2–9.6	6.3–9.9
Male	247	9.2 (0.8)	9.3	7.3–10.8	5.2–12.2
HCT					
Female	331	0.40 (0.03)	0.41	0.32–0.46	0.24–0.48
Male	247	0.44 (0.04)	0.44	0.36–0.51	0.25–0.57
MCV (fl)	578	89 (6)	89	79–100	58–128
MCH (pg/cell)	578	30.1 (2.1)	30.1	25.6–33.8	19.3–42.6
MCHC (g/l)	578	336 (9)	336	316–355	302–388
Platelet ($\times 10^9/l$)	578	236 (69)	230	123–401	44–630
ESR (mm/h)	545	17 (16)	12	2–58	1–120

SD = standard deviation; ALAT = alanine aminotransferase; AST = aspartate aminotransferase; ESR = erythrocyte sedimentation rate; GGT = gamma glutamyl transpeptidase; HCT = hematocrit; Hb = hemoglobin; HDL-cholesterol = high-density lipoprotein cholesterol; LDL-cholesterol = low-density lipoprotein cholesterol; MCH = mean corpuscular hemoglobin; MCHC = mean corpuscular hemoglobin concentration; MCV = mean corpuscular volume; TSH = thyroid-stimulating hormone.

was 2.34 ± 7.19 mIU/l; 3.8% of participants had TSH levels below the reference interval and 2.9% had levels above.

3.2. Hematological indices (see Tables 1 and 2)

The mean sample leucocyte count was $5.0 \pm 2.5 \times 10^9/l$, and 95.1% of participants fell within the reference interval. The mean erythrocyte count was $4.6 \pm 0.4 \times 10^{12}/l$ in women and $4.8 \pm 0.5 \times 10^{12}/l$ in men; 22.0% of women had an erythrocyte above the reference range and 6.2% below, and 3.5% of men had a count above the reference range and 15.5% below. The mean Hb concentration was 8.4 ± 0.6 mmol/l in women and 9.2 ± 0.8 mmol/l in men; 97.2% of women and 96.6% of men had values within the reference interval. The mean HCT value was 0.40 ± 0.03 for women and 0.44 ± 0.04 for men; 4.8% of women and 12.6% of men had HCT values below the reference range, and 3.9% of women and 3.5% of men had values above.

The mean MCV within the whole sample was 89 ± 6 fl and 95.1% of participants had values within the reference interval. The mean MCH value was 30.1 ± 2.1 pg/cell and 5.3% of the sample returned values that were above the reference interval. The mean MCHC was 336 ± 9 g/l, and 99.5% of participants returned values within the reference interval. The mean platelet count was $236 \pm 69 \times 10^9/l$, and 95.8% of participants had counts within the reference interval. The mean ESR was 17 ± 16 mm/h, and 24.8% of participants had counts that were above the reference interval.

3.3. Glucose and diabetes

As reported in Table 2, 145 participants had glucose levels above the CHUAC reference range. Table 3 divides this subsample according to whether or not they had had a diagnosis of diabetes; it also similarly reports the diagnosis of diabetes among the 88 participants (15.2% of the 580 who had a glucose determination) who had glucose values above the WHO reference interval. As can be seen, 51.7% of people with glucose values above the CHUAC reference interval did not report diabetes. The current WHO diagnostic criteria for diabetes stipulate a concentration of fasting plasma glucose above 7.0 mmol/l (126 mg/dl) and 88 participants (15.2%) in our sample fulfilled this criterion; of these, 31.8% had not received a diagnosis of diabetes. Furthermore, the percentage of participants with fasting plasma glucose above 7 mmol/l who did not report a diabetes diagnosis was significantly higher ($p = 0.001$) among those who had not visited their doctor within the previous 6 months (63.2%) than among those who had visited their doctor (23.2%).

3.4. Cholesterol and dyslipidemia

As reported in Table 2, 317 participants had total cholesterol levels above the CHUAC reference value and 203 had LDL-cholesterol above the CHUAC reference value. Table 4 divides these subsamples according to whether or not they had had a diagnosis of dyslipidemia; it also similarly reports the diagnosis of dyslipidemia among the participants who had cholesterol values (total and LDL) above the reference values indicated in the European guidelines [17]. As

Table 2
Number and percentage of values above and below the reference intervals.

	Reference intervals	Frequencies					
		Low		Normal		High	
		n	%	n	%	n	%
Biochemistry							
Glucose (mmol/l)	3.9–5.6	7	1.2	428	73.8	145	25.0
Urea (mmol/l)	3.4–8.3	2	0.3	423	73.1	154	26.6
Creatinine ($\mu\text{mol/l}$)							
Female	43–98	-	-	287	87.0	43	13.0
Male	53–106	-	-	177	72.8	66	27.2
Uric acid ($\mu\text{mol/l}$)							
Female	144–342	2	0.6	244	74.9	80	24.5
Male	204–420	2	0.8	187	76.3	56	22.9
AST ($\mu\text{kat/l}$)	0.08–0.66	-	-	557	97.0	17	3.0
ALAT ($\mu\text{kat/l}$)							
Female	0.10–0.66	-	-	312	93.7	21	6.3
Male	0.10–0.75	-	-	227	91.9	20	8.1
GGT (U/l)	5–36	2	0.4	507	89.5	57	10.1
Total cholesterol (mmol/l)	≤ 5.7	-	-	264	45.4	317	54.6
Triglycerides ($\mu\text{mol/l}$)	0.3–2.3	-	-	505	87.1	75	12.9
HDL-cholesterol (mmol/l)	0.9–2.3	11	1.9	538	94.4	21	3.7
LDL-cholesterol (mmol/l)	≤ 3.9	-	-	364	64.2	203	35.8
Phosphorus (mmol/l)	0.8–1.4	47	8.6	494	90.3	6	1.1
Calcium (mmol/l)	2.0–2.5	3	0.5	542	99.0	3	0.5
TSH (mIU/l)	0.35–5.50	21	3.8	521	93.3	16	2.9
Hematology							
Leucocyte count ($\times 10^9/l$)	4.0–11.5	15	2.6	543	95.1	13	2.3
Erythrocyte count ($\times 10^{12}/l$)							
Female	4.0–4.8	19	6.2	218	71.8	67	22.0
Male	4.5–5.5	35	15.5	183	81.0	8	3.5
Hb (mmol/l)							
Female	7.4–9.9	9	2.8	311	97.2	-	-
Male	8.1–11.2	7	3.0	225	96.6	1	0.4
HCT							
Female	0.41–0.50	15	4.8	283	91.3	12	3.9
Male	0.36–0.45	29	12.6	194	83.9	8	3.5
MCV (fl)	80–99	12	2.1	544	95.1	16	2.8
MCH (pg/cell)	26.0–32.0	8	1.5	493	93.2	28	5.3
MCHC (g/l)	310–360	-	-	569	99.5	3	0.5
Platelet ($\times 10^9/l$)	130–450	18	3.1	554	95.8	6	1.0
ESR (mm/h)	1–20	-	-	410	75.2	135	24.8

Values in which more than 25% of participants showed results above those of the reference intervals are presented in bold.

Table 3
Number and percentage of subjects with glucose levels above the CHUAC and WHO reference intervals reporting a previous diagnosis or no diagnosis of diabetes.

	No diagnosis		Diagnosis	
	n	%	n	%
CHUAC (≥ 5.6 mmol/l)	75	51.7	70	48.3
WHO (≥ 7.0 mmol/l)	28	31.8	60	68.2

CHUAC = Complejo Hospitalario Universitario A Coruña; WHO = World Health Organization.

shown, 72.6% of subjects with total cholesterol and 72.4% of those with LDL-cholesterol above the CHUAC reference value did not report having received a diagnosis of dyslipidemia.

According to the "European guidelines on cardiovascular disease prevention in clinical practice", total plasma cholesterol should be

below 5 mmol/l and LDL-cholesterol should be below 3 mmol/l, but 79.5% of participants in the present study had cholesterol levels above 5 mmol/l. Of these, 74.9% did not report having received a diagnosis of dyslipidemia. As regards LDL-cholesterol, 75.5% of the 567 participants who had a determination had levels above

Table 4
Number and percentage of subjects with cholesterol levels above the CHUAC and European reference intervals reporting a previous diagnosis or no diagnosis of dyslipidemia.

	No diagnosis		Diagnosis	
	n	%	n	%
CHUAC				
Total cholesterol (≤ 5.7 mmol/l)	230	72.6	87	27.4
LDL-cholesterol (≤ 3.9 mmol/l)	147	72.4	56	27.6
European				
Total cholesterol (> 5 mmol/l)	346	74.9	116	25.1
LDL-cholesterol (> 3 mmol/l)	323	75.5	105	24.5

CHUAC = Complejo Hospitalario Universitario A Coruña. European reference interval = "European guidelines on cardiovascular disease prevention on clinical practice" [17].

3 mmol/l. Of these 428 participants, a further 75.5% did not report having received a diagnosis of dyslipidemia.

In those subjects with a level of total cholesterol above 5 mmol/l, the percentage of those who did not report having received a diagnosis of dyslipidemia was significantly higher ($p=0.001$) among those who had not visited their doctor within the last 6 months (88.8%) than among those who did report a visit (71.6%). Also, among those subjects with levels of LDL-cholesterol above 3 mmol/l, the percentage of people who did not report having received a diagnosis of dyslipidemia was significantly higher ($p=0.006$) among those who had not visited their doctor within the last 6 months (87.5% vs. 12.5%).

4. Discussion

On most of the biochemical indices, a significant percentage of the participants had values outside the reference range. Only in the case of the AST and calcium did more than 95% of participants have values within the reference intervals. The hematological indices on which more than 95% of participants were within the reference intervals were leucocyte count, Hb, MCV, MCHC and platelet count. These results are consistent with those reached in a previous study [19]. Thus, few reference intervals for hematological and biochemical indices can be applied directly to community-living elderly subjects without finding an excess of out-of-range values.

In our study, 25% or more of the participants had levels of glucose, urea, creatinine (in males), total cholesterol and LDL-cholesterol above the local reference intervals. Some studies have found that plasma urea levels increase with age, but no relation has been observed between age and plasma creatinine levels [20,21]. The high levels of plasma creatinine found in males could be an indication of kidney failure. However, apart from age and sex, the plasma creatinine is also affected by other variables, including weight and ethnicity. Consequently, plasma creatinine levels should not be used alone to assess the kidney function; the Cockcroft and Gault formula (CGCC) [22] or the MDRD2 equation [23], which take into account these variables, are more accurate methods of assessment.

The high levels of glucose and cholesterol are particularly noteworthy, as they will have important consequences on health and quality of life, especially for older adults. Diabetes among older adults is a risk factor of cardiovascular events [24] and increases the risk of mortality [25], although the precise role of cholesterol in cardiovascular mortality among the elderly is not as clear as it is for more middle-aged populations. Nevertheless, some studies suggest that total cholesterol is an important risk factor for mortality due to coronary disease in the elderly [26,27].

We found that a large proportion (31.8%) of those subjects who fulfilled the WHO's criterion for diabetes (i.e. a glucose level ≥ 7.0 mmol/l) did not report having received a diagnosis of diabetes; similarly, large proportions (around three-quarters) of the participants with high levels of total cholesterol and LDL-cholesterol did not report having received a diagnosis of dyslipidemia (Table 4). This is particularly worrying because it indicates these subjects are not aware of their condition and are not in receipt of appropriate medical treatment.

The percentage of people who did not know they fulfilled the diagnostic criteria for these two disorders was significantly higher among those who had not visited the doctor within the last 6 months. In other studies it has been shown that having two or more visits to the doctor annually is associated with awareness of dyslipidemia and diabetes [8].

A problem we face when it comes to comparing laboratory values reported in the literature is the use of different techniques and reference values. It would be desirable to harmonize the

methods of measurement and the reference values used by different laboratories, as this would mean that patient results would be transferable, which in turn would amplify health benefits and reduce the demand on health systems [28].

Clinical chemistry reference values should be separately specified for elderly persons and these should be re-evaluated regularly to ensure that they remain appropriate [5]. For many of the biochemical and hematological indices we investigated, an excess of values was found outside the reference range set for a younger adult population. It is important to establish optimal reference values for the elderly which take into account the particularities of this group, as this will help the doctors to provide an early and correct diagnosis. In this regard, since laboratory tests are frequently used to detect severe and/or chronic pathologies, the use of adapted, more appropriate reference values for the elderly would help to establish the point at which medical intervention is appropriate for older patients.

Contributors

We declare that Millán-Calenti designed the study, interpreted the data, and critically reviewed the final version of the manuscript. Sánchez undertook the statistical analysis and wrote the first draft of the manuscript. Lorenzo-López and Maseda managed the literature searches. All authors contributed to and have approved the final version of the manuscript.

Competing interest

None.

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V. DISCUSIÓN

1. Factores predictores de la presencia de deterioro cognitivo, síntomas depresivos y de la coexistencia de ambos en las personas mayores

Los resultados de nuestro trabajo apoyan la evidencia de que la coexistencia de deterioro cognitivo y síntomas depresivos es frecuente en las personas mayores^{113,147,230}, encontrando que el 7,9% de los participantes presentaban tanto deterioro cognitivo como síntomas depresivos.

Con respecto a las características sociodemográficas, el género femenino se relacionó con la presencia de deterioro cognitivo, síntomas depresivos y con la coexistencia de ambos. Este resultado es consistente con los resultados encontrados por otros autores que muestran una mayor presencia de sintomatología depresiva^{88,94,231} y deterioro cognitivo^{43,232} en las mujeres que en los hombres. A diferencia de otros autores^{44,46,233}, no se encontró una relación clara entre el deterioro cognitivo y la edad o el bajo nivel educativo. Esto probablemente se debe a que al definir la presencia de deterioro cognitivo se consideró la influencia de ambas variables, por lo que las discrepancias en la edad y en el nivel educativo fueron minimizadas²²¹.

1.1. Influencia de los factores relacionados con la salud física y funcional

En el primero de los estudios incluidos en este trabajo se observó que la dependencia en las AIVD era un predictor significativo en los tres grupos de personas mayores, mientras que la dependencia en las ABVD aumentaba el riesgo de sintomatología depresiva y de coexistencia de deterioro cognitivo y síntomas depresivos. En otros estudios también se ha observado que el desempeño en las actividades de la vida diaria es un predictor de la sintomatología depresiva^{79,85,234} y de la coexistencia de deterioro cognitivo y síntomas depresivos en las personas mayores¹⁵⁸.

Aunque se sabe que ciertas comorbilidades predicen la aparición de deterioro cognitivo y sintomatología depresiva por separado, no se ha analizado qué enfermedades crónicas se asocian con la coexistencia de ambos. Para solventar este problema, en este trabajo hemos estudiado la asociación diferencial de las diferentes enfermedades crónicas con el deterioro cognitivo, los síntomas depresivos y con la coexistencia de ambos. En primer lugar, nuestros resultados muestran que el cáncer fue más prevalente en los participantes con deterioro cognitivo. Una explicación sería que la quimioterapia en los pacientes con cáncer podría ocasionar un deterioro en diferentes dominios cognitivos, que se mantendría a lo largo del tiempo^{235,236}. Otros autores han observado que el deterioro cognitivo es común en pacientes con enfermedad cardíaca, enfermedad cerebrovascular y diabetes^{34,35,237-239}, pero en nuestro estudio no hemos encontrado esta asociación.

En segundo lugar, se encontró una asociación entre las enfermedades del tejido conectivo, el déficit visual, las úlceras y la enfermedad vascular periférica con la presencia de síntomas depresivos. Estos resultados concuerdan con los encontrados por otros autores, que observaron que los pacientes con artritis, déficit visual y enfermedades gastrointestinales a menudo presentan sintomatología depresiva^{84,240-244}. En nuestro estudio, la influencia de la enfermedad vascular periférica sobre la sintomatología depresiva fue mayor que la encontrada en otros trabajos, que más bien subrayaron la importancia de las enfermedades del corazón y de la diabetes^{83,242,245,246}.

En tercer lugar, la discapacidad visual, la enfermedad cerebrovascular, la insuficiencia cardíaca congestiva, la discapacidad auditiva y la diabetes predijeron la coexistencia de deterioro cognitivo y síntomas depresivos. Estas enfermedades crónicas se han asociado en otros trabajos con la depresión por sí sola y/o con el deterioro cognitivo por sí solo²⁴⁷⁻²⁵⁰. La discapacidad visual en las personas mayores es también

un factor de riesgo para la dependencia en las actividades de la vida diaria^{251,252}, por lo que las personas mayores con déficits visuales constituirían un grupo de riesgo al que se ha de prestar una especial atención.

Las personas con síntomas depresivos y las que presentaban tanto deterioro cognitivo como síntomas depresivos consumían un mayor número de fármacos. Este resultado concuerda con el encontrado en otros estudios, donde se observa que la polifarmacia es un predictor de la presencia de sintomatología depresiva en las personas mayores^{173,253}.

A la hora de interpretar estos resultados hay que considerar que este es un estudio transversal y por tanto no es apropiado para elaborar inferencias causales. Si bien es posible que los cambios físicos y psicológicos relacionados con las enfermedades crónicas contribuyan a la presencia de deterioro cognitivo y/o síntomas depresivos, el deterioro cognitivo y la sintomatología depresiva también podrían empeorar las condiciones médicas crónicas, debido a un deficiente autocuidado.

Es necesario, por tanto, realizar estudios longitudinales que aclaren la relación entre los síntomas depresivos y el deterioro cognitivo en las personas mayores, y el papel que juegan las patologías médicas en la compleja relación existente entre ambos. Si las condiciones médicas crónicas se interpretan como un factor de riesgo para el desarrollo de deterioro cognitivo y/o síntomas depresivos, podrían ayudar a la comprensión de la fisiopatología del deterioro cognitivo y de la depresión. De hecho, se ha propuesto que algunas de estas enfermedades, como por ejemplo la enfermedad cerebrovascular, podrían ayudar a explicar la compleja asociación existente entre el deterioro cognitivo y los síntomas depresivos^{114,254}.

A la inversa, si el deterioro cognitivo y la sintomatología depresiva se consideran predictores de las enfermedades crónicas, su presencia podría alertar a los clínicos de la presencia de esas patologías.

1.2. Influencia del apoyo social

Los resultados del segundo estudio confirman la importancia del apoyo social en la salud psicológica de las personas mayores. Con respecto a la primera dimensión del apoyo social, el grado de contacto con otros, se observa que los participantes con un escaso contacto con otras personas tenían una mayor probabilidad de presentar deterioro cognitivo. Por el contrario, no se observó una asociación significativa entre el grado de contacto con otros y la presencia de síntomas depresivos o la coocurrencia de deterioro cognitivo y síntomas depresivos.

En la literatura, existen discrepancias acerca de la relación entre los aspectos cuantitativos del apoyo social y el funcionamiento cognitivo. En diferentes estudios longitudinales se ha observado también una asociación significativa entre los aspectos cuantitativos del apoyo social, como el tamaño de la red social, el grado de interacción social o la participación en actividades sociales, y el riesgo de deterioro cognitivo^{54,255-258} y demencia^{259,260}. Sin embargo, otros autores no han encontrado una relación entre los aspectos cuantitativos del apoyo social y la presencia de deterioro cognitivo^{56,261}. Estas discrepancias podrían deberse a las diferencias en la definición del apoyo social y en el tipo de instrumentos de medición utilizados en los diferentes estudios.

Para explicar la relación entre el grado de contacto e interacción social y el funcionamiento cognitivo se han propuesto diferentes teorías. La hipótesis de la reserva cognitiva sugiere que las experiencias vitales tales como la participación en actividades sociales o de ocio, pueden dar lugar a mejores conexiones neuronales, proporcionando

una mayor reserva cognitiva²⁶². Las relaciones positivas con amigos y familiares pueden producir una continua estimulación mental y mejores estrategias cognitivas o incrementar el crecimiento neural y la densidad sináptica, retrasando así el deterioro cognitivo²⁵⁶. Además, tener una amplia red social puede facilitar el acceso a los servicios de salud y favorecer las conductas saludables, reduciendo o previniendo indirectamente las patologías cerebrales y otras condiciones que afecten a la cognición²⁶⁰. Igualmente, las personas que tienen un contacto más frecuente con otras personas tienen mayores oportunidades de establecer relaciones sociales, y esto puede protegerlos contra el declive cognitivo a través de los efectos positivos sobre el estado emocional, como la mejora de la autoestima y el estado de ánimo^{263,264}.

Otra posible hipótesis sería la existencia de una relación inversa entre la red social y el funcionamiento cognitivo. Según esta teoría, las personas con una mejor estructura neural, más resistentes al deterioro cognitivo, tendrían mejores condiciones para adquirir y mantener las habilidades y los contactos sociales²⁵⁶.

Con respecto a la segunda dimensión del apoyo social, la satisfacción con los contactos, hemos encontrado que tener una baja o regular satisfacción con los contactos era un predictor significativo de la presencia de síntomas depresivos y de la coocurrencia de deterioro cognitivo y síntomas depresivos. Este resultado es consistente con un estudio anterior¹⁵⁸ en el que se observó que la falta de satisfacción con el apoyo social aumentaba el riesgo de síntomas depresivos y de la coocurrencia de síntomas depresivos y deterioro cognitivo en las personas mayores. Otros trabajos han confirmado también la influencia de los aspectos subjetivos del apoyo social, como la satisfacción con el apoyo social^{106,107,111} o los sentimientos de soledad¹⁰⁸, en la sintomatología depresiva de las personas mayores.

Los resultados de este estudio sugieren que los aspectos cualitativos del apoyo social son predictores más importantes de la sintomatología depresiva que los aspectos cuantitativos. Esto podría explicarse por la variabilidad individual en la necesidad de contacto social. El grado de contacto social podría no ser un predictor adecuado de la sintomatología depresiva ya que el número o la frecuencia de las relaciones sociales adecuadas para cada persona pueden verse influenciados por variables de personalidad y/o variables contextuales. Sin embargo, en algunos estudios se ha encontrado que los aspectos cuantitativos sí afectan a la sintomatología depresiva de las personas mayores^{49,50,111}. De hecho, Litwin¹⁰⁴ encontró que la estructura de la red social era incluso más importante que la calidad percibida de las relaciones como indicador de la sintomatología depresiva.

La última dimensión del apoyo social evaluada, la disponibilidad de ayuda, no ha resultado ser un factor de riesgo significativo en ninguno de los tres grupos de sujetos. En un trabajo anterior¹¹⁰, se observó un mayor riesgo de depresión entre aquellas personas que consideraban que en caso de estar enfermo no tendrían a nadie que cuidase de ellos. La falta de resultados significativos en nuestro trabajo podría deberse a que la gran mayoría de las personas de nuestra muestra consideraban que en el caso de encontrarse enfermo o de tener discapacidad podrían contar con alguien que les proporcionase ayuda a largo plazo, siendo muy escaso el número de sujetos que consideraban que no dispondrían de tal ayuda.

Los resultados de este estudio confirman la importancia de diferenciar las distintas dimensiones del apoyo social¹¹¹ ya que tienen importantes implicaciones a nivel práctico. En primer lugar, es recomendable que al realizar la valoración psicosocial de las personas mayores se incluyan tanto los aspectos cuantitativos como los aspectos cualitativos del apoyo social. Además, de cara a la prevención de la salud

de las personas mayores han de llevarse a cabo políticas socio-sanitarias que promuevan el apoyo social en este grupo de edad, considerando la importancia tanto de la extensión y frecuencia del contacto social como de la satisfacción subjetiva con el apoyo social. Es necesario desarrollar estrategias encaminadas a incrementar la participación de las personas mayores en la sociedad y asegurar que las personas que se encuentran en situación de riesgo puedan ser derivadas a los recursos comunitarios destinados a mitigar el aislamiento social y los sentimientos de soledad^{265,266}.

2. Factores predictores de la mala salud percibida en las personas mayores

En el tercer estudio incluido en este trabajo se analizó la influencia de diferentes predictores sobre la mala salud percibida en las personas mayores. En concordancia con otros trabajos que observaron que la salud percibida mejora con la edad^{182,183,267,268}, hemos observado una relación inversa entre la edad y la mala salud percibida. Esta mejoría en la salud percibida podría deberse a que al aumentar la edad disminuyen las expectativas respecto a la propia salud, por lo que las personas de mayor edad con un mismo grado de problemas de salud se percibirían como más sanas que las de menor edad²⁶⁹.

Sin embargo, el género no se asoció significativamente con la mala salud percibida, en línea con lo informado por otros autores que no encuentran diferencias importantes entre hombres y mujeres^{186,189,191}. Esto podría deberse a que los hombres tienen una mejor percepción de su estado de salud durante la adultez, pero después de alcanzar la edad de 50 años, el deterioro de la salud percibida es mayor. Como resultado, las diferencias de género en la salud percibida desaparecen en la adultez tardía²⁷⁰.

Estar soltero fue también un predictor significativo de la mala salud percibida en el conjunto de la población. La relación entre el estado civil y la salud percibida no está clara. En estudios previos se ha encontrado que estar soltero es un factor de riesgo de mala salud percibida, en comparación con estar casado o vivir en pareja, tanto en el caso de los hombres como en el de las mujeres^{271,272}. Sin embargo, otros autores han encontrado que las personas solteras/divorciadas/separadas no tenían un mayor riesgo de mala salud percibida que las personas casadas o que vivían en pareja¹⁸⁸.

Con respecto a los hábitos de vida, hemos encontrado que la falta de actividad física se relaciona significativamente con una mala salud percibida en el total de la muestra y en las mujeres, pero no en los hombres. En esta línea, otros investigadores han encontrado que un bajo nivel de actividad física es un predictor de la salud percibida en las mujeres¹⁸³ y que un descenso en la actividad física predice el empeoramiento de la salud percibida en las personas mayores²⁶⁹.

En cuanto al consumo de alcohol, en el total de la muestra se ha observado una correlación inversa con la salud percibida. En un estudio previo se encontró que las personas que no beben alcohol perciben su salud peor que aquellos que beben ocasionalmente o diariamente¹⁸⁹. Esta relación podría ser debida a los efectos del consumo de alcohol combinado con los efectos de otras variables socioeconómicas. Otra explicación podría ser que las personas que tienen una mejor percepción de su salud son las que consideran que pueden permitirse consumir alcohol; en todo caso, son necesarios más estudios para aclarar esta relación. El consumo de alcohol se relacionó inversamente con la salud en los hombres pero no en las mujeres. Esto es consistente con los resultados de otros autores¹⁶⁰ y podría explicarse por el hecho de que la mayoría de los consumidores de alcohol son hombres.

En diferentes estudios se ha encontrado que la dimensión física de la salud es un factor central en la salud percibida, observándose que la proporción de mala salud percibida que puede atribuirse a las enfermedades crónicas es mayor en las personas mayores que en los adultos de mediana edad¹⁸⁴. Diversas enfermedades crónicas como la diabetes, las enfermedades cardiovasculares, las enfermedades neurológicas, la artritis reumatoide o el cáncer han sido señaladas como predictores importantes de la salud percibida de las personas mayores^{160,186,268}.

En nuestro estudio, la enfermedad del tejido conectivo fue un predictor significativo de mala salud percibida en el total de la muestra, y en hombres y en mujeres por separado. La enfermedad pulmonar crónica fue un predictor significativo de mala salud percibida en el total de la muestra y en los hombres, pero no en las mujeres. Esto podría explicarse por el hecho de que el factor de riesgo más importante de la enfermedad pulmonar crónica es el consumo de tabaco²⁷³, que es más frecuente en los hombres. Asimismo, la presencia de dos o más enfermedades crónicas fue un predictor significativo de la mala salud percibida, en el total de la población y en los hombres y mujeres por separado, coincidiendo con los estudios que encuentran que la presencia de comorbilidad y el número de enfermedades crónicas son predictores de la salud percibida^{168,182,183}. Incluso en los nonagenarios, un incremento en el número de enfermedades crónicas se ha relacionado con el empeoramiento de la salud percibida²⁷⁴.

La dependencia para las AIVD, también fue un predictor significativo de la mala salud percibida en el total de la muestra y en hombres y mujeres por separado, en concordancia con otros trabajos que muestran que la capacidad funcional es uno de los principales determinantes de la salud percibida en las personas mayores^{168,184,275}.

En nuestro estudio, los síntomas depresivos fueron el principal predictor de la mala salud percibida en el total de la muestra y en hombres y mujeres por separado. La

influencia de los aspectos emocionales sobre la salud percibida ha sido hasta ahora poco estudiada, pero algunos estudios han encontrado que la depresión es uno de los principales predictores de la mala salud percibida en las personas mayores^{160,186,192,276}. Asimismo, se ha observado que las personas que están preocupadas por problemas emocionales tienen un mayor riesgo de mala salud percibida en comparación con aquellos que no tienen esta preocupación¹⁸⁸.

La necesidad de un cuidador las 24 horas en los últimos 6 meses fue el siguiente predictor en orden de importancia en el total de la población y en las mujeres. Sin embargo, no fue un predictor significativo de mala salud percibida en el caso de los hombres y esto puede ser debido al hecho de que en nuestro país el cuidado ha sido tradicionalmente realizado por las mujeres^{277,278}.

Nuestros resultados apoyan la idea de que la salud percibida es un constructo multidimensional influenciado por aspectos relacionados con la salud física, psicológica y funcional y por aspectos sociales y sociodemográficos^{268,275}. Los resultados de este y otros trabajos similares tienen importantes implicaciones a nivel práctico, ya que del conocimiento de los principales predictores de la salud percibida en las personas mayores se pueden extraer estrategias que mejoren la calidad de vida en este sector de la población, cada día más numeroso. Dada la gran contribución de la sintomatología depresiva a la percepción de mala salud percibida y la alta prevalencia de síntomas depresivos en las personas mayores^{58,67}, resulta especialmente importante aumentar las medidas encaminadas a la prevención de la depresión y la promoción de la salud mental. Las personas mayores pueden no reconocer los síntomas depresivos o pueden asumir que se deben a padecimientos físicos, lo que puede llevar a buscar tratamiento en atención primaria en lugar de un profesional de la salud mental. Es importante, por tanto, que los profesionales de atención primaria examinen la presencia de síntomas

depresivos en las personas mayores y las deriven, en su caso, a los profesionales de la salud mental para una posterior evaluación y tratamiento^{276,279}.

3. Valores de laboratorio en las personas mayores: comparación con los valores de referencia en adultos jóvenes

En el cuarto estudio de este trabajo hemos encontrado que, en una gran parte de los índices bioquímicos y hematológicos analizados, un porcentaje significativo de los participantes mostraban valores fuera de los intervalos de referencia. De los índices bioquímicos, solo en el caso del aspartato aminotransferasa (AST) y el calcio, más del 95% de los participantes mostraban valores dentro del rango de los intervalos de referencia. Los índices hematológicos en los que más del 95% de los participantes estaban dentro de los valores de referencia fueron el recuento de leucocitos, la hemoglobina (Hb), el volumen corpuscular medio (VCM), la concentración de hemoglobina corpuscular media (CHMC) y el recuento de plaquetas. Estos resultados son consistentes con los encontrados en estudios previos^{206,280} indicando que son pocos los intervalos de referencia de los índices bioquímicos y hematológicos que pueden aplicarse directamente a las personas mayores que viven en la comunidad sin encontrar un exceso de los valores fuera de rango.

En nuestro estudio, más del 25% de los participantes mostraron niveles de urea, creatinina (en hombres), glucosa, colesterol total y colesterol LDL por encima de los intervalos de referencia existentes. Algunos autores han encontrado que los niveles de urea en plasma aumentan con la edad, pero no se ha observado una relación entre la edad y los niveles de creatinina^{281,282}. Los altos niveles de creatinina encontrados en los hombres podrían ser un indicador de una posible insuficiencia renal. Sin embargo, además de por la edad y el sexo, la creatinina plasmática también está afectada por otras

variables como el peso y la raza. Como consecuencia, la determinación de la creatinina plasmática no debería utilizarse aisladamente para evaluar la función renal. La fórmula de Cockroff-Gault (CGCC)²⁸³ o la ecuación MDRD²⁸⁴, que tienen en cuenta estas variables, son métodos más precisos para evaluar la función renal.

Los valores elevados de glucosa y colesterol son especialmente relevantes, debido a las importantes consecuencias de la diabetes y el colesterol en la salud y en la calidad de vida. La diabetes en las personas mayores es un factor de riesgo de eventos cardiovasculares²⁸⁵ e incrementa el riesgo de mortalidad, particularmente debido a razones cardiovasculares²⁸⁶. El papel del colesterol como predictor de la mortalidad en las personas mayores no es tan claro como en la población de mediana edad²⁸⁷. Sin embargo, en algunos estudios se ha observado que el colesterol total es un factor de riesgo importante de mortalidad por enfermedad coronaria en las personas mayores^{288.289}.

Un porcentaje importante de los sujetos que cumplían los criterios diagnósticos de diabetes de acuerdo con la OMS²⁹⁰ no informaban de haber recibido un diagnóstico de diabetes. De manera similar, un porcentaje elevado de personas con niveles altos de colesterol total y colesterol LDL según la “Guía europea sobre prevención de la enfermedad cardiovascular”,²⁹¹ no informaban de haber recibido un diagnóstico de dislipidemia. Este hecho es especialmente preocupante, ya que indica que estas personas no son conscientes de la posibilidad de padecer estas patologías y, en consecuencia, no siguen el tratamiento médico adecuado.

El porcentaje de personas que no sabían que cumplían los criterios diagnósticos para esas dos enfermedades fue significativamente mayor entre aquellos que no habían visitado al doctor en los últimos 6 meses. En este sentido, se ha encontrado que visitar

al médico dos o más veces al año está asociado a tener consciencia de padecer dislipidemia y diabetes y a recibir un tratamiento médico para estas enfermedades²⁰⁸.

Un problema con el que nos encontramos al comparar los valores de laboratorio en los diferentes estudios publicados en la literatura es el uso de diferentes técnicas y valores de referencia. Sería necesario, por tanto, armonizar los métodos de medición y los valores de referencia utilizados en los diferentes laboratorios para lograr una mayor transferencia de los resultados, ampliar los beneficios sobre la salud y atender la creciente demanda del sistema sanitario²⁹².

Es importante que los valores de referencia de los parámetros bioquímicos sean apropiados para las personas mayores y que sean reevaluados regularmente para asegurarse de que continúan siendo apropiados²⁰⁵. De esta forma podremos saber si las desviaciones de los intervalos de referencia encontradas en los parámetros bioquímicos y hematológicos son debidas a la edad o bien se relacionan con la presencia de alguna patología. El uso de intervalos de referencia adecuados para las personas mayores ayudará a los clínicos a realizar un diagnóstico temprano y correcto y contribuirá a explorar la necesidad de cambiar el punto en el que tiene lugar la intervención médica.

VI. CONCLUSIONES

In this thesis we have seen that certain comorbidities are specific predictors of the presence of cognitive impairment, depressive symptoms and the coexistence of both in the elderly. In our results the coexistence of cognitive impairment and depressive symptoms is explained by dependence in basic and instrumental activities of daily living, cerebrovascular disease, congestive heart failure and diabetes. The findings suggest that elderly people with cognitive impairment, depressive symptoms and coexistence of both should be carefully screened for associated chronic medical conditions, and vice versa. Furthermore, longitudinal studies are necessary to clarify the relationship between depressive symptoms and cognitive impairment in older people, and the role of the medical conditions in the complex relationship between both of them.

In our study of the mental health of elderly adults we have observed how it is affected by various dimensions of social support. A limited amount of contact with others is linked to the presence of cognitive impairment, whereas the lack of satisfaction with social support is related to depressive symptoms both alone and when they co-occurred with cognitive impairment. Therefore, an extensive social network and a subjective satisfaction with the social support appear to be critical aspects for ensuring adequate mental health in the elderly. These findings suggest that mental health assessment in older adults should include both quantitative and qualitative aspects of social support.

With respect to poor self-rated health, the predictors are also diverse, including physical, psychological, functional, and social aspects. Depressive symptoms were the main predictor of poor self-rated health in the total population and in both sexes, while other factors, such as the need for caregiver support, being single, having connective tissue disease, chronic pulmonary disease, the presence of two or more chronic diseases,

the dependence in instrumental activities of daily living and not practicing exercise regularly, were also significant. We remark that the recognition and intervention on these significant predictors of poor self-rated health may contribute to its improvement and to ultimately improving the welfare and quality of life of this growing segment of the population.

Regarding the laboratory parameters, in many of the biochemical and hematological data explored we found an excess of values outside the range of the normal reference values set for the young adult population. Therefore it is important to establish optimal reference values for the elderly which take into account the specific particularities of this group of population, and help the doctors to provide an early and correct diagnosis. At this regard, since laboratory tests are frequently used to detect or confirm the diagnosis of severe and/or chronic pathologies, the use of adapted and appropriate reference values for the elderly would contribute to explore the necessity of changing the point at which medical intervention would occur for older patients.

VII. BIBLIOGRAFÍA

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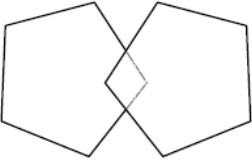
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VIII. ANEXOS

Anexo I. Escala de Recursos sociales del OARS-MFAQ^{218, 219}

ESCALA DE RECURSOS SOCIALES DEL OARS-MFAQ		
1 ¿Estado civil?		
1.-Soltero/a 2.-Casado/a o En pareja 3.-Viúdo/a 4.-Divorciado/a o separado/a NS/NC		
2 ¿Quién vive con usted en su casa? (MARCAR 'SÍ' O 'NO' PARA CADA UNA DE LAS SIGUIENTES)		
Nadie	Sí	No
Marido/Mujer	1	0
Hijos/as	1	0
Nietos/as	1	0
Padres o suegros	1	0
Hermanos/as o cuñados/as	1	0
Otros familiares (ESPECIFICAR)	1	0
Amigos/as	1	0
Asistente (a sueldo o prestándole una habitación sin ser familiar)	1	0
Otros/as (ESPECIFICAR)	1	0
3 ¿A cuánta gente conoce lo suficiente como para ir de visita a su casa?		
3.-Cinco o más 2.-Tres o cuatro 1.-Uno o dos 0.-Nadie NS/NC		
4 Aproximadamente, ¿cuántas veces habló Vd. por teléfono la semana pasada con alguien-amigos, familiares u otros-tanto si lo llamaron como si llamó Vd.) (SI NO TIENE TELÉFONO TAMBIÉN SE APLICA LA PREGUNTA).		
3.-Una vez al día o más 2.-De dos a seis veces a la semana 1.-Una vez a la semana 0.-Ninguna NS/NC		
5 ¿Cuántas veces durante la semana pasada pasó Vd. algún tiempo con alguien con quien no vive; es decir, Vd. fue a verlos o ellos vinieron a visitarle, o salieron a hacer algo juntos?		
3.-Una vez al día o más 2.-De dos a seis veces a la semana 1.-Una vez a la semana 0.-Ninguna NS/NC		
6 ¿Tiene alguien en quien pueda confiar?		
1.-Sí 2.-No NS/NC		
7 ¿Se encuentra solo/a muy a menudo, a veces o casi nunca?		
0.-Muy a menudo 1.-Algunas veces 2.-Casi nunca NS/NC		
8 ¿Ve a sus familiares o amigos tan a menudo como quiere, o no?		
1.-Tan a menudo como quiere 0.-No tan a menudo como quisiera NS/NC		
9 ¿Hay alguien que podría ayudarlo/a si estuviese enfermo/a o incapacitado/a, por ejemplo, su mujer o su marido, un miembro de su familia o un amigo? (SE REFIERE A AYUDA SOCIAL, NO ECONÓMICA)		
1.-Sí 0.-No hay nadie dispuesto y capaz de ayudar NS/NC		
En caso afirmativo, realizar las siguientes preguntas:		
a. ¿Hay alguien que podría cuidarlo/a tanto tiempo como necesitara, solo por poco tiempo, o alguien que le ayudaría de vez en cuando (por ejemplo: llevándolo/a al médico o preparándole la comida ocasionalmente...?)		
3.-Alguien que lo/a cuidaría indefinidamente (tanto tiempo como lo necesitara)		
2.-Alguien que le cuidaría por poco tiempo (de unas pocas semanas a seis meses)		
1.-Alguien que le ayudaría de vez en cuando (llevándolo/a al médico o preparándole una comida)		
NS/NC		
b. ¿Quién es/son esas personas?		
Relación	Sí	No
Cónyuge	1	0
Hermano/hermana	1	0
Hijos/as	1	0
Nietos/as	1	0
Otro pariente	1	0
Amigo/a	1	0
Otro	1	0

Anexo II. Mini Examen del Estado Mental (MMSE)^{220, 221}

MINI EXAMEN DEL ESTADO MENTAL (MMSE)	PUNTOS
1. Dígame el día: A) Día (nº) B) Día (semana)..... C) Mes..... D) Estación..... E) Año.....	.....(5)
2. Dónde estamos: A) Ciudad..... B) Provincia..... C) País..... D) Calle..... E) Nº .....	.....(5)
3. Repita estas 3 palabras: PESETA, CABALLO, MANZANA (Repetir hasta que las aprenda, máximo 5 veces, anotar el nº de intentos utilizados) Nº de intentos .....	.....(3)
4. Pida al sujeto que cuente desde 100 en orden decreciente de 7 en 7 Si no es capaz, que deletree hacia atrás la palabra MUNDO	.....(5)
5. ¿Recuerda las tres palabras que le dije antes? PESETA, CABALLO, MANZANA	.....(3)
6. Mostrar un LÁPIZ ¿Qué es esto? Repetirlo con el reloj	.....(2)
7. Repita esta frase: “NI SÍ, NI NO, NI PEROS”	.....(1)
8. COJA ESTE PAPEL CON LA MANO DERECHA, DÓBLELO POR LA MITAD Y PÓNGALO EN EL SUELO	.....(3)
9. Lea esto y haga lo que diga: CIERRE LOS OJOS	.....(1)
10. Escriba una frase: cuénteme algo por escrito	.....(1)
11. Copie este dibujo	.....(1)
Puntuación TOTAL (Máximo 30)	
.....	
Corrección por edad y escolaridad	
.....	
Puntuación AJUSTADA	
.....	
Marcar estado: Alerta 1 Obnubilado 2 Estupor 3 Coma 4	

Anexo III. Escala de Depresión Geriátrica de Yesavage (GDS)²²²

ESCALA DE DEPRESIÓN GERIÁTRICA DE YESAVAGE (GDS)		
1. ¿En general, está satisfecho/a con su vida?	SÍ	NO
2. ¿Ha abandonado muchas de sus tareas habituales y aficiones?	SÍ	NO
3. ¿Siente que su vida está vacía?	SÍ	NO
4. ¿Se siente con frecuencia aburrido/a?	SÍ	NO
5. ¿Se encuentra de buen humor la mayor parte del tiempo?	SÍ	NO
6. ¿Teme que algo malo pueda ocurrirle?	SÍ	NO
7. ¿Se siente feliz la mayor parte del tiempo?	SÍ	NO
8. ¿Con frecuencia se siente desamparado/a, desprotegido/a?	SÍ	NO
9. ¿Prefiere usted quedarse en casa, más que salir y hacer cosas nuevas?	SÍ	NO
10. ¿Cree que tiene más problemas de memoria que la mayoría de la gente?	SÍ	NO
11. ¿En estos momentos, piensa que es estupendo estar vivo?	SÍ	NO
12. ¿Actualmente se siente un/a inútil?	SÍ	NO
13. ¿Se siente lleno/a de energía?	SÍ	NO
14. ¿Se siente sin esperanza en este momento?	SÍ	NO
15. ¿Piensa que la mayoría de la gente está en mejor situación que usted?	SÍ	NO
Puntuación TOTAL (Máximo 15)		.....

Anexo IV. Índice de Katz²²⁴

ÍNDICE DE KATZ
LAVARSE (Con esponja, ducha o en bañera)
Independiente: Requiere asistencia únicamente para ciertas partes del cuerpo (la espalda o una extremidad inválida) o se lava sin ninguna ayuda.
Dependiente: Recibe asistencia para lavarse más de una parte específica del cuerpo; recibe ayuda para entrar o salir de la bañera; o no puede lavarse.
VESTIRSE
Independiente: Coge la ropa y trajes de los armarios y cajones; se viste con la ropa y los trajes, y se pone los complementos o adornos externos; se abrocha. (Se excluye la acción de atarse los zapatos).
Dependiente: No puede vestirse solo o lo hace en parte.
IR AL SERVICIO
Independiente: Va al servicio; se sienta y se levanta del retrete; se limpia los órganos excretores (puede utilizar por sí mismo la cuña o el orinal por la noche y puede usar, o no, ayuda mecánica).
Dependiente: Usa habitualmente la cuña o el orinal o recibe asistencia para ir al servicio y utilizarlo.
DESPLAZARSE
Independiente: Entra y sale de la cama sin ayuda, y se sienta y se levanta de una silla sin ayuda (puede, o no, utilizar ayudas mecánicas).
Dependiente: Necesita asistencia para entrar o salir de la cama o para levantarse y sentarse en una silla; o no realiza ninguno de estos actos.
CONTINENCIA
Independiente: Controla totalmente la micción y la defecación.
Dependiente: Tiene incontinencia total o parcial de la micción o la defecación; necesita un control parcial o total a base de enemas, sondas o el uso reglado de orinales o pañales.
COMER
Independiente: Lleva la comida del plato o su equivalente a la boca. (Se excluye de la evaluación cortarle la carne y prepararle la comida; por ejemplo ponerle mantequilla al pan.)
Dependiente: Necesita asistencia para comer; no come o recibe alimentación parenteral.

Anexo V. Índice de Lawton y Brody²²⁵

ÍNDICE DE LAWTON Y BRODY	
EN LA ACTUALIDAD NECESITA AYUDA PARA...	
USAR EL TELÉFONO	
0 No utiliza el teléfono en absoluto	
1 Contesta al teléfono, pero no sabe marcar	
1 Sabe marcar números conocidos	
1 Utiliza el teléfono por propia iniciativa, busca y marca los números	
HACER LAS COMPRAS	
0 Completamente incapaz de hacer la compra	
0 Ha de ir acompañado para cualquier compra	
0 Solo sabe hacer pequeñas compras	
1 Realiza todas las compras necesarias de manera independiente	
PREPARARSE LA COMIDA	
0 Necesita que le preparen y le sirvan la comida	
0 Prepara, calienta y sirve la comida, pero no sigue una dieta adecuada	
0 Prepara la comida solo si se le proporcionan los ingredientes	
1 Planea, prepara y sirve comidas adecuadas por sí solo/a	
LAS TAREAS DOMÉSTICAS	
0 No participa ni hace ninguna tarea	
1 Necesita ayuda, pero realiza todas las tareas domésticas	
1 Realiza tareas ligeras, pero no es suficiente como para mantener un nivel de limpieza adecuado	
1 Realiza tareas ligeras (fregar platos, camas...) y con eso le es suficiente	
1 Realiza todas las tareas de la casa por sí sola, solo ayuda ocasional para tareas muy pesadas	
LAVAR LA ROPA	
0 La ropa la tiene que lavar otra persona	
1 Lava solo las prendas pequeñas (calcetines, medias, etc.)	
1 Lava solo/a toda la ropa	
MODO DE TRANSPORTE	
0 No viaja en absoluto	
0 Viajes limitados en taxi o coche con ayuda de otros (adaptado)	
1 Solo viaja en transporte público si va acompañado	
1 Puede ir solo en taxi, no utiliza otro transporte público	
1 Viaja por sí solo/a, utiliza transporte público/conduce coche	
ORGANIZAR SU MEDICACIÓN (RESPONSABILIDAD RESPECTO A LA MEDICACIÓN)	
0 No es capaz de tomar la medicación solo/a. Necesita que alguien le ayude a tomarse la medicación (le prepare la dosis y se lo recuerde y le ayude a digerirla/inyectársela)	
0 Toma la medicación solo si se la preparan previamente	
1 Es capaz de tomar la medicación a la hora y en la dosis correcta, solo/a	
CAPAZ DE MANEJARSE CON EL DINERO	
0 Incapaz de utilizar el dinero	
1 Se encarga de compras diarias, pero necesita ayuda para ir al banco	
1 Sí, se responsabiliza de asuntos económicos solo/a	
Puntuación TOTAL (Máxima Dependencia: 0 puntos)	

Anexo VI. Índice de Comorbilidad de Charlson (CCI)²²⁶

ÍNDICE DE COMORBILIDAD DE CHARLSON (CCI)		
PUNTUACIÓN	SÍ=1	NO=0
Infarto de miocardio		
Insuficiencia cardíaca congénita		
Enfermedad vascular periférica		
Enfermedad cerebrovascular		
Demencia		
Enfermedad pulmonar crónica		
Patología del tejido conectivo		
Enfermedad ulcerosa		
Patología hepática ligera		
Diabetes		
Hemiplejía		
PUNTUACIÓN	SÍ=2	NO=0
Patología renal moderada o grave		
Diabetes con lesión orgánica		
Neoplasias		
Leucemias		
Linfomas malignos		
PUNTUACIÓN	SÍ=3	NO=0
Patología hepática moderada o grave		
PUNTUACIÓN	SÍ=6	NO=0
Metástasis sólida		
SIDA		
PUNTUACIÓN TOTAL		
ANOTACIONES		

Anexo VII. Número de visitas al médico en los últimos seis meses y presencia de discapacidad visual y auditiva. OARS-MFAQ^{218,219}

OARS-MFAQ	
<p>3. ¿Cuántas veces fue al médico o a la enfermera en los últimos 6 meses, (desde _____ ESPECIFICAR MES), sin estar ingresado/a en un hospital?</p> <p>Número de veces _____</p>	
<p>11. Con respecto a la vista:</p> <p>11.a) ¿Cómo está de la vista (con gafas o lentillas puestas)?:</p> <p>1. Excelente 2. Bien 3. Regular 4. Mal 5. Está ciego/a 6. NS/NC</p> <p>11.b) ¿Está pendiente de operarse de la vista o de hacer tratamiento con láser?</p> <p>1. Sí 2. No 3. NS/NC</p>	
<p>12. Con respecto al oído:</p> <p>12.a) ¿Cómo está del oído: Excelente, bien, regular, mal o está sordo/a? (SIN AYUDA PARA OIR)</p> <p>1. Excelente 2. Bien 3. Regular 4. Mal 5. Está sordo/a 6. NS/NC</p> <p>Si la respuesta fue regular o mal o estar sordo (3-4-5), continuar con las siguientes preguntas:</p> <p>13) ¿Le hicieron pruebas para saber por qué no oye bien?</p> <p>1. Sí 2. No 3. NS/NC</p> <p>14) ¿Está pendiente de operarse del oído?</p> <p>1. Sí 2. No 3. NS/NC</p>	